Metropolitan Association of College and University Biologists

53rd MACUB FALL 2020 Conference

OCTOBER 31
9AM-2PM

To register and for the zoom link email:

knolan@sfc.edu

Register by sending an e-mail with subject "MACUB Registration" and, in body of e-mail, your full name, title, faculty or student, and school name to Kathleen Nolan.

Member presentations
10-11am

Poster sessions
11AM-12:30pm

Award Ceremony
2pm

Keynote Speakers

Viruses, Vaccines, and Vectors
9-9:45am

Vincent Racaniello, Ph.D.
Professor of Microbiology and Immunology at Columbia University's College of Physicians and Surgeons and founder of "TWIV---This Week in Virology" podcast

Health Inequities in the Age of COVID-19 1-1:45pm

Shamard Charles, M.D., MPH.
Assistant Professor of Health Promotion, St. Francis College, NBC News Health Journalist

WELCOME TO THE 53rd Annual Metropolitan Association of College and University Biologists MACUB Conference!

We hope to have a great day for you!

9-9:05 AM. Introduction of speaker by Kathleen A. Nolan, Ph.D.,
President of MACUB

9:05-9:50 AM. Keynote Speaker: ***Vincent Racaniello, Ph.D***., Columbia University

"Viruses, Vaccines, and Vectors"

10-11AM---------Member presentations---Stay in the Main Room

11 AM-11:10 AM---Main Room--Introduction to Poster Session by
Allen Burdowski, Ph.D., Dean of Science and Health, St. Francis College

11:10 AM-12:30 PM---Poster presentations and Student Mingling in
4 separate Zoom Rooms: (see below)

12:30-1 PM—Lunch break on your own

1-1:45 PM—Second Keynote Speaker: Shamard Charles, M.D., St. Francis College

"Health Inequiities in the Age of COVID-19"

2 PM--------Awards Ceremony

The Board of MACUB thanks you for attending

Kathleen Nolan
Gary Sarinsky
Fernando Nieto
Edward Catapane
Margaret Carroll
Paul Russo
KumKum Prabhakar
Tin-chun Chu
Nidhi Gadura
John Grew
Jill Callahan
Martin Hicks
Jonathan Ouellet
Pam Monaco
Davida Smyth
Joshlyn Mensah
Donald Stearns
Christopher Corbo
Anthony DePass

Vincent R. Racaniello (born in Paterson, New Jersey) is a Higgins Professor in the Department of Microbiology and Immunology at Columbia University's College of Physicians and Surgeons. He is a co-author of a textbook on virology, *Principles of Virology*.

Racaniello has received the Irma T. Hirschl, Searle Scholars, Eli Lilly, Julius Younger and NIH Merit awards. He has also been a Harvey Society Lecturer at Rockefeller University, the Hilleman Lecturer at the University of Chicago, and University Lecturer at Columbia University. He was also the keynote speaker for the MACUB meeting at NJCU in 2017 and at the American Society for Virology, at its 2018 meeting. Racaniello has served on the editorial boards of scientific journals, including the Journal of Virology,[5] and is a community editor for the open access journal PLOS Pathogens.

Dr. Racaniello graduated from Cornell University (BA, biological sciences) and completed his PhD in the laboratory of Peter Palese in 1980, studying genetic reassortment of influenza virus. As a post-doctoral fellow in David Baltimore's laboratory at MIT (1979–1982), Dr. Racaniello used recombinant DNA technology to clone and sequence the genome of the small RNA animal virus poliovirus. Using these tools he generated the first infectious clone of an animal RNA virus. Construction of the infectious clone revolutionized modern virology. Dr. Racaniello hosts a weekly podcast on virology, “This Week in Virology”. “This podcast is about viruses---the kind that make you sick!”.

Shamard Charles, MD, MPH, joined St. Francis College in September 2020 as an Assistant Professor of Public Health & Health Promotion. He has covered medical and health stories for NBC News since 2017.

Dr. Shamard Charles may be a new face among the St. Francis College faculty, but he is likely familiar to many who turn on the evening news at the end of each day.

Since 2017, Dr. Charles has been a journalist with NBC News, covering the health and medical beat first as a web writer and then as an on-air contributor. His more than 100 stories there include an in-depth examination of the lack of Black men in medicine, the disproportionate rate of junk food ads targeting Black and Hispanic kids and the rise in underage vaping.

Dr. Charles' media credentials extend beyond the peacock network. As a Global Press Fellow for the United Nations General Assembly for the past three years, he spent time in Nigeria, covering the efforts to eliminate polio there. He also writes regularly for The Grio (see his most recent column here) and hosts a weekly health podcast, Heart Over Hype.

A graduate of The Warren Alpert Medical School of Brown University, Dr. Charles earned a Master of Public Health degree from Harvard T.H. Chan School of Public Health. His undergraduate degree in psychology comes from NYU. The Bushwick, Brooklyn native attended Chaminade High School in Mineola, New York.

Dr. Charles joined St. Francis College in September 2020 as an Assistant Professor of Public Health & Health Promotion.

History of St. Francis College

St. Francis College has a proud heritage of preparing students to take their places as leaders in their fields and to become contributing members of society. With a mission founded on the ideals and teachings of St. Francis of Assisi, the College plays a vital role in the community and in the lives of its students and alumni.

A group of Franciscan Brothers first came to Brooklyn in 1858, opening St. Francis Academy several months later in 1859. It was the first private school in the diocese of Brooklyn. The school, which was opened to educate the boys of the diocese, started in a building on Baltic Street and grew quickly. In 1884, just 25 years later, the trustees of St. Francis received permission from the state legislature to "establish a literary college" under its current name and giving it the power to confer diplomas, honors, and degrees. In June 1885, St. Francis College conferred its first Bachelor of Arts degree, and seven years later the first Bachelor of Science degree was granted.

See a visual timeline of our first 150 years

The College continued its meteoric growth and built a new facility on Butler Street in 1926. In 1957, the Regents of the University of the State of New York granted an absolute Charter to the Trustees of the College. In 1960, St. Francis embarked on an expansion program. It moved to Remsen Street, where it had purchased two office buildings from Brooklyn Union Gas Company, allowing it to double its enrollment. Shortly thereafter, it became a co-educational institution and additional property was purchased on both Remsen and Joralemon Streets. The College expanded its facilities with the construction of a science building, athletics complex and housing to accommodate the Franciscan Brothers and provide more space for faculty.

The addition of the Anthony J. Genovesi Center in 2003 offers students additional opportunities to participate and watch athletic events while the $40 million Frank and Mary Macchiarola Academic Center which opened in 2006, houses a library, numerous smart classrooms, HDTV studio, and black box theater.

Today the School has more than 2,600 students and 20,000 alumni. They come primarily from Brooklyn and the other boroughs of New York City, although their diverse backgrounds represent some 80 countries.

Biology

A Bridge to Careers in Science, Medicine and Health Care

With two floors of brand-new state-of-the-art labs and top-flight professors, our Biology education prepares students to move ahead in a variety of fields, from Science to Medicine to Health Care.

Our program prepares you for medical and graduate school as well as professions in a number of fields. St. Francis graduates currently work as physicians and physician assistants; veterinarians; dentists; podiatrists; scientists; teachers; x-ray technicians; sonographers and nurses.

The program prepares students for medical and graduate school and professions in a number of fields.

They have gone on to graduate and Ph.D. work at prestigious universities including:

- Columbia University
- Albert Einstein College of Medicine
- Michigan State University College of Veterinary Medicine
- Boston University Goldman School of Dental Medicine

Graduates also pursue careers at biotechnology firms; hospitals; pharmaceutical companies, as well as universities. A degree in Biology prepares you to enter a healthy job market and a career filled with exciting opportunities.

The Biology department at St. Francis College offers majors in:

- Biology (as preparation for medical and graduate school)
- Biomedical Science
- and Radiologic Sciences.

Radiological Sciences is offered jointly with the Center for Allied Health.

We encourage Biology students to consider the diverse opportunities available through field placements, internships, or semesters abroad. Many of our students conduct summer research projects at esteemed institutions including:

- NYU Medical School
- American Museum of Natural History
- Brooklyn Botanic Garden
- New York City Department of Health
- and at companies such as Pfizer, Colgate-Palmolive, and numerous hospitals.

Faculty Member Presentations --- 10-11 AM Stay in the Main Zoom Room!

1.10-10:12 AM
Using Research in Curriculum as a High Impact Practice - Pedagogical Tool for Undergraduates at a Community College.
Nidhi Gadura, Queensborough Community College, CUNY, Bayside, NY.

2. 10:12-10:24 AM
Cloning and Expression of Human MEF2b C-terminal STOP Codon Truncated Mutant Proteins From Human Lymphoma Patients in Cell Lines.
Sanjay Koul, Queensborough Community College (CUNY), Bayside, NY.

3. 10:24-10:36 AM
A Summer Biotechnology Boot Camp to Increase STEM Interest among Minority HS Students.
Peter A. Novick and Nidhi Gadura, Queensborough Community College, Bayside, NY.

4. 10:36-10:48 AM
Upregulation of Host Nutrient Transport by the Intracellular Protozoan Parasite *Toxoplasma gondii*.
Amos Orlofsky[1] and Yubao Wang[2], [1]Queensborough Community College, Bayside, NY Albert Einstein College of Medicine, Bronx, NY, and [2]Dana-Farber Cancer Institute, Boston, MA.

5. 10:48-11 AM
An Intervention to Address Biology Student Misconceptions.
Regina Sullivan[1], Michal Fux[2] and John D. Coley[2]
[1]Queensborough Community College[1] and [2]Northeastern University, Boston, MA.

Faculty Abstracts MACUB Conference 2020

Using Research in Curriculum as a High Impact Practice - Pedagogical Tool for Undergraduates at a Community College.
Nidhi Gadura, Queensborough Community College, CUNY, Bayside, NY.
https://docs.google.com/presentation/d/10EC8_6Op-YQiWJtQco7q7c8SXl_Z4iLdOW1579SCxDg/edit?usp=sharing

At Queensborough Community College, CUNY most of our students are first generation, non-traditional students with majority of them working full-time or part-time to meet family obligations and sustain themselves outside the classroom. While a few of our students can follow a traditional one-on-one research model, majority cannot. Therefore, as an educator, I had to bring research to them in their classroom as part of the CUR (Council on Undergraduate Research) initiative. I reluctantly implemented it in the honors course in the Biotechnology degree program. Undergraduate research has been institutionalized and used cross curriculum in multiple disciplines on our campus. Authentic research experiences are embedded in the curriculum. I partnered with Cold Spring Harbor DNA Barcoding Lab that runs an Urban Barcoding project. This was originally done to help local high school students with authentic research experience. Later, I requested the Urban Barcoding Project team to allow my Queensborough students to participate in the project. I incorporated a DNA Barcoding experiment in my Genetics course as an honors component. Biotechnology students served as mentors to Genetics students while being closely supervised. This served as a capstone experience for sophomores at a community college. A detailed curriculum and assessment strategy was developed for the DNA Barcoding to be incorporated in the curriculum. The Queensborough honors committee then approved this

Cloning and Expression of Human MEF2b C-terminal STOP Codon Truncated Mutant Proteins From Human Lymphoma Patients in Cell Lines.
Sanjay Koul, Queensborough Community College (CUNY), Bayside, NY.

Myocyte enhancer factor 2b (Mef2B) belongs to MAD-S family of genes. Its protein product is a transcriptional activator which binds to MEF2 elements (5'-YTA[AT](4)TAR-3') found in numerous muscle specific or growth factor related genes. This gene has N terminal MADS/MEF2 DNA binding and dimerization domain and C-terminal domain. Human Mef2B gene has been observed to be mutated in 15% of lymphoma patients. These mutations fall into different domains of the protein and accordingly they effect the different class and functionality of the protein. The purpose of this study is to characterize and understand the role of C-terminal domain STOP codon truncation mutations in lymphoma. Literature survey and the database search revealed 8 different STOP codon Truncation mutations in C-terminal domain of Human Mef2b gene at codons 104, 108, 127, 147, 171, 201, 219 and 297 in the ORF. These different truncated mutant versions of the gene were cloned using site directed mutagenesis in expression vectors and introduced into two different lymphoma cell lines SUDHL10 and LY7. So far, the preliminary results on the study of MEF2B truncated mutant forms of the protein in SUDHL10 cells indicate that Mef2b truncated form of 104 108 127 147 are unstable while as 171, 201, 219 are highly stable and 297 is strangely differentially unstable than the later three. The above transformed cell lines will be used in growth curve, IP and microarray studies and the resultant data will be compared with the untransformed cell lines. Comparison of C-terminal mutant data with N terminal mutants will reveal the differences between two varied groups of mutations in different domains. On more basic science side we can do protein biochemistry studies on these mutant proteins to understand the underlying biology. Acknowledgements: Katia Basso, Chuanjiang Yu, & Riccardo Dalla-Favera, Institute of Cancer Genetics, HICCC, Columbia University, 1130 St. Nicholas Avenue, New York, NY 10032.

A Summer Biotechnology Boot Camp to Increase STEM Interest among Minority HS Students.
Peter A. Novick and Nidhi Gadura, Queensborough Community College, Bayside, NY.

There is a disparity in the number of adults from minority populations employed in STEM careers. In order to increase the interest of at risk high school students in the STEM field in Queens, NY, an immersive Summer Biotechnology Boot Camp was developed. Fifty five predominantly minority and female students completed the summer Boot Camp over a three year period. Students learned about molecular biology, conducted modern biotechnology techniques, detected genetically modified foods sourced from their own homes, created a presentation and were rewarded with Barnes and Noble gift cards. They then took a survey to reveal their thoughts on the program and their likelihood of pursuing a degree in the STEM field before and after the workshop. Participants became more confident in their science and math skills and indicated they were more likely to complete a STEM degree. Overall, high school students enjoyed the hands-on self-discovery aspect of the project. Many indicated that they became more interested in STEM, which could help increase the number of college entry level minority students interested in STEM fields.

Upregulation of Host Nutrient Transport by the Intracellular Protozoan Parasite *Toxoplasma gondii*.
Amos Orlofsky[1] and Yubao Wang[2], [1]Queensborough Community College, Bayside, NY Albert Einstein College of Medicine, Bronx, NY, and [2]Dana-Farber Cancer Institute, Boston, MA.

The ubiquitous protozoan parasite *Toxoplasma gondii* has evolved a broad capability for manipulation of host cell function, rendering this parasite a model system for the study of host-pathogen interaction. A key aspect of this interaction is the control of parasite nutrient acquisition. While much progress has been made with respect to intracellular nutrient flow across the host-parasite interface, there has been less attention to parasite influence on host nutrient acquisition from the external milieu. We present initial findings indicating that *T. gondii* markedly upregulates host cell capability for both glucose and amino acid transport. Glucose transport upregulation in infected myoblasts and differentiated myotubes far exceeded levels obtainable by insulin treatment and showed cell specificity, suggesting a mechanism adapted for skeletal muscle, a favored encystation site. Enhanced glucose transport was associated with increased surface localization of the glucose transporter GLUT1. Coupled with evidence of strongly increased expression of a leucine transporter system in infected cells, our findings indicate the existence of novel mechanisms by which *T. gondii* can activate host anabolic pathways in potential support of parasite growth.

An Intervention to Address Biology Student Misconceptions.
Regina Sullivan[1], Michal Fux[2] and John D. Coley[2]
[1]Queensborough Community College[1] and [2]Northeastern University, Boston, MA.

General Biology courses are challenging for U.S. college students. In most colleges, including Queensborough Community College (QCC), General Biology I is deemed a gatekeeper or gateway course. The grade a student receives in this course has a significant impact on their retention in STEM and STEM related fields. Successful completion of General Biology can either open or close the “gate” to higher level required courses and achievement of students’ career goals. Implementation of interventions that increase our students’ success is imperative. We studied the effect of interventions that are designed to dissect the relationship between misconceptions in biology and intuitive thinking. Misconceptions are inconsistent with scientific knowledge and can be linked to misunderstandings and perhaps failure of the course. There is a body of evidence to suggest that common misconceptions are tightly linked to types of intuitive thinking specifically teleological, essentialist and anthropic thinking. Several interventions were implemented to identify these types of intuitive thinking in QCC General Biology I&II classes. Further, interventions were also implemented that served to inform students about these types of intuitive thinking. The students were shown examples of how such thinking can reinforce science misconceptions. From beginning to end of a semester, use of Teleological and Anthropomorphic thinking decreased as scientific knowledge increased, especially for General Biology I. Essentialist thinking followed mixed patterns. These findings demonstrate the complex relationships between intuitive thinking and formal education, constructive at times, detrimental at others. The methodology, examples of student’s responses and results will be discussed.

Four Zoom rooms to open at 11 AM

Please note each Zoom meeting room has a passcode. Each Zoom meeting room will have a waiting room.

Poster Room 1. Arachnida
Judges:
Jill Callahan. jcallahan@saintpeters.edu
Denver Baptiste, dbaptiste@saintpeters.edu
Allen Burdowski aburdowski@sfc.edu
John Grew JGrew@NJCU.edu

Topic: SFC Poster Room 1. Arachnida
Time: Oct 31, 2020 11:00 AM Eastern Time (US and Canada)
Join Zoom Meeting
https://sfc.zoom.us/j/93165894309?pwd=U1hVMW81Q1dsRHA3bkNPYW9IZmg5dz09
Meeting ID: 931 6589 4309
Passcode: 525939

Poster Room 2. Ghost Shrimp
Judges:
Victoria Ruiz. vruiz@sfc.edu
Anne C. Seligman acseligman@msas.net
Robin Andersen andersen@fordham.edu
Rosann Gonzalez. Rosann.Gonzalez@ncc.edu

Topic: Poster Room 2. Ghost Shrimp
Time: Oct 31, 2020 11:00 AM Eastern Time (US and Canada)
Join Zoom Meeting
https://sfc.zoom.us/j/92895319731?pwd=Rkt6V0I5OExhZE1GMGZqV3l5VSt1Zz09
Meeting ID: 928 9531 9731
Passcode: 197201

Poster Room 3. Chiroptera
Judges
Davida Smyth. smythd@newschool.edu
KumKum Prabhakar. Kumkum.prabhakar@ncc.edu
Chun Zhou. czhou1@mercy.edu
Alison Dell adell@sfc.edu

Topic: Poster Room 3. Chiroptera
Time: Oct 31, 2020 11:00 AM Eastern Time (US and Canada)
Join Zoom Meeting
https://sfc.zoom.us/j/94343502868?pwd=aHdMMllBK25nMkMrbnpPd052VCthdz09
Meeting ID: 943 4350 2868
Passcode: 722272

Poster Room 4. Pumpkins and Guords
Judges

Ursula Golebiewska	**UGolebiewska@qcc.cuny.edu**
Tin-chun Chu	**tinchun.chu@shu.edu**
Sarbani Ghoshal	**SGhoshal@qcc.cuny.edu**
Mangala Tawde	**MTawde@qcc.cuny.edu**

Topic: Poster Room 4. Pumpkins and Guords
Time: Oct 31, 2020 11:00 AM Eastern Time (US and Canada)
Join Zoom Meeting
https://sfc.zoom.us/j/91803503064?pwd=RUpYNDk4OStiWWhGVGx1QXZQRDZOUT09
Meeting ID: 918 0350 3064
Passcode: 291890

Student Abstracts MAUB 2020 Conference

Poster Room 1. Arachnida
Judges for 1-1 through 1-5. Jill Callahan and Denver Baptiste
Judges for 1-6 through 1-11. John Grew and Allen Burdowski

1.1. QCC
Comparative Molecular Analysis of Vertebrate SCN1. Tamara Areizaga and Peter Novick, Queensborough Community College, Bayside NY.
https://drive.google.com/file/d/1WpFWk9gTkCrVHB4JH-u1f30A6Z1nf9lc/view?usp=sharing

1-2. QCC
Synthesis of PolyRhodanine Via Oxidation/Reduction Reaction., Saleh Jaser[1], Arnab Sharma[1], Gurjeet Longia[2] and Bhanu P. Chauhan[2], Moni Chauhan[1] [1]Queensborough Community College of CUNY, Bayside, NY and [2]William Patterson University, Wayne, NJ.
https://drive.google.com/file/d/1DT31Tjy_ZFXMNlNibL6SlPfo1WZdZNYP/view?usp=sharing

1-3. KBCC/MEC
Histamine Receptors Genomic Study in the Bivalve *Crassostrea virginica.* Kera Mansfield[1], Martha Larios[1], Mohamed Eid[2], Craig Hinkley[1], Margaret A. Carroll and Edward J. Catapane[2], [1]Kingsborough Community College and [2]Medgar Evers College, Brooklyn, NY.
https://drive.google.com/file/d/1__xoX_9k0pioWoBv-loMf8Kl4uybYc64/view?usp=sharing

1-4. KBCC
Manganese Toxicity, Mitochondrial Dysfunction, and the Potential Therapeutic Value of p-Aminosalicylic Acid, Taurine and Carnosine. Tenise Bowman, Rosanne Wallach, Margaret A. Carroll and Edward J. Catapane, Medgar Evers College, Brooklyn, NY.
https://drive.google.com/file/d/1dfGXlM_bMT4ejG2JG1Mdk9ZJjDeC2HnY/view?usp=sharing

1-5. KBCC/MEC
Genomic Study of GABA Receptors in the Bivalve *Crassostrea virginica.* Tia M. Foster[1], Mohamed Eid[1], Craig Hinkley[2], Margaret A. Carroll[1] and Edward J. Catapane[1], [1]Medgar Evers College and [2]Kingsborough Community College, Brooklyn, NY.
https://drive.google.com/file/d/1LMuSlsspYLI2VeWplOtM111HYhVeVOwd/view?usp=sharing

1-6. MERCY
Do Native Gardens Mitigate Pollinator Decline. Bianca Jimenez[1], Marisa Rodriquez[2], Margaret Eiden[2] and J. Holly Bukofser[2], [1]Mercy College, Dobbs Ferry, NY and [2]Westchester Community College, Valhalla, NY.
https://drive.google.com/file/d/1SkWNcw1YFDC2LH0HLlkTQiXj1H8y8FfK/view?usp=sharing

1-7. MERCY
***Gleditsia triacanthos*, Is It The Best Tree For The City? Catherine Jordan[1], Margaret Eiden[2] and J. Holly Bukofser[2], [1]Mercy College, Dobbs Ferry, NY and [2]Westchester Community College, Valhalla, NY.**
https://docs.google.com/presentation/d/1bjT5D8Lv16U801S0fg766dLzyqm1D9_-LTWFcH4WxXo/edit?usp=sharing
.

1-8. MERCY
Role of Volume Regulated Anion Channels in Regulating Glutathione Levels. Keti Kodra, Helan Palouse and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1asx9hLhKE5bl07wXRp6P0tc-zpQLO8NX/view?usp=sharing
.

1-9. SHU
Antispore Effects of Natural Formulations Containing Lipophilic Green Tea Polyphenol. Sabrina Lopez and Tinchun Chu. Seton Hall University, South Orange, NJ.
https://drive.google.com/file/d/1nue8FH0q5SAqVIamxnwzcFfd0fGcYD1d/view?usp=sharing

1-10. SHU
The Physiological Effects of Nickel Chloride on the Cyanobacterium Anabaena spp. BMCC, Seton Hall University, South Orange, NJ.
https://drive.google.com/file/d/1O2SaJAnbLaDEWxT-L-4xBwQQMWWrEHxF/view?usp=sharing

1-11 BMCC
Adsorption of heavy metals using chemically-modified tea leaves
Reem Ulay, Abel Navarro, [1]New York City Technical College, Brooklyn, NY and [2]Borough of Manhattan Community College, New York, NY.
https://drive.google.com/file/d/1pmBu1m14K6QhVoL3ggMtqjoWBcqqadmP/view?usp=sharing

Poster Room 2. Ghost Shrimp

Judges for 2-1 through 2-6. Victoria Ruiz and Anne C. Seligman
Judges for 2-7 through 2-12. Robin Anderson and Rosann Gonzalez

2-1. QCC
Analysis of the Genome of Settecandela. Michelle Franco and Urszula Golebiewska, Queensborough Community College, Bayside, NY.
https://drive.google.com/file/d/1VEAZVNXPFHBY6wnOWz9VhEY26ctkGUAb/view?usp=sharing

2-2. QCC
Use of a Plant-based System to Study Genetic Toxicology Natasha McGowan[1], Lisbel Pena[1], Ritesh Banerjee[2], Anita Mukherjee[2] and Sarbani Ghoshal[1], [1]Queensborough Community College-CUNY, Bayside, NY and [2]University of Calcutta, India.
https://drive.google.com/file/d/1f5xGpWG5T-nG9cKN3WzXgU7L9FiYXx08/view?usp=sharing

2-3. QCC
Exploring Antibiotic Resistance in Soil Bacteria: A Literature Review
Austin Hwang and Dr. Mangala Tawde, QCC
https://drive.google.com/file/d/1f9X6QeNxa89YYesaPSJKzcaASwjNTHr7/view?usp=sharing

2-4. MERCY
Bioinformatic Analysis of the LRRC8 Promoter Region. Rosabely Mota, Besani Espinal, Osner Solon and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1wuMK3DZPC24M9cTa3C7XRPneCEQ1hX4J/view?usp=sharing

2-5. MERCY
Identification of Telomere-Regulating Genes in *Drosophila melanogaster.* Nikole Ortiz, Tye C. Taylor, Chad E. Jacob, Abdelhamid Dalia, Francisco Ricci, Isabella J. Hanesworth, Patrick Elysee, Sydney Sieh-Takata, Billy Nguyen and Chun Zhou, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/13Yhw1gUmluGgwHa8XbUKHKQDx9OtbNR1/view?usp=sharing

2-6. MERCY
Analyzing How Plant Pathogens Interact with Host Defense Genes Using PlantSimLab Models. Nataly Vigil, LeeAnne Williams and Devdutta Deb, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1ElxGSC7z_CvERHXkeBpZd3Mk93eZxsyC/view?usp=sharing

2-7. SPU
Ethnic Foodways, Fresh Produce, and Food Security in Jersey City, NJ. Diana Chen, Deyna Aquino, Alexis O'Callahan and Brandy Garrett Kluthe. Saint Peter's University, Jersey City, NJ.
https://drive.google.com/file/d/1PU4TD_DAytTkfLuiDB6tqSn8Mepcxavg/view?usp=sharing

2-8. SHU
Mechanism of Antigermination of Theaflavin on Bacillus spp. Ayuni Yussof and Tinchun Chu, Seton Hall University, South Orange, NJ.
https://drive.google.com/file/d/1AilK2YgUFdFKnUO-n_n04cakD5uwZD2y/view?usp=sharing

2-9. NYU
Exploring Catalytic Activity and Stability of Phosphotriesterase Through Computational Design. Jason W. Chen, Farbod Mahmoudinobar, P. Douglas Renfrew, Richard A. Bonneau and Jin Kim Montclare, New York University, New York, NY.
https://drive.google.com/file/d/1Jdel6mb9mEYvhP2zA383zFeWsoZKsAHa/view?usp=sharing

2-10. BMCC
Machine Learning to Predict Breast Cancer Diagnosis With High Accuracy. Valeria Gromova[1] and Chiaki Yanagisawa[2], [1]Hofstra University, Hempstead, NY and [2]Borough of Manhattan Community College, New York, NY.
https://drive.google.com/file/d/1djuiOmdYRzk9x7PGRvc2y0LIhQ70jPve/view?usp=sharing

2-11. NJCU
Molecular Dynamic Simulation and Analysis of PEA-15 Complexes with ERK2 and FADD. Joyce Ikedife and Yufeng Wei, New Jersey City University, Jersey City, NJ.
https://drive.google.com/file/d/1BtZlB79MwltVFgvvLyvXVqc9hPOAiz7i/view?usp=sharing

2-12. BMCC
Uptake of Co(II) Ions from Aqueous Solutions by Low-Cost Biopolymers and Their Hybrid. Mohamadia Nassar[1] and [2]Abel Navarro, [1]New York City Technical College, Brooklyn, NY and [2]Borough of Manhattan Community College, New York, NY.
https://drive.google.com/file/d/1_Z-cPnD_iE4BF8T8eu_f4kqMzwEP4hqg/view?usp=sharing

Poster Room 3. Chiroptera

Judges for 3-1 through 3-5. Davida Smyth and KumKum Prabhakar
Judges for 3-6 through 3-10. Chun Zhou and Alison Dell

3-1. QCC
Southern Blotting "Detecting the Sickle Cell Gene." Jernaire Mitchell and Nidhi Gadura, Queensborough Community College, CUNY, Bayside, NY.
https://drive.google.com/file/d/1kmk-hmMBRcrRY2BFhR8wBOm5ZM5mCIq7/view?usp=sharing

3-2. QCC
Preparation and Characterization of Ion Gels for Use as Gas Separation Membranes. Shameir Nembhard, Nicole Zmich, Jasodra D. Ramdihal, Edward Castner, James F. Wishart and Sharon I. Lall-Ramnarine, Queensborough Community College, CUNY, Bayside, NY.
https://drive.google.com/file/d/1wtiasotySFy_VXFVuzKzND6-dpXUiRyR/view?usp=sharing

3-3. KBCC
Blue mussels, *Mytilus edulis*, from Plumb Beach, New York, represent the same genetic population as blue mussels from Great Wass Island, Maine. Mariam Khelashvili, Craig S. Hinkley and Lilja Nielsen, Kingsborough Community College, Brooklyn, NY.
https://drive.google.com/file/d/1lqZosAjpNZ44LqorcHhWQx1PTi9YXHD0/view?usp=sharing

3-4. KBCC/MEC
Survey of fecal coliform contaminants like *Salmonella and Escherichia coli* in produce samples sold in local Brooklyn farmers' market
Maricoule Doucara and Anupam Pradhan
Kingsborough Community College, Brooklyn, NY
https://drive.google.com/file/d/1hRCQP2SCxbKjq99EtT16GWiT0YJasaS-/view?usp=sharing

3-5. SPU
Project FeederWatch at Saint Peter's University: Six Years and Counting. Xiomara Nunez, Oshane Annon, Sara Gonzalez, Bianca Cantillano, Julia Diaz, Catherine Argueta, Ben Regis, Claudio Amaya, Disleiny Perez, Pamela Fernandez, Minette Nguyen and Katherine Wydner, Saint Peter's University, Jersey City, NJ.
https://drive.google.com/file/d/138aHdm9JgsPsgAskP9HoxKNm139PWUuD/view?usp=sharing

3-6. SPU
MiRNAs Involved in Chronic Exposure to Bisphenol A, and Its Alternatives, Bisphenol S and Bisphenol F, Individually and in Combination, in Development of *Xenopus laevis* (Clawed Frog). Vasilios A. Orologas, Yaidelis Lopez Jimenez, Karen Canales, Christina Mortellaro and Laura H.Twersky, Saint Peter's University, Jersey City, NJ.
https://drive.google.com/file/d/1BFz0EKRxLT1IyobqZMlcScGRUkZpDU7l/view?usp=sharing

3-7. SHU
Antimicrobial Activity of *Pogostemon cablin* on *Staphylococcus epidermidis* and *Escherichia coli.* Elizabeth Wong and Tinchun Chu, Seton Hall University, South Orange, NJ.
https://drive.google.com/file/d/1Ch4XFqEosPaWLBLO9r1uUNtmFg4UhhcA/view?usp=sharing

3-8. MOLLOY
Isolation and Characterization of Wild Yeast. Libin Thomas, Andreas Markoulli, Christian Pino, Petrucia Jean-Baptiste and Li Li, Molloy College, Rockville Centre, NY.
https://drive.google.com/file/d/1GqcF5kSa8KyzS3BT4UmPhEYcCOcAsz9_/view?usp=sharing

3-9. WAGNER
The Possible Function of the Submucosal Aggregates in the Small Intestine of Urodeles. Kaelin Wolf, Eliza Garcia, Christopher Corbo and Zoltan Fulop, Wagner College, Staten Island, NY.
https://drive.google.com/file/d/1SwQaO6sOaUjVbA5yhkZlATr1Koa1emXr/view?usp=sharing

3-10. NJCU
Inhibition of Bacterial Biofilm Formation Using Natural Seed Oils Jessica Menjivar, Meriem Bendaoud Ph.D. Department of Biology New Jersey City University
https://drive.google.com/file/d/1Mf88PwUwAXA1gpf9zN83BT4vTO9Us76k/view?usp=sharing

3-11 BMCC
Elimination of organosulfur compounds from model fuels with biological wastes: tackling acid rain. Adebayo Efunnuga and Abel Navarro, BMCC
https://drive.google.com/file/d/1jMA4E1GIwI4PEcRPuHnLjBiCZ4xizugn/view?usp=sharing

Poster Room 4 Pumpkins and Guords

Judges for 4-1 through 4-6: Sarbani Ghoshal and Mangala Tawde
Judges for 4-7 through 4-12: Tin-chun Chu and Ursula Golebiewska

4-1. KBCC/MEC
Dopamine Receptors Genomic Study in the Bivalve *Crassostrea virginica.* Shatema Small[1], Mohamed Eid[2], Craig Hinkley[1], MargarCt A. Carroll[2] and Edward J. Catapane[2], [1]Kingsborough Community College and [2]Medgar Evers College, Brooklyn, NY.
https://drive.google.com/file/d/1vbYBgue38jDUF8-zckW1nygESXd_GG6p/view?usp=sharing

4-2. KBCC/MEC
Periwinkles (*Littorina littorea)* from Fort Wadsworth, New York, and Damariscotta, Maine, represent the same genetic population. Elon S. Toney, Craig S. Hinkley and Lilja Nielsen, Kingsborough Community College, Brooklyn, NY.
https://drive.google.com/file/d/1VTPGob-d6STSDemDcBE-FH5hL17-gGPj/view?usp=sharing

4-3. MERCY
The Effects of Organic Microbials on *Bacillus subtilis* and *Escherichia coli* – A CURE Project. Kayla Carson, Mylaisha Daye, Juliana Keenan, Xiaraliz Sencion and Devdutta Deb, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1qfYJk-wmHmfmYtortPGFlZojLiX00r03/view?usp=sharing

4-4. MERCY
Daily Interactions with Microbial Biofilms – A CURE Project. Besani Espinal, Munisa Habibova, Arashdeep Kaur, Rosabely Mota, Ruby Xelo and Devdutta Deb, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1M-oiHxyugauii5n0_5U7dwiHAiWC2GoI/view?usp=sharing

4-5. MERCY
Nucleotide and Amino Acid Comparison of LRRC8 Gene Between Human, Mouse and Chicken Using Bioinformatic Tools. Angie Jaramillo, Natalie Malarczyk and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.
https://drive.google.com/file/d/1llVr6Br2IklYKqcbA-PigA7Vu9lJOETs/view?usp=sharing

4-6. SPU
Effects of Allura Red AC (Red 40) and Tartrazine (Yellow 5), Individually and in Combination, on the Development of *Xenopus laevis* (Clawed Frog). Brittanie Fils[1], Anthony Coccaro[2] and Laura H. Twersky[3], [1]CUNY Graduate School of Public Health and Health Policy, New York, NY, [2]Johns Hopkins School of Education, Baltimore MD and [3]Saint Peter's University, Jersey City, NJ.
https://drive.google.com/file/d/15NlbTFneRBdCdZQvq3fTD56E8bSjfFwy/view?usp=sharing

4-7. SPU
Review of Daily Exposure of Babies to Environmental Endocrine Disruptors(EEDS)/Plastic. Stephanie Martinez, Karen Canales, Shawn Ali and Laura H. Twersky, Saint Peter's University, Jersey City, NJ.
https://drive.google.com/file/d/186ezPmLvGLQavkValjUz3liaUuNyVOCD/view?usp=sharing

4-8. WCC
Results/ Malva sylvestris Online data Jazmin K. Morales Cisneros Mentors: Margaret Eiden Ph.D and J. Holly Bukofser DPS. Westchester Community College
https://docs.google.com/presentation/d/1y_p-McWEy1kktKxwBMBVwS2KOqUcyJENiyyU2_i2wB4/edit?usp=sharing

4-9. NJCU
Effective Antimicrobial Activity of Hydroxamic Acids and Derivatives
Jenan Kanan, Daniel Antunes, Omar Aquani, Harshal Desai, Dr. Robert Aslanian, and Dr. Meriem Bendaoud. New Jersey City University, Department of Biology, 2039 J.F. Kennedy Blvd, Jersey City, NJ 07305
https://drive.google.com/file/d/14U1AQxVyUQQSRG7j1AKcMWblrDhJoXQD/view?usp=sharing

4-10. KBCC
Age and Carapace Epibionts of the "Walking Museums": American Horseshoe Crabs (*Limulus polyphemus*) and the Abundance of Barnacles (*Semibalanus balanoides*)
Shiva Jean-Baptiste* Chih Fu Hsiang† Kavi Sarna⁕, Christina Colon (PhD)*
***Kingsborough Community College †Hunter College, City University of New York**
⁕Hotchkiss School, Salisbury, Connecticut
https://drive.google.com/file/d/1s76jLNw4tEO9Iogc8XvjlUiwk4nwrghU/view?usp=sharing

4-11. BMCC
Adsorption of Heavy Metals using Chemically-modified Tea Leaves. Reem Ulay, Abel Navarro. BMCC.
https://drive.google.com/file/d/1pmBu1m14K6QhVoL3ggMtgjoWBcqqadmP/view?usp=sharing

4-12. SUNY OLD WESTBURY
Investigating Estrogen Effects on Microglial and Glioblastoma Function. Maryann Johnson, Tania Kumar, Mohammed Mian, Sameer Ahmed and Jillian Nissen, SUNY College at Old Westbury, Old Westbury, NY.
https://docs.google.com/presentation/d/1BG5YqX2_7bsKpb2MQ7we7xtI7Z5NgTBRIuzeNDWbNeE/edit?usp=sharing

Queensborough CC

QCC

Comparative Molecular Analysis of Vertebrate SCN1. Tamara Areizaga and Peter Novick, Queensborough Community College, Bayside NY.

SCN1A and SCN1B produce a voltage-gated sodium channel which plays a role in neural signaling. Mutations in these genes lead to an array of disorders dealing with generalized seizures and other syndromes in humans. The human SCN1A gene is located on Chromosome 2 and codes for the alpha-1 subunit which creates a channel with 24 transmembrane domains. The human SCN1B located on Chromosome 19 codes for the beta-1 subunit, is associated with channel inactivation and contains the signal peptide to direct both to the membrane. These subunits then work cohesively to regulate electrical signaling within the brain and muscles. We hypothesize that a comparative analysis of sequences and structure would help to understand the evolution and characteristics of these genes and associated proteins. Using bioinformatics, the SCN1 genes and proteins from model vertebrates were compared for location, length, transposable element load, number of exons and other features. Results showed that many proteins contribute to this complex system. As there were very high levels of conservation at the protein level, analysis of the genetic environment and structure of the genes were of slightly more interest. Although the mammalian species had fewer introns than the amphibians, they were littered with more transposable elements, specifically LINEs and SINEs. Additionally, by viewing the neighboring genes, it is possible to discern other proteins that are transcribed at the same time as SCN1B. Two genes of these neighboring genes that came up in multiple species are FXYD1 and GRAMD1A. The SCN1 system is quite complicated; working with these genes in a model organism may contribute to medical treatments.

QCC

Synthesis of PolyRhodanine Via Oxidation/Reduction Reaction. Moni Chauhan[1] , Saleh Jaser[1], Arnab Sharma[1], Gurjeet Longia[2] and Bhanu P. Chauhan[2], [1]Queensborough Community College of CUNY, Bayside, NY and [2]William Patterson University, Wayne, NJ.

The advantages of having noble metal nanoparticles embedded in conjugated polymers are they provide high thermal stability, easy film formation, application as catalysts, electroluminescent devices, optical and electrochemical sensors. Rhodanine (Rh) provides a great chelating agent due to sulfur, nitrogen and oxygen coordinating sites. Azo compounds containing Rhodanine are great candidates to form metal complexes as they form stable six membered rings with metal ions. Previously, Polyrhodanine (pRh) has been synthesized via electrochemical methods or by redox reactions in the presence of Ag(I) ions and Fe(III) ions. PolyRhodanine exhibits corrosion inhibition properties, are antibacterial, anti-diabetic, anti-viral, antimicrobial, antihistaminic and HVC inhibitor. In our lab we have successfully synthesized polyRhodanine (pRh) nano/micro spheres by an oxidation reduction reaction with Cu (II) salts. These core shell structures are first green synthesis of a facile, single step process where metal salts are the oxidizing agent. 80% degradation of MO (Methyl Orange dye) occurs in 3 hrs via adsorption when treated with Cu 0 - polyrhodanine nanocomposite. With Ag(I) ions Rh, is known to generate pRh nanotubes and nano fibres/Ag 0 which exhibits high antimicrobial efficacy against Gram-negative and Gram-positive bacteria and yeast. Since mono cationic silver (Ag^{+}) generates pRh nano fibers and di cationic copper (Cu^{+2}) produces pRh nano spheres, we decided to investigate Palladium (II) acetate mediated polyRhodanine synthesis to study the morphology of the material and investigate nano Palladium encapsulated conducting polymer for catalytic reactions. Pd^{+2} mediated pRh synthesis takes place only in the presence of $KMnO_4$ in microwave conditions or heating at 80° C for 72 hrs in the presence of $KMNO_4$ and nano/micro spheres with core shell morphology were generated. IR, UV-vis, SEM and TEM analysis was conducted to analyze the material and application of these microspheres with Pd(0) are under investigation.

QCC

Analysis of the Genome of Settecandela. Michelle Franco and Urszula Golebiewska, Queensborough Community College, Bayside, NY.

Settecandela is an AA cluster mycobacteriophage isolated in 2016 from a compost pit in Hope, Michigan. Phage annotation and characterization of Settecandela's 224 genes were completed as part of the Student Education Alliance Program of the Howard Hughes Medical Institute. This research was conducted in two phases: the first phase sought to find gene functions of Settacandela; the second phase analyzed all genes to isolate those related to subcluster C1 and then analyzed orphan genes for possible functions. To determine the relationship of Settecandela to other viruses, all the genes were analyzed and compared to genes in multiple databases and using several software programs. Genome annotation involved use of DNA Master, Phamerator.org, PhagesDB.org, and NCBI. Of the 224 genes annotated, 35 encoded for proteins and 15 genes were placed into orphan categories. After preliminary analysis, results showed Settadanela's relation to subcluster C1. This study also revealed relationships with other subclusters: A1 and F1, further proving the mosaicism of Settecandela genes. The study of mycobacteriophages and their genomes has led to a greater understanding of mycobacteria and proven useful in development of Phage Therapy which may be an alternative to antibiotics and a treatment for drug resistant bacteria. Michelle Franco is a participant in the NIH Bridges to the Baccalaureate Program at Queensborouh Community College R25GM065096.

QCC

Use of a Plant-based System to Study Genetic Toxicology Natasha McGowan[1], Lisbel Pena[1], Ritesh Banerjee[2], Anita Mukherjee[2] and Sarbani Ghoshal[1], [1]Queensborough Community College-CUNY, Bayside, NY and [2]University of Calcutta, India.

Higher plants are useful screening and monitoring systems. Plants like *Allium cepa*, *Tradescantia*, *Zea mays*, *Vicia faba* have been extensively used for their sensitivity to toxicants as well as their ability to detect point mutations and chromosomal aberrations. Such aberrations represent a marker of susceptibility to cancer. Leaves, stems, stamen hair, roots can be used to detect chromosomal aberrations. Among all such plant systems, *Allium cepa* is regarded as one of the best systems to study disturbances in mitotic spindle, due to easy visualization of large size and low number of chromosomes. Mitotic index is a measure of cellular division. Cancer cells are known to have elevated mitotic index than normal cells. Germinating *Allium* bulbs are grown in solutions containing potential toxicants; chromosomal abnormalities and DNA damage are investigated by various assays. In this presentation, we will describe use of meristematic root tips of *Allium* cepa to investigate mitotic index and different types of chromosomal aberrations induced by few common toxicants or food additives.

QCC

Southern Blotting "Detecting the Sickle Cell Gene." Jernaire Mitchell and Nidhi Gadura, Queensborough Community College, CUNY, Bayside, NY.

Southern Blotting can be described as a well-known biochemical technique used to detect a specific DNA sequence within a given genome. *MstII*, a restriction enzyme, is then used to cut the given DNA sequence in fragments. In this case *MstII* will cut the Normal gene and not be able to cut the mutant gene. This is followed by Gel Electrophoresis to separate and analyze the DNA fragments, according to their size after it is transferred to the nylon membrane and probed. In this experiment we will detect the Sickle Cell Gene using Southern Blotting. Sickle Cell Disease is a recessive disease so we will use Southern blotting to detect two recessive alleles. My hypothesis is that a person with the Sickle Cell Disease will have two recessive alleles which can be identified because they won't be cut by *MstII* enzyme. In comparison to a person without the disease: who will have two short DNA strands because their normal alleles will be cut by *MstII* enzyme. An individual who is a carrier for this disease will therefore have a combination of both a short and long DNA strands. Lastly, for the results two parents (maternal/paternal) and their offspring would be compared; Punnett Square analysis will be shown to confirm the real genotype of the offspring compared to a hypothetical genotype.

QCC

Preparation and Characterization of Ion Gels for Use as Gas Separation Membranes. Shameir Nembhard, Nicole Zmich, Jasodra D. Ramdihal, Edward Castner, James F. Wishart and Sharon I. Lall-Ramnarine, Queensborough Community College, CUNY, Bayside, NY.

The urgent need for suitable replacements of hazardous chloroflourocarbons (CFCs) as refrigerant gases owing to their ozone depleting nature, has resulted in the use of mixtures of hydrofluorocarbons (HFCs). However, the separation of the HFC blends which is necessary before recycling or disposal at the end of their life cycle, is problematic. Ionic liquids (ILs) with their low vapor pressure are suitable for use under vacuum conditions used for the separation of gases but their viscosity is too low. Ion gels prepared from ionic liquid-polymer mixtures have shown promise as solid supports that allow for the separation of gases while retaining the IL properties. However, the properties of ion gels are still poorly understood and both the structure of the IL and the IL/polymer ratio needs to be optimized to achieve a good separation of gaseous mixtures. We report here on the Synthesis and physical characterization of alkylphosphonium and alkylammonium bis(trifluorosulfonyl)imide ionic liquids mixed with a polymer to produce ion gels. The ILs were designed to have a dominant non-polar region and optimized for use as gas separation membranes. H-1 and C-13 NMR was used to confirm the structure of the ILs. Physical characterization of ion gel films include Differential Scanning Calorimetry (DSC). This work was supported in part by the NIH Bridges to the Baccalaureate program at Queensborough Community College and the U.S. Department of Energy, Office of Basic Energy Sciences, Division of Chemical Sciences, Geosciences, and Biosciences under contract DE-SC0012704.

QCC

Exploring Antibiotic Resistance in Soil Bacteria: A Literature Review

Austin Hwang and Dr. Mangala Tawde, QCC

With the discovery of Penicillin, antibiotics have saved humanity for centuries. However, with the long history, misuse and overuse of antibiotics have led to antibiotic resistance which is a major threat in medicinal therapeutics. The antibiotic resistant pathogens have evolved over time through various mechanisms such as mutations of inherent genes or evolution of genetic elements. This evolution is important as the bacteria can continue to become resistant to more and more antibiotics, leading to the constant need for the development and research of new antibiotics. Here we take upon a comprehensive literature review to study what is known in current literature about antibiotic/drug resistance developing in soil bacteria. This review will help us better design our research project studying the ongoing epidemic of drug resistance.

Medgar Evers College
Kingsborough CC

KBCC/MEC

Histamine Receptors Genomic Study in the Bivalve *Crassostrea virginica.* Kera Mansfield[1], Martha Larios[1], Mohamed Eid[2], Craig Hinkley[1], Margaret A. Carroll and Edward J. Catapane[2], [1]Kingsborough Community College and [2]Medgar Evers College, Brooklyn, NY.

Histamine is a biogenic amine found in a wide variety of invertebrates. Histamine is particularly well studied in arthropods and gastropods where it is involved in local immune responses as well as regulating physiological functions in the gut. Histamine also functions as a neurotransmitter, especially for sensory systems. Previous physiology work of our lab found that histamine activates the sensory system of *Crassostraea virginica*, eliciting a motor response in the gill. Our earlier cell biology and immunofluorescence work also showed the presence of histamine receptors in ganglia and mantle of *C. virginica*. Recently the genome of *C. virginica* and other bivalves have begun to be mapped. We hypothesize that *C. virginica* contains genes for histamine receptors and that these receptors are similar to those found in other animals, including mammals and humans. To study this we did BLAST searches of the NCBI (National Center for Biotechnology Information) database using DNA and protein sequences of *C. virginica* histamine 1, 2 and 3 receptor (H1R, H2R, H3R) genes. We found gene matches for the histamine receptors. H1R genes were found on chromosome 8; H2R on chromosomes 1, 2, 5 and 10; and H3R on chromosome 3. Receptor BLASTS of other invertebrates and mammals found matches with very low Expect Values (E Values) and moderately high Percent Identity, signifying similarities of H1R, H2R and H3R of *C. virginica* to those of other bivalves, gastropods, insects, mice, rats and humans. For H1R, various bivalves had Percent Identity above 60%, but poor matches for gastropods and insects. For H2R, *C. gigas* had a high match of 82%, but other invertebrates, mice, rats and humans had very low matches. For H3R, *C. gigas* had a high match of about 75%, while some other bivalves, mice, rats and humans had Percent Identity of about 40%. Gastropods and insects did not show as good matches as other bivalves and various other invertebrates. This study complements our earlier physiology and cell biology studies demonstrating the presence and function for histamine in *C. virginica*, and shows that the genome of *C. virginica* contains genes to produce histamine receptors that are similar to those found in other animals. This new information is valuable as it shows that the simple nervous system of *C. virginica* can be used to expand studies on histamine neurotransmission. This work was supported in part by grant 2R25GM06003 of the Bridge Program of NIGMS, NIH grant K12GM093854-07A1 IRACDA Program of Rutgers University and PSC-CUNY grants 62344-00 50 and 63434-00 51.

KBCC/MEC

Manganese Toxicity, Mitochondrial Dysfunction, and the Potential Therapeutic Value of p-Aminosalicylic Acid, Taurine and Carnosine. Tenise Bowman, Rosanne Wallach, Margaret A. Carroll and Edward J. Catapane, Medgar Evers College, Brooklyn, NY.

Manganese (Mn) is an essential metal but toxic exposure causes accumulation in human brain and extrapyramidal symptoms called Manganism, which is clinically similar to Parkinson's disease. Mn disrupts dopamine (DA) neurotransmission. The neurotoxic mechanism of Mn is not fully understood. Currently there are no effective treatments. Proposed mechanisms of Mn toxicity include elevated oxidative stress and mitochondrial (MITO) dysfunction. Using the Eastern Oyster, Crassostrea virginica, as a model to study Mn toxicity on the animal and its DA system, we previously showed Mn interferes with DA's cilio-inhibitory effect in oyster gill cells, and reduces gill MITO O2 consumption and MITO membrane potential. We also showed the toxic effects were reduced or prevented by p-aminosalicylic acid (PAS), taurine (TAU) and carnosine (CAR). We hypothesize PAS, TAU and CAR are protective against Mn induced MITO dysfunction in other animals including mammals. To study this we analyzed published data of other labs to qualify and quantify the MITO dysfunction reported in animals exposed to toxic levels of Mn and determine if PAS, TAU or CAR were effective in alleviating the damage. We found in invertebrates and vertebrates, including mice and rats, Mn caused MITO dysfunction. The damage included: inhibition of MITO electron transport chain, decreased O2 consumption, oxidative phosphorylation interference of ATP synthase, decreased MITO dehydrogenases and glutathione peroxidase, decreased MITO membrane potential, altered MITO permeability and disruption of MITO Ca2+ homeostasis with resulting MITO swelling. While less data was available on the use of PAS, TAU and CAR against Mn induced MITO dysfunction, there were significant number of reports these agents showed various degrees of efficacy against Mn toxicity in other animals. PAS, which generally is thought to work by chelating Mn, was reported to reduce neuro-inflammation, oxidative stress and intracellular reactive O2 species (ROS) generation. It also prevented Mn induced loss of MITO membrane potential and reduced O2 consumption. TAU preserved MITO ATP as well as membrane potential, prevented swelling and increased MITO dehydrogenases activity. CAR was reported to regulate MITO matrix pH, preserve membrane potential, increase respiratory chain complexes activity and enhance MITO energy production. These findings concur with our previous work on Mn toxicity in oyster mitochondria, and support our hypothesis PAS, TAU and CAR show protective actions against Mn induced MITO dysfunction in other animals. They further support our use of C. virginica as a model animal to study the mechanisms underlying Mn toxicity and generate new information to assist in the design of future experiments, the results of which should be of interest to those exploring possible agents in the prevention or therapeutic treatment of Manganism. This work was supported in part by grant 2R25GM06003 of the Bridge Program of NIGMS, NIH grant K12GM093854-07A1 IRACDA Program of Rutgers University and PSC-CUNY grants 62344-0050 and 63434-0051.

KBCC/MEC

Genomic Study of GABA Receptors in the Bivalve *Crassostrea virginica.* Tia M. Foster[1], Mohamed Eid[1], Craig Hinkley[2], Margaret A. Carroll[1] and Edward J. Catapane[1], [1]Medgar Evers College and [2]Kingsborough Community College, Brooklyn, NY.

GABA (γ-aminobutyric acid) is a major inhibitory neurotransmitter in molluscs and other animals, but it has not been well studied in bivalves. In humans impairment of GABA neurotransmission can cause epilepsy. In the bivalve mollusc *Crassostrea virginica,* as well as many other bivalves, serotonin is an excitatory neurotransmitter that increases the beating rate of gill lateral cell cilia. This serotonin innervation originates in the cerebral and visceral ganglia of the animals. Previous physiology work of our lab demonstrated that in *C. virginica* the action of serotonin on accelerating the beating rates of gill lateral cell cilia is blocked by applying GABA to the visceral or cerebral ganglia. Additionally, the GABAa receptor antagonist bicuculline methchloride blocked the inhibitory effect of GABA. By using HPLC we previously had detected GABA in low ng amounts in the cerebral and visceral ganglia of *C. virginica.* Our earlier immunofluorescence histochemistry studies also showed the presence of GABA neurons in both the cerebral and visceral ganglia; and that some serotonin neurons in the ganglia had GABA receptors on their soma. Recently the genome of *C. virginica* and other bivalves have begun to be mapped. We hypothesize that *C. virginica* contains genes for GABA receptors and that these receptors are similar to those found in other animals, including mammals and humans. To study this we conducted BLAST searches of the NCBI (National Center for Biotechnology Information) database using the DNA and protein sequences from *C. virginica* and other invertebrate and mammalian species GABAa and GABAb receptor genes. We found matches for GABAa and GABAb receptor genes located on *C. virginica* chromosomes 3 and 5, respectively. Doing BLASTS of the receptors of other invertebrates and mammals found matches with very low Expect Values (E values) and high Percent Identity, signifying high similarities of the GABAa and GABAb receptors of *C. virginica* to those in other bivalves, gastropods, insects mice, rats and humans. Various invertebrates had Percent Identity above 60%, while humans and mice had Percent Identity of about 40% for GABAa and 50% for GABAb. This study complements our earlier physiology and cell biology studies demonstrating the presence and a function for GABA in *C. virginica*, and shows that the genome of *C. virginica* contains genes to produce GABA receptors that are similar to those found in other animals. This new information is valuable as it shows that the simple nervous system of *C. virginica* can be used to conduct studies on GABA neurotransmission. This work was supported in part by grant 2R25GM06003 of the Bridge Program of NIGMS, NIH grant K12GM093854-07A1 IRACDA Program of Rutgers University and PSC-CUNY grants 62344-00 50 and 63434-00 51.

KBCC/MEC

Blue mussels, *Mytilus edulis*, from Plumb Beach, New York, represent the same genetic population as blue mussels from Great Wass Island, Maine. Mariam Khelashvili, Craig S. Hinkley and Lilja Nielsen, Kingsborough Community College, Brooklyn, NY.

Blue mussels, *Mytilus edulis*, are mollusks endemic to the North Atlantic. They are ecologically important because as filter feeders they remove bacteria, toxins and particles, purifying the water as they feed. Blue mussel populations have been declining in many regions, likely due to climate-driven changes in ocean temperatures, overfishing, and siltation. Due to their vital ecological role, it is imperative that we understand why their numbers are dwindling. This study examines genetic diversity in populations from New York and Maine. By determining whether these locations contain genetically separate populations, we can understand whether migration is happening between these populations, and begin to correlate the local conditions with population decline. We therefore examined whether blue mussels in Great Wass Island, Maine, are genetically separate populations from those in Plumb Beach, New York. Our hypothesis is that blue mussels from NY are genetically different from blue mussels from ME. To test our hypothesis, we compared the cytochrome-c-oxidase I gene of blue mussels from NY and ME. Multiple sequence alignments of the NY and ME sequences showed there were 26 polymorphisms and 13 haplotypes that contained blue mussels from each geographic location. The average divergence (d) for blue mussels from NY was d=0.004212 (S.E.=0.001507) and from ME was d=0.008390 (S.E.=0.001724). Using a two-tailed t-test with $\alpha = 0.05$, we were unable to reject the null hypothesis that average divergence between the two groups was the same, p-value = 0.1361. Phylogenetic tree analysis using either the neighbor-joining method or the minimum evolution method constructed trees with the same structure and showed that the sequences from New York and Maine were not grouped by geographic location. Taken together, this data suggests that blue mussels from Plumb Beach, NY, and Great Wass Island, ME, do not represent genetically separate populations and we therefore reject our hypothesi

KBCC/MEC

Survey of fecal coliform contaminants like *Salmonella and Escherichia coli* in produce samples sold in local Brooklyn farmers' market

Maricoule Doucara and Anupam Pradhan

Kingsborough Community College, Brooklyn, NY

Farmers' markets are attractive for local shoppers for fresh, less-processed, locally grown produce. However, reports suggest a statistical correlation with such markets and outbreaks of fecal coliforms like *Salmonella sp.* and *Escherichia coli*; reinforces the need for investigation of our local produce. The objective of this course-embedded authentic research is to investigate the presence of fecal contaminant indicator sp. on selected foods from farmers' market of Brooklyn. Students collected and analyzed selected produce (salads, vegetables, and poultry) from their farmers' market of choice for the presence of *Salmonella sp.* and *E. coli* by utilizing microbiology lab techniques and created a report on their research findings. Findings from 5 class sections (16 students each) enrolled in an undergraduate microbiology course (Fall 2017-Spring 2019) of Kingsborough Community College, Brooklyn, NY. Briefly, many analyzed samples showed consistent indication of *Salmonella* and *E. coli* species grown in a specialized media Xylose Lysine Deoxycholate Agar (XLD Agar). Serological analysis of the positive colonies using Microgen latex agglutination beads confirmed the presence of *Salmonella* and *E.coli* (0157:H7) in a few samples. Detection of *Salmonella* and *E.coli* (0157:H7) in produce, samples violate the New York State Department of Health (NYSDOH) guidelines. We
recommend frequent surveys of farmers market by state officials and education of the public on the need for proper handling and hygiene.

KBCC/MEC

Dopamine Receptors Genomic Study in the Bivalve *Crassostrea virginica.* Shatema Small[1], Mohamed Eid[2], Craig Hinkley[1], Margaret A. Carroll[2] and Edward J. Catapane[2], [1]Kingsborough Community College and [2]Medgar Evers College, Brooklyn, NY.

Gill lateral cells of *Crassostrea virginica* are innervated by dopamine and serotonin nerves. Dopamine slows down and stops gill lateral cell cilia beating rates and serotonin accelerates them. Dopamine receptors are classified as D1R and D2R, each with subtypes. Previous pharmacological, cell biology and immunofluorescence work of our lab found that the dopamine receptors involved in gill lateral cell cilia inhibition are D2R-like in the gill cells, while those in the cerebral and visceral ganglia are D1R-like. Our previous HPLC studies detected dopamine in various tissues, including gill, cerebral and visceral ganglia of *Crassostrea virginica.* Using imunofluorescence histochemistry techniques we showed the presence of dopamine neurons in the cerebral and visceral ganglia as well as D2R-like postsynaptic receptors in gill lateral cells and D1R-like postsynaptic receptors in the cerebral and visceral ganglia. Recently the genome of *C. virginica* and other bivalves have begun to be mapped. We hypothesize that *C. virginica* contains genes for dopamine receptors and that these receptors are similar to those found in other animals, including mammals and humans. We investigated this by conducting BLAST searches of the NCBI (National Center for Biotechnology Information) database using DNA and protein sequences of *C. virginica* D1R and D2R genes. We found gene matches for D1R genes located on chromosome 4 and 5, and D2R genes on chromosomes 3 and 5 of *C. virginica*. BLASTS of the receptors found matches with very low Expect Values (E values) and high Percent Identity, signifying high similarities of the D1R and D2R receptors of *C. virginica* to those in other bivalves, gastropods, insects mice, rats and humans. Various invertebrates had Percent Identity above 60%, while humans and mice had Percent Identity of about 40% for D1R, but only about 30% for D2R. This study complements our earlier physiology and cell biology studies demonstrating the presence and function for dopamine in *C. virginica*, and shows that the genome of *C. virginica* contains genes to produce dopamine receptors that are similar to those found in other animals. This new information is valuable as it shows that the simple nervous system of *C. virginica* can be used to expand studies on dopamine neurotransmission. This work was supported in part by grant 2R25GM06003 of the Bridge Program of NIGMS, NIH grant K12GM093854-07A1 IRACDA Program of Rutgers University and PSC-CUNY grants 62344-00 50 and 63434-00 51.

KBCC/MEC

Periwinkles (*Littorina littorea)* from Fort Wadsworth, New York, and Damariscotta, Maine, represent the same genetic population. Elon S. Toney, Craig S. Hinkley and Lilja Nielsen, Kingsborough Community College, Brooklyn, NY.

The common periwinkle (*Littorina littorea)*, is a species of marine snails. They can be found in marsh grasslands, estuaries or waters with high salinity and mainly feed on algae. They are believed to have been introduced to North America in the 1800s, where they have had major negative ecological impacts. Periwinkle populations have drastically altered the abundance and distribution of algae and have also competitively replaced some indigenous species. In order to reduce their damage to an ecosystem, we need to develop strategies to manage populations of invasive species like the periwinkle. Management would be aided by understanding the genetic structure of each population. To this effect, we wanted to understand the extent to which populations of periwinkles are able to migrate so we compared periwinkles populations from Fort Wadsworth, New York, and Damariscotta, Maine, to determine if they were the same or different genetic populations. Our hypothesis is that NY and ME periwinkles represent the same genetic population. To test this hypothesis, we compared the cytochrome-c-oxidase I gene of periwinkles from NY to periwinkles from ME. A multiple sequence alignment of the NY and ME sequences showed there were 7 polymorphisms that were grouped into 6 haplotypes and these haplotypes contained periwinkles from both NY and ME. Average evolutionary divergence within groups (d) for periwinkles from NY was d=0.002501 (S.E.=0.001448) and from ME was d=0.005795 (S.E.=0.002197). Using a two-tailed t-test with $\alpha = 0.05$, we were unable to reject the null hypothesis that the average divergence between the two groups was the same, p-value = 0.2332. Phylogenetic tree analysis showed that the DNA sequences from NY and ME were not grouped separately by geographic location. This data suggests that periwinkles from Fort Wadsworth, NY, and Damariscotta, ME, represent the same genetic population and we therefore accept our hypothesis.

KBCC

Age and Carapace Epibionts of the "Walking Museums": American Horseshoe Crabs (*Limulus polyphemus*) and the Abundance of Barnacles (*Semibalanus balanoides*)

Shiva Jean-Baptiste* Chih Fu Hsiang† Kavi Sarna⁕, Christina Colon (PhD)*
***Kingsborough Community College †Hunter College, City University of New York**
⁕Hotchkiss School, Salisbury, Connecticut

Horseshoe crabs are known to be living fossils since they have been around for more than 455 million years. They are extremely important in the biomedical industry be-cause of their blue blood that contains Limulus Amebocyte Lysate, which is used to detect the presence of endotoxins on medical equipment. Horseshoe crabs also play a vital role in the ecology of both estuarine and coastal communities (Botton, 2009). For instance, their eggs are the major food source for migratory birds, especially the Red Knots (*Calidris canutus)*. Horseshoe crabs are also known as "walking museums" because their shells serve as a substrate for a large number of epibionts. These associations are best de-scribed by the term epibiosis, which is a non-symbiotic relationship between the substrate organism such as the horseshoe crab and sessile animals (Wahl, 1989), such as barnacles. The most common species of barnacles found in Delaware Bay, NJ, and Jamaica Bay, NY is *Semibalanus balanoides*. It has been reported that epibionts occur more frequently on older adult male horseshoe crabs, than younger adult males (Patil and Anil, 2000). By ex-amining carapace condition, size and kinds of epibionts on the carapace, the relative age of horseshoe crabs can be inferred (Botton and Ropes, 1988). An initial examination of the data from both estuaries, it was evident that various species of epibionts live on the shells of those horseshoe crabs. It was suspected that barnacles could impact a higher fraction of older individuals.

Mercy College
Westchester CC

MERCY

The Effects of Organic Microbials on *Bacillus subtilis* and *Escherichia coli* – A CURE Project. Kayla Carson, Mylaisha Daye, Juliana Keenan, Xiaraliz Sencion and Devdutta Deb, Mercy College, Dobbs Ferry, NY.

Biofilms are a collection of surface-associated mixed communities of microorganisms. The microorganisms in a biofilm are enclosed by an extracellular polymeric matrix. The development of biofilms continues if the environment is favorable and there is an availability of nutrients. Biofilms are capable of growing on many different surfaces including water systems, rocks, hulls of ships, dairy and petroleum pipelines, clogged drains and frozen areas. Biofilm are very important in their contribution to the public health crisis, since they are capable of forming on and within the human body. This includes human tissues, teeth, contact lenses and medical implants. When these biofilms form within the body, it could result in a multitude of pathogenic infections and diseases. This project was a Course-based Undergraduate Research experience as part of our General Biology I lab curriculum. In this experiment, we investigated which organic antimicrobial was the most effective in inhibiting the growth of commonly found, biofilm forming bacteria. The bacteria we investigated were *Bacillus subtilis* and *Escherichia coli* (*E. coli*). We tested honey, lemon juice, and coconut oil as our antimicrobials. We hypothesized that honey would be the most effective in inhibiting the growth of bacteria due to hydrogen peroxide being its active ingredient. We observed that lemon juice proved to be the most effective while coconut oil proved to be the second most effective antimicrobial.

MERCY

Daily Interactions with Microbial Biofilms – A CURE Project. Besani Espinal, Munisa Habibova, Arashdeep Kaur, Rosabely Mota, Ruby Xelo and Devdutta Deb, Mercy College, Dobbs Ferry, NY.

Microbial biofilms are mixed communities of microorganisms that adhere to a surface and are enclosed by an extracellular matrix. The extracellular matrix is a mucus-like material that encompasses the microorganisms and is made up mostly of polysaccharides, proteins, and DNA. Through adsorption, microorganisms affix themselves to, and grow on, several surfaces such as bones, tissues, plants, and everyday surfaces. Biofilms affect humans in the form of plaque on teeth and pacemakers and are found in water sources such as water sewage pipes and pond scum. Considering their abundance in nature, and their potentially pathogenic characteristics, it was important for us to understand if biofilms formed by bacteria would grow on common household surfaces such as plastic, cloth, metal, or polystyrene. This project was a Course-based Undergraduate Research experience as part of our General Biology I lab curriculum. We hypothesized that biofilm formed by *B. subtilis* bacteria would form on these surfaces. We suspected that biofilm growth would be the greatest on metal, because of its texture and ability to form ions, and the least on plastic, because of its smoothness. Our quantitative assay showed four times more biofilm growth in our experimental group than our control. We also observed biofilm growth on all four surfaces, with the most growth visible on the metal and the least on plastic.

MERCY

Nucleotide and Amino Acid Comparison of LRRC8 Gene Between Human, Mouse and Chicken Using Bioinformatic Tools. Angie Jaramillo, Natalie Malarczyk and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.

The Volume Regulated Anion Channel (VRAC) is composed of LRRC8 (Leucine-rich repeat-containing protein) subunits A, B, C, D and E. VRAC is activated in response to cell swelling and is involved in the release of glutamate from astrocytes, a glial cell type in the brain, during cerebral stroke. Due to its involvement in the release of glutamate (a precursor of the major antioxidant glutathione involved in neuroprotection), the LRRC8 gene is thought to contain a promoter region termed the Antioxidant Response Element, which binds the antioxidant transcription factor Nrf2. In order to further investigate the LRRC8 gene and its relationship with Nrf2 in human cerebral stroke, we aimed to find a model organism with high homology to human LRRC8. We hypothesize that the chicken is an ideal model organism to study LRRC8 in human disease. To carry out this study, we compared the LRRC8 nucleotide sequences and amino acid sequences in humans, mice and chickens using the NCBI databases. We focused our comparisons on the LRRC8A subunit, which is involved in glutamate release, and a subunit not involved in glutamate release (LRRC8B), to determine if there is a difference in the level of homology. After comparison of the gene and protein sequences in all three organisms, we analyzed the percent identities for both LRRC8A and LRRC8B. We determined that LRRC8A has a high degree of homology across all three species and LRRC8B has a low degree of homology. The high homology of the A subunit, compared to B subunit, further supports LRRC8A's necessary role in VRAC-mediated glutamate release. Our bioinformatic analysis also supports the further use of the chick embryonic brain cell culture model to further investigate the role of LRRC8 in the antioxidant response pathway in human disease.

MERCY

Do Native Gardens Mitigate Pollinator Decline. Bianca Jimenez[1], Marisa Rodriquez[2], Margaret Eiden[2] and J. Holly Bukofser[2], [1]Mercy College, Dobbs Ferry, NY and [2]Westchester Community College, Valhalla, NY.

Humans rely on pollination by various species such as ants, flies, honey bees, bumblebees, wasps, and beetles to pollinate food crops in the United States and globally. Pollinator species are crucial to the stability of our ecosystem. Due to anthropogenic factors such as climate change, agricultural intensification, and pesticide use, there has been a significant decline in pollinator species. Attempts at mitigating the decline of pollinators has led to an increase in the implementation of native gardens or "butterfly gardens". In this study, an intentionally planted garden of native plants is compared to a pre-existing garden comprising a mix of native and non-native plants. In this study, the hypothesis was that more pollinators will visit an intentionally planted garden more often than the pre-existing one. The experiment considered factors such as plant color, flowering stage, and temperature. The pre-existing garden was located in Stormville, NY. It contained four plants; three non-natives and one native plant. The intentional garden was located in Pleasantville NY. It contained four native plants. To make the observations, four plants were observed in the gardens at 10 am, high pollinator activity, and 7 pm, low pollinator activity. Every time a pollinator made contact with the plant, this counted as a visit by a pollinator. The observations proved that pollinators will visit the intentional garden more than the pre-existing garden. Although there were more visits in the intentional garden, the pre-existing garden saw more diversity in the class of insects that visited. The implementation of native gardens will promote pollinator conservation. In the future, observations should take place at two high activity hours and for a longer amount of time to get a more accurate picture of pollinator visits.

MERCY

***Gleditsia triacanthos*, Is It The Best Tree For The City? Catherine Jordan[1], Margaret Eiden[2] and J. Holly Bukofser[2], [1]Mercy College, Dobbs Ferry, NY and [2]Westchester Community College, Valhalla, NY.**

The Honey Locust scientifically known as *Gleditsia triacanthos* is one many trees that are purposely chosen to be planted in the city of New York. The process for choosing sidewalk trees is run by the NYC park organization because they have to ensure that not only is the tree beneficial to the environment but that its growing characteristics do not disturb the area they will be planted on. Particularly trees are chosen for sun protection, reducing air pollution, reducing CO_2 levels, sheltering wildlife, and reducing stormwater runoff. The Honey Locust falls into this category because of its leaf shape it can withstand high winds and is resistant to stormy weather and stretches out far enough to form a canopy and protect the asphalt from warming up and releasing chemicals when exposed to sun. The theory of testing this tree species popularity in the city was done by performing a quantitative survey of the sighting of this species along a NYC bus route. The benefits and popularity that this tree has brought about an interesting question: what would happen if this tree were to go extinct due to climate change? With this question in mind data was gathered from the Nature's Phenology Network to compare how blooming dates have been affected with climate change. Nature's Phenology Network not only offers plant data and animal data but it also offers climate information based on selected years and compares it to a 30 year average in order to see if there has been any change in when the warmer seasons begin. Both types of data were then gathered and compared for a four year review using information logged by citizen scientists that have gone out to observe different honey locust in the New York area to determine when exactly the Honey Locust began blooming.

MERCY

Role of Volume Regulated Anion Channels in Regulating Glutathione Levels. Keti Kodra, Helan Palouse and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.

Homeostatic cell volume regulation is provided by channels that transport ions and organic osmolytes, such as glutamate, across the plasma membrane, creating a driving force for the movement of water to the extracellular space. One important channel that is critical to counteracting cell swelling is the Volume Regulated Anion Channel (VRAC). VRAC is activated by hypotonicity-induced cell swelling and swelling that occurs in response to the breakdown of normal ionic gradients. LRRC8A (leucine-rich-repeat-containing 8 family member A) protein is an essential subunit of this channel. In the brain, LRRC8/VRACs found in astrocytes are activated in response to cell swelling in cerebral ischemia and release glutamate. Due to the relationship between LRRC8/VRACs and the release of glutamate (a precursor to the major antioxidant glutathione), it is plausible that the LRRC8 gene contains a binding site for the antioxidant transcription factor Nrf2 termed the Antioxidant Response Element (ARE). We hypothesize that Nrf2 regulates LRRC8A, resulting in glutamate release from astrocytes which subsequently increases glutathione levels in neurons. Our experimental procedure involved treating astrocytic and neuronal cells, cultured from the optic tectum of day 8 and 6 chick embryos, separately with hypo-osmotic media containing different NaCl concentrations to induce LRRC8A/VRAC activation. In response to swelling-induced LRRC8/VRAC activation, glutathione levels were measured using a GSH-Glo assay. Our preliminary experiments thus far suggest that swelling decreases glutathione levels in neurons when astrocytes are absent, although further replicates are needed for statistical analysis. Future experiments will address if neuronal glutathione levels are enhanced in the presence of astrocytes exposed to swelling conditions.

MERCY

Bioinformatic Analysis of the LRRC8 Promoter Region. Rosabely Mota, Besani Espinal, Osner Solon and Renee Haskew-Layton, Mercy College, Dobbs Ferry, NY.

Neurodegenerative diseases are a group of disorders that affect the nervous system and are associated with progressive brain atrophy. The purpose of our project was to study potential treatments for neurodegenerative disease, focusing on the antioxidant response of astrocyte cells during oxidative stress. In astrocytes, oxidative stress triggers the transcription factor Nrf2 to bind to a promoter region of DNA termed the Antioxidant Response Element (ARE), in turn this initiates the transcription of antioxidant genes including those involved in regulating the synthesis and use of the major antioxidant glutathione and its precursors glutamate, cysteine and glycine. Within astrocytes, LRRC8 (leucine-rich repeat-containing protein-8) subunits form volume-regulated anion channels (VRACs) that release glutamate to neighboring neurons. Considering its role in releasing the glutathione precursor glutamate, we hypothesized that LRRC8 is regulated by Nrf2 and contains the ARE region of DNA, where Nrf2 binds. Through the use of bioinformatics, we analyzed the nucleotide sequence of the LRRC8A, a subunit of the LRRC8 channel, to determine if it contained the ARE consensus sequence (the most commonly occurring nucleotides in a specific segment of DNA). Our results did not indicate that the ARE consensus sequence was in the promoter region of the LRRC8A subunit, however preliminary analysis suggests there is an NFkB binding region, which is involved in an anti-inflammatory response. Future experimentation is required to determine if the ARE is found within an enhancer, rather than promoter, region of the LRRC8 gene.

MERCY

Identification of Telomere-Regulating Genes in *Drosophila melanogaster.* Nikole Ortiz, Tye C. Taylor, Chad E. Jacob, Abdelhamid Dalia, Francisco Ricci, Isabella J. Hanesworth, Patrick Elysee, Sydney Sieh-Takata, Billy Nguyen and Chun Zhou, Mercy College, Dobbs Ferry, NY.

Telomeres function to maintain chromosome stability. Telomerase is commonly utilized to extend telomere length in eukaryotic species. In *Drosophila melanogaster*, however, telomeres are composed of and extended by non-LTR retrotransposons. Previously, two mutations called *Tel* and *E(tc)* have been identified to regulate telomere elongation in fruit flies. Interestingly, both mutations are located in a short region on the third chromosome. In the present study, we set out to identify telomere-length regulating genes in this region of the third chromosome. We have hypothesized that the genes that can modulate chromosomal structure or remodeling have the potential to regulate the telomere length or structure. To this end, we used a bioinformatic approach to identify the genes in this particular chromosomal region that have been indicated to influence chromosomal stability. We then extracted genomic DNA from various mutant strains of these candidate genes. Using real-time PCR, we have analyzed the telomere length among different mutant strains. We have identified a gene called CG6026, whose mutation can lead to elongated telomeres. To investigate whether these gene candidates' disruption may also cause a structural defect of telomeres, we are performing polytene chromosome staining. This research can help understand the molecular regulatory mechanisms of telomere elongation and structure in fruit flies, which may shed light on the mechanisms of alternative lengthening of telomeres in human cancer cells.

MERCY

Analyzing How Plant Pathogens Interact with Host Defense Genes Using PlantSimLab Models. Nataly Vigil, LeeAnne Williams and Devdutta Deb, Mercy College, Dobbs Ferry, NY.

Plants are essential for our survival but like humans, they can be infected by pathogens and become diseased. Some common diseases caused by plant microbial pathogens include leaf spots, powdery mildew, and blight. These diseases cause massive devastation in agronomically important crops such as wheat, corn, soybean, rice, and potatoes. Due to these diseases, each year billions of dollars are lost from crop loss worldwide. Some of the common plant pathogens are bacteria, virus, fungi, nematodes, insects, and oomycetes. Our research focus is on Oomycetes as plant pathogens. Oomycetes are fungi-like pathogens that cause diseases in several crops like soybean, tobacco, potato, and cabbage. They use sophisticated molecular strategies where they secrete effector proteins inside host cells to sabotage the host defenses. Plants, on the other hand, maintain an elaborate defense system. A pathogen must first encounter the pre-formed defenses and then if it overcomes those, must encounter the various induced defenses of the plant. The objective of our project was to analyze how pathogen effector proteins interact with host defense genes in plants. This project was conducted in the Summer Research Academy, held in collaboration with Mercy College and Westchester Community College as part of the HSI-STEM grant. We hypothesized that when essential genes in the plant defense pathway are knocked down, it will lead to loss of resistance by the host plant. We also hypothesized that effector proteins will suppress plant immunity by inhibiting the essential host defense genes, thereby causing disease. Our experiments were conducted using a simulation PlantSimLab software. We used this software to create models of the host defense pathways and run virtual knockdown experiments. On running virtual simulation experiments we observed that the knockdown of either one or multiple genes led to the plant losing their resistance or becoming diseased. We also observed that effector proteins can reduce plant resistance by suppressing essential host defense genes.

WCC

Results/ Malva sylvestris Online data Jazmin K. Morales Cisneros Mentors: Margaret Eiden Ph.D and J. Holly Bukofser DPS. Westchester Community College

Malva sylvestris is a plant from the Malvaceae family. It is native to Europe, north Africa and Asia. It has been used medicinally since ancient times. Archeologists have found seeds of Malva sylvestris on denture fossils of human remains that date back to 3000B.C. near Syria. The Iranians consumed it to treat bronchitis and applied it topically for wounds. The plant in the ecosystem is a host for microorganisms and visiting insects like butterflies, bees, and hoverflies. It blooms late spring and grows in different types of soil.With that noted my hypothesis is malva sylvestris invasive as the plant is prominent in traditional medicinal use. In order to determine if any record had been noted in USA, and if Malva sylvestris is characterized as invasive in New York State?

St. Peters University

SPU

Ethnic Foodways, Fresh Produce, and Food Security in Jersey City, NJ. Diana Chen, Deyna Aquino, Alexis O'Callahan and Brandy Garrett Kluthe. Saint Peter's University, Jersey City, NJ.

This paper relies on original anthropological research and previously existing literature to explore the ethnic foodscape of the culturally diverse city of Jersey City, New Jersey. Although Jersey City has a long history as a destination for immigrants from a wide range of countries, few studies exist concerning its rich array of ethnic urban foodways. The results presented in this paper demonstrate a strong preference across racial and ethnic groups for fresh ingredients, supplied largely by both supermarkets and farmers markets. This work and that of other scholars show that fresh fruits and vegetables especially are considered a hallmark of traditional cuisine for many immigrant groups and for traditional African-American foodways as well. Therefore, access to fresh produce is essential not just for healthy eating but also for expressing cultural identity, and thus it ties into the newly redefined concept of food security from the United Nations. A list of the top 20 most salient food items elicited through a free-listing task contains nine fruits and vegetables, as well as additional plant-based foods, some of which are unique to several of the city's largest cultural groups. With the information collected in this paper, the food environment of Jersey City may be further enhanced to embrace the needs of its varied residents.

SPU

Effects of Allura Red AC (Red 40) and Tartrazine (Yellow 5), Individually and in Combination, on the Development of *Xenopus laevis* (Clawed Frog). Brittanie Fils[1], Anthony Coccaro[2] and Laura H. Twersky[3], [1]CUNY Graduate School of Public Health and Health Policy, New York, NY, [2]Johns Hopkins School of Education, Baltimore MD and [3]Saint Peter's University, Jersey City, NJ.

The consumption of artificial food dyes is a topic of controversy in the United States. In contrast, many European nations opted for natural alternatives after studies suggested that they cause hypersensitivity in children. Two of the most prevalent food dyes, Red 40 and Yellow 5, are possible carcinogens and are solidly linked to ADHD in children. With the addition of yellow 6, these dyes make up ninety percent of the dyes used commercially. There are nine food dyes approved by the FDA. Their function is solely for aesthetic purposes. The consumption of food dyes has increased five times its original amount since 1955. Research on combinations, which is the usual exposure route, may reveal synergy. As far as our literature search showed, there has not previously been a study on combinations of food dyes to determine whether there are any interactions. The purpose of this study is to use the model organism, *Xenopus laevis*, the clawed frog, to observe the effects of these dyes separately and together. Specimens were incubated in concentrations of Red 40, Yellow 5, or both at either 2.5µg/ml, 5µg/ml, or a combination when both dyes are used. A control group and eight experimental groups were exposed to the dyes from metamorphosis stage 48 (Nieuwkoop and Faber) on. Observations measured included length and movement; mortality and malformations were noted. Preliminary results indicate the highest mortality rate was in the 5µg/ml Red 40 group. More research on combinations of food dyes and combinations of food dyes with other food additives is needed to assess health effects. Advantages of using *Xenopus* include rapid development and a transparent larval stage.The model system we are using is an excellent one to assess possible carcinogenicity due to the rapid cleavage stages analogous to those seen in a tumor. An extensive literature review that includes discussion of marketing techniques of products that include food dyes, methods to assess the concentration of food dyes in products, and health effects of alternative dyes (such as vegetable colorings) will be presented. Supported by a grant from the TriBeta Research Foundation.

SPU

Review of Daily Exposure of Babies to Environmental Endocrine Disruptors(EEDS)/Plastic Stephanie Martinez, Karen Canales, Shawn Ali, and Laura H. Twersky Department of Biology Saint Peter's University

A review is being done to assess the number and type of environmental endocrine disruptors(EEDs)/ plasticizers and plastic particles infants are exposed to on a daily basis.The different types of materials that contain these chemicals range from baby formula, baby food, disposable baby diapers, baby bottles, sippy cups to baby pacifiers and baby toys. Chemicals infants may be exposed to include plasticizers such as phthalates and bisphenol A (BPA), and its substitutes, bisphenol S (BPS) and bisphenol F(BPF); per- and polyfluoroalkyl substances (PFAS); perchlorate; heavy metals such as lead;pesticides; microplastics; and dioxins. These chemicals have been implicated in increasing risk of birth defects, cancer, diabetes, infertility, weight gain, autism and mood disorders. Infant's unique sensitivity and underdeveloped immune systems have shown to be highly affected by chemicals especially in neonates until 6 months of age. Endocrine-disrupting chemicals and many other chemical mixtures are present via placental exposure leading a direct effect on the fetuses(Street and Bernasconi,2020). Maternal exposure to nanoparticles in cosmetic products can be fetotoxic, having effects on the brain and development. Microplastic exposure through formula made in polypropylene feeding bottles was shown to be much higher than previously thought, an average 1.5 million particles per infant per day (Li et al., 2020). Concerns include physical damage and leaching of harmful chemicals. Alternative options to toxic baby materials will be presented, which include glass or stainless steel baby bottles, cloth diapers and wipes and non-plastic toys.There is limited research on detailing babies' exposure per day to EEDs, plasticizers and other chemicals. Experiments with a model organism such as the clawed frog, Xenopus laevis, will aid in understanding the effects of EEDs/plasticizers/plastic particles on development, as well as examining effects of mixtures of these chemicals for possible synergistic interactions

SPU

Project FeederWatch at Saint Peter's University: Six Years and Counting. Xiomara Nunez, Oshane Annon, Sara Gonzalez, Bianca Cantillano, Julia Diaz, Catherine Argueta, Ben Regis, Claudio Amaya, Disleiny Perez, Pamela Fernandez, Minette Nguyen and Katherine Wydner, Saint Peter's University, Jersey City, NJ.

Urban birds face numerous challenges due to human disturbance and environmental threats. For six consecutive years, we have used Project FeederWatch (PFW) to characterize the winter bird community on the campus of Saint Peter's University in Jersey City, NJ. Two years ago, the habitat in the area used for PFW was improved through replacement of invasive ornamental landscaping with a developing native plant garden. We are now able to test the hypothesis that habitat restoration within an urban environment will attract a greater number of bird species than before the restoration. In the past two years as compared to the first four years, we have seen a significant increase in the weekly diversity of bird species during the PFW season (November to April). This includes increased sightings of native species. Numbers of house sparrows have also increased over the past six years. We compare the population trends for our most common species with PFW data for the state of NJ. Over six winters, we have identified 24 species in total. During this past winter season (2019-20), 13 species visited our PFW area, including two native species seen for the first time: sharp-shinned hawk and song sparrow.

SPU

MiRNAs Involved in Chronic Exposure to Bisphenol A, and Its Alternatives, Bisphenol S and Bisphenol F, Individually and in Combination, in Development of *Xenopus laevis* (Clawed Frog). Vasilios A. Orologas, Yaidelis Lopez Jimenez, Karen Canales, Christina Mortellaro and Laura H.Twersky, Saint Peter's University, Jersey City, NJ.

Exposure to environmental endocrine disruptors (EEDs) like the plasticizer bisphenol A (BPA)(4,4'-(propane-2,2-diyl)diphenol) which is commonly found in plastic bottles and food packaging, has been shown to interfere in normal *Xenopus laevis* development. BPA has been shown to be involved in cancer, diabetes, autism, and birth defects. Bisphenol S (BPS) and bisphenol F (BPF) have been used as alternatives to BPA. However, studies have found that BPS and BPF also lead to developmental malformations, similar to what is seen in BPA exposure in the development of *X. laevis* (Thottumari et al., 2019). BPA mimics estrogen, binding to its receptors by acting as an antagonist and also binds to thyroid receptors by antagonizing T3 activation of the thyroid hormone. MicroRNAs (miRNAs) are short, non-coding RNAs involved in gene regulation through complementary, antisense targeting of mRNA with high sequence specificity that play important roles during development and throughout life. MiRNA-mRNA interactions often result in downregulation of target transcripts by inhibiting translation or mRNA degradation. The involvement of miRNAs in embryonic development has been observed across multiple species; many sharing human orthologs with specific miRNAs exhibiting expression patterns at different stages of *X.laevis* organ and cell development (Ahmed et al., 2015; Blum and Ott, 2018). BPA and BPS exposure can lead to changes in miRNA expression causing abnormal cell signaling pathways and metabolism that play a role in cellular processes (Lee et al., 2018; Farahani et al., 2020). However, to date, there are few studies that have reported the effects of BPF on miRNA expression and no studies that have investigated the combined effects of BPA, BPS, and BPF on miRNA expression. Therefore, the purpose of the study is to examine the regulation of select miRNAs in *X. laevis* development with chronic exposure to BPA, BPS, and BPF, individually and in combination, using RT-qPCR. Incubation of specimens will start at Nieuwkoop and Faber stage 26 (tailbud) at bisphenol exposures of 5µg/ml. A review of the studies on the effects of BPA, BPS, and BPF on the expression of miRNAs will also be conducted.

Seton Hall
SHU

Antispore Effects of Natural Formulations Containing Lipophilic Green Tea Polyphenol. Sabrina Lopez and Tinchun Chu. Seton Hall University, South Orange, NJ.

Green tea, derived from the leaves of the Camellia sinesis plant, is known for its distinct and beneficial health properties. Studies have shown that the popular drink has been associated with the prevention of infections and infectious agents. The green tea polyphenols (GTP) found within the tea leaves contain antioxidant, anti-inflammatory, and anti-microbial properties. The major active ingredient in GTP is known as epigallocatechin-3-gallate (EGCG). This study focuses on the sporicidal effect of lipophilic GTP, epigallocatechin-3-gallate-palmitate (EGCG-P) as the water-soluble EGCG is unstable. EGCG-P based formulations were used to evaluate their inhibitory activity on Bacillus species using microplate and germination assay. The results from the germination assay showed that on average, the EGCG-P formulations were able to reduce spore germination by >4 log10. Preliminary results from the microplate assay showed that the EGCG-P formulations were able to reduce bacterial replication for up to 8 hours. The range of percent inhibition when using Formulation #4 was found to be between 54-96%. When using Formulation #2, the range of percent inhibition was found to be 80-97%. This shows the natural EGCG-P containing formulations possess strong antispore activities, which can be beneficial in the food industry and medical field

SHU

The Physiological Effects of Nickel Chloride on the Cyanobacterium Anabaena spp. Danielle Maragh and Tinchun Chu, Seton Hall University, South Orange, NJ.

Heavy metal contamination due to anthropogenic activities has been steadily on the rise as the world become more and more industrialized. Increasing freshwater cyanobacterial harmful algal blooms (CHABs) are observed which have detrimental impact on public health. Anabaena spp., a cyanobacterium secrets cyanotoxin, is one of the major species that causes CHAB. Anabaena spp. Can thrive in water bodies that have been contaminated by heavy metal runoffs and are able to tolerate heavy metal stress even in relatively high concentrations. This study aims to evaluate the physiological response of Anabaena spp. under nickel stress. Anabaena spp. cultures were exposed to various concentrations of the nickel chloride (0, 10, 25, 50 mg/L). Cell growth and abnormality were monitored over a 12-day period. Cell morphology and average cell size began to be affected as early as 24 hours after exposure, with all nickel-stressed cultures have reduced cell size by 10.34%, 17.24% and 31.03% for 10, 25, and 50 mg/L $NiCl_2$, respectively. Compared with control, the cell number reduced drastically by 69-73% for all stressed culture. Cells exposed to 50 mg/L $NiCl_2$ began to show aggregation by day 4 and akinetes were observed by day 6. The results showed the nickel toxicity may affect the cell division of Anabaena spp.

.

SHU

Antimicrobial Activity of *Pogostemon cablin* on *Staphylococcus epidermidis* and *Escherichia coli.* Elizabeth Wong and Tinchun Chu, Seton Hall University, South Orange, NJ.

Patchouli (*Pogostemon cablin* Benth. of the mint family *Lamiaceae*) is a commercially important plant in healthcare products, cosmetics, aromatherapy, and Traditional Chinese Medicine (TCM). Previously, its most potent forms, patchouli essential oil and its active compound patchouli alcohol (patchoulol) have been studied for its antioxidant, antifungal, anti-inflammatory, antimicrobial and dermatological healing for skin disorders in diabetes properties. This study examined the antibacterial effect of patchouli alcohol leaf extract with balanced pH (PA3_4.8) on Gram-positive *Staphylococcus epidermidis* (*S. epidermidis*) and Gram-negative *Escherichia coli* (*E. coli*) with a microplate assay. In a 96-well plate, overnight culture from *S. epidermidis* and *E. coli* were monitored for 24h with varying concentrations of PA3_4.8, including control, 0.83X, 0.5X, 0.33X, 0.25X, and 0.17X PA3_4.8. Preliminary results have shown that PA3_4.8 is bacteriostatic for *S. epidermidis* with a minimum inhibitory concentration (MIC) of 0.5X while PA3_4.8 is bacteriostatic for *E. coli* with a MIC of 0.33X. Fluorescent microscopy results showed that 0.3X PA3_4.8 could inhibit *E. coli* growth by 98.59% and reduce the cell size by 31.13% for *E. coli*. The results also showed that 0.5X PA3_4.8 could inhibit *S. epidermidis* growth by 90.41% and reduce the cell size by 76.67%. It suggested that *the Pogostemon cablin* might be a good antibacterial agent.

SHU

Mechanism of Antigermination of Theaflavin on Bacillus spp. Ayuni Yussof and Tinchun Chu, Seton Hall University, South Orange, NJ.

The spore germination of various Bacillus species plays a vital role for disease pathogenesis and food spoilage. Theaflavin (TF), extracted from fermented leaves of *Camellia sinesis*, has shown to have anti-bacterial and anti-spore properties. The aim of this study is to determine the antigermination activity and the potential mechanism of TF on three Bacillus species, *Bacillus cereus* (*B. cereus*), *Bacillus megaterium* (*B. megaterium*), and *Bacillus subtilis* (*B. subtilis*). Microplate assay was used on planktonic cells to evaluate the antibacterial effect of TF. Colony forming using (CFU) assay and confocal microscopy were carried out to determine the germination inhibition of TF. Biovia, Vega ZZ, Autodock Tools, Autodock Vina, and Pymol software were used to determine the binding location of TF on the conserved germination associated genes. Microplate assay showed the minimum inhibitory concentration (MIC) was 0.1% TF80 and the half inhibitory concentration (IC 50) was 0.025% TF80 for all three Bacillus species. CFU assay showed 0.25% TF80 inhibit 99% of spore from germinating while the Autodock indicates a range of -7.07 kcal/mol to 9.78 kcal/mol for the binding affinity of TF1, TF2A, TF2B, and TF3 across all three Bacillus species. In conclusion, TF can be a promising in inhibiting Bacillus spores from germinating.

New York University
NYU
Exploring Catalytic Activity and Stability of Phosphotriesterase Through Computational Design. Jason W. Chen, Farbod Mahmoudinobar, P. Douglas Renfrew, Richard A. Bonneau and Jin Kim Montclare, New York University, New York, NY.

Phosphotriesterase (PTE) is a dimeric metalloenzyme known for its ability to catalyze the detoxification of organophosphates (OPs), which are commonly used as pesticides and chemical warfare agents. The mechanism of action of OPs is inhibition of acetylcholinesterase (AChE), which results in overaccumulation of the acetylcholine neurotransmitter in the nervous system. As a result, exposure to OP agents can lead to paralysis, asphyxiation, and death. The high toxicity and structural variability of OP agents creates a need for the development of effective OP detoxifiers. Previous investigations have demonstrated that manipulating amino acid residues in the substrate binding pocket of PTE can improve its catalytic function, thereby increasing detoxification activity. However, these variants exhibited decreased soluble expression levels and limited efficacy on a particular OP agent. Recent findings suggest that supercharging proteins can enhance properties such as protein robustness and solubility while maintaining the structure and desired functionality. Alteration of residues on the enzyme surface appears to be crucial to enhancing such properties. Our lab has previously identified supercharged PTE variants with increased kinetic efficiency for paraoxon and chlorpyrifos through computational modeling via Rosetta, a macromolecular modeling software suite. In this project, PTE detoxification activity for acephate, an OP insecticide, was refined through redesigning the substrate binding pocket. A total of nine mutations were demonstrated to enhance the overall interaction of the substrate binding pocket with acephate. It was further demonstrated through manipulation of surface residues that supercharging the best variants results in improved total stability based on the calculated binding energy and total energy from Rosetta. Here, we identified the best supercharged PTE variants showing improvements in catalytic activity and overall stability relative to that of the wild-type enzyme. Future studies will focus on experimental confirmation of these variants with expression in bacteria and characterization of stability and decomposition kinetics. The work is supported by the CounterACT Program of the National Institute of Health under Award Number R21-NS10383-01 and the National Science Foundation under Award Number IIP-1918981.**Borough of Manhattan CC**

Borough of Manhattan CC
BMCC
Machine Learning to Predict Breast Cancer Diagnosis With High Accuracy. Valeria Gromova[1] and Chiaki Yanagisawa[2], [1]Hofstra University, Hempstead, NY and [2]Borough of Manhattan Community College, New York, NY.

With the diagnosis and early detection of breast cancer the 5-year survival rate of many patients increases. One method of detection of breast cancer is to extract cells from suspicious lumps in the patient's breast using Fine Needle Aspiration (FNA) technique, and to look at characteristics of individual cells or cell nuclei. This method is not as invasive as the standard biopsy that requires surgery. A small dataset is publicly available with 30 features of sample cells (malignant and benign). Early data analyses of such data showed mixed results, depending on the examiners' skills. Among studies with the dataset, most of them ignored proper error analysis for the small statistics of the data as well as a bias due to imbalanced mixture of the data of malignant and benign cells (212 vs. 357 samples, respectively). A rapid progress has been made in the past decade in the field of machine learning (ML) together with a steady increase in computational power. Thus, time is ripe to apply ML algorithms to distinguish the two classes of cells, malignant vs. benign, without human intervention to maintain consistency and good accuracy of the method. For this study we chose one of ML algorithms called Supper Vector Machine (SVM) to demonstrate the power of ML methods with proper error estimate on some metrics to evaluate effectiveness of the algorithm and of the FNA technique to diagnose breast cancer. To evaluate the metrics and their errors for performance, we adapted the nested-cross-validation method that is appropriate for analysis of small data samples in this type of study. With SVM we found that it can achieve over 95% of accuracy with a small % of uncertainty to correctly identify cell classification. We also found some biases imposed by imbalanced data and will present the result.

BMCC
Uptake of Co(II) Ions from Aqueous Solutions by Low-Cost Biopolymers and Their Hybrid. Mohamadia Nassar[1] and [2]Abel Navarro, [1]New York City Technical College, Brooklyn, NY and [2]Borough of Manhattan Community College, New York, NY.

Most bioremediation techniques study the removal of metals, dyes and recently antibiotics. However, large urban cities deal with a latent problem, which is eutrophication. It consists on the presence of excess nutrients, including cobalt ions in water ponds and lakes. This excess of nutrients causes the overgrowth of algae, and microorganisms in an uncontrollable manner. This biota unbalance produces algal bloom and the death of larger organisms such as fish and bigger plants due to the lack of oxygen in these water resources. This study aims to evaluate the potential of alginate hydrogel beads as adsorbents of nitrates and cobalt in batch systems. Activated carbon will also be studied as a conventional adsorbent and control. Equilibrium parameters like acidity, adsorbent mass, nutrient concentration, salinity, presence of metals and time will be investigated. Then, the materials will be characterized by instrumental analysis before and after the adsorption. These techniques include surface properties, heat resistance, infrared spectroscopy, acid-base properties and elemental analysis.

BMCC
Absorption of heavy metals using chemically-modified tea leaves
[2]Abel Navarro, [1]New York City Technical College, Brooklyn, NY and [2]Borough of Manhattan Community College, New York, NY.

Copper is perhaps the most prevalent heavy metal used in the manufacturing industries, from food additives to metal-mechanic factories. Common methodologies to remove copper are expensive and produce undesired substances that need to be taken care of. A good decontaminating candidate should be environment-friendly, inexpensive, and capable of eliminating low concentration of the metal. This can be achieved by chemically-modifying known adsorbents to enhance their adsorption properties. This work suggests the use of a chemically-modified spent tea leaves of chamomile, peppermint and green tea under their thiolated, sulfonated and carboxylated forms as candidates for the removal of copper from solutions. Batch experiments were carried out to maximize the adsorption of copper (II) ions. Effects such as acidity, salinity, adsorbent dose, metal concentration, and presence of surfactant were explored. Experimental data shows that the maximum adsorption is reached at neutral pH. The results indicate that Cu(II) can be removed up to 53%, 22% and 19% with the thiolated, carboxylated and sulfonated adsorbents, respectively. The maximum adsorption of copper on TPM (53%) is achieved with 150mg and decreases with the presence of salts, and surfactants. Conversely, sulfonated and carboxylated adsorbent show a better adsorption in the presence of surfactants. Time dependent experiments show that adsorption is reached in less than 25 min for TCM and 5 min for SCM. Instrumental analyses were used to determine the presence of active functional groups, thermal resistance, and scanning electron microscopy; indicating that both adsorbents are promising cost-efficient materials for the selective recovery and treatment of metal ions from wastewaters. Finally, columns were prepared with these adsorbents to explore their application in scaled-up processes, with very positive results. A long-term goal involves the recycling of the exhausted adsorbent and/or their use in the preparation of biofuels due to changes in materials' structures.

BMCC

Elimination of organosulfur compounds from model fuels with biological wastes: tackling acid rain. Adebayo Efunnuga and Abel Navarro, BMCC

The prevalence of organosulfur compounds compounds in fuels has been an important concern since the XIX century as an environmental risk due to the increase of greenhouse gases in the atmosphere and accentuation of acid rain. This project evaluates the potential of solid waste such as fruit peels as adsorbents for the removal dibenzothiophene (DBT). The adsorption on the fruit peels of orange (OG), lime (LM) and pineapple (PN) was investigated in a batch and continuousflow systems with synthetic fuels (gasoline and diesel) as a function of type of adsorbent, adsorbent dosage, initial concentration of DBT and column experiments. DBT adsorption follows this trend in gasoline: LM (12.3%) > PN (8.8%) > OG (6.9%) with 50mg, 125mg, and 50mg, respectively. On the other hand, the adsorption of DBT in diesel followed the trend: LM (14.6%) > OG (4.2%) > PN (3.5%) with 50mg, 75mg, and 75mg, respectively. Instrumental analyses propose a polar-drive mechanism by the interaction of carboxyl and hydroxyl groups of the adsorbent and the sulfur atom of DBT. Thermal analysis also suggest that these materials have good thermal and mechanical properties. Column experiments indicate that this approach can be used in continuous-flow system for the treatment of larger volumes of fuels. This work highlights the potential use of fruit peels for the elimination of organosulfur compounds from model fuels as a low-cost and environmentally friendly purification technique.

BMCC

Adsorption of Heavy Metals using Chemically-modified Tea Leaves. Reem Ulay, Abel Navarro. BMCC.

This research proposes the use of chemically-modified spent tea leaves chamomile, peppermint, and green tea under their thiolated, sulfonated and carboxylated foras as candidates for the removal of copper (II) ions from solutions Effects such as acidity, salinity, and adsorbent dose were explored.

New Jersey City University

NJCU

Molecular Dynamic Simulation and Analysis of PEA-15 Complexes with ERK2 and FADD. Joyce Ikedife and Yufeng Wei, New Jersey City University, Jersey City, NJ.

PEA-15, phosphoprotein enriched in astrocytes, 15 kDa, performs a variety of functions in regulating cellular pathways, such as cell proliferation and apoptosis. The protein consists of a death effector domain (DED) and a long, irregular structured C-terminal tail. We hypothesize that phosphorylation of the C-terminal tail residues, Ser-104 and Ser-116, promotes conformational changes at the DED, and alters the binding specificity from extracellular regulated kinase-2 (ERK2) to Fas associated death domain (FADD). To test the hypothesis, we used the molecular dynamics package, GROMACS, to simulate the complexes between unphosophorylated PEA-15 and ERK2, and phosphorylated PEA-15 (PEA-15pp) and FADD on a GPU-equipped Linux workstation, with simulation time up to 150 ns. The simulated complex structures were analyzed and visualized with VMD and PyMOL programs. From the computational experiment, we have found that the DED conformations and surface polar interactions are dependent on phosphorylation states on the C-terminal serine residues. The binding interfaces between PEA-15 and ERK and PEA-15pp and FADD are similarly composed of both DED and C-terminal tail residues of PEA-15. Residues from helices 5 and 6 of the DED directly interact with either ERK2 or FADD, while helices 2, 3, and 4 become more flexible in the complex structures than the free-form protein. PEA-15 also uses the same stretch of its irregular C-terminal tail to interact with FADD or ERK2 (residues 116-130). Phosphorylation of Ser-104 and Ser-116 on the C-terminal tail alters the binding specificity from ERK2 to FADD, as the negatively charged phosphoryl groups interact with positively charged amino acids on FADD, while there are no charge-charge interactions of the C-terminal tail with ERK2. I would like to thank the HSI stem grant for allowing me to perform this research under the guidance and supervision of Dr. Yufeng Wei of the chemistry department at New Jersey City University. I would also like to thank the executive board of MACUB (Metropolitan Association of College and University Biologists) for giving me the opportunity to share the findings of this research at the Annual virtual conference. It is an honor. Thank you. Reference: Crespo-Flores, S. L., Cabezas, A., Hassan, S., & Wei, Y. (2019). PEA-15 C-Terminal Tail Allosterically Modulates Death-Effector Domain Conformation and Facilitates Protein–Protein Interactions. *International Journal of Molecular Sciences*, *20*(13), 3335.

NJCU

Effective Antimicrobial Activity of Hydroxamic Acids and Derivatives

Jenan Kanan, Daniel Antunes, Omar Aquani, Harshal Desai, Dr. Robert Aslanian, and Dr. Meriem Bendaoud. New Jersey City University, Department of Biology, 2039 J.F. Kennedy Blvd, Jersey City, NJ 07305

The need to develop new antimicrobial compounds is becoming vital as the number of infections caused by antibiotic resistant strains of bacteria such as Staphylococcus aureus and Staphylococcus epidermidis has drastically increased. In this study, we evaluated the antimicrobial effect of newly synthesized hydroxamic acids and their analogues as potential antibiotic alternatives. Selected compounds with the strongest antimicrobial effect were further tested at different concentrations to be able to analyze the dose-response and their selective effectiveness against the following microorganisms: Candida albicans ATCC 102Staphylococcus aureus 31, Enterococcus faecalis ATCC 19433, Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 10145, ATCC 25923, Staphylococcus epidermidis ATCC 35984, Erwinia amylovora ATCC 15580, and Pectobacterium Carotovorum ATCC 15713. The aim of this study is to identify analogues of hydroxamic acids that will keep the antimicrobial effect of the original acid but will have a reduced cytotoxicity against animal and plant cells. All selected compounds displayed consistent dose-response antimicrobial activity against one or more microorganisms tested. Future study will evaluate the potential cytotoxic effect of the compounds against animal and plant cells.

NJCU

Inhibition of Bacterial Biofilm Formation Using Natural Seed Oils Jessica Menjivar, Meriem Bendaoud Ph.D. Department of Biology New Jersey City University

Many bacteria form biofilm as an important virulence factor in the pathogenesis of bacterial infection. When bacteria attach to surfaces and form biofilm, they build a resistance against antibiotics and other antimicrobial agents, which makes them very difficult to eradicate. This is a critical problem for public health as millions of people acquire infections from pathogenic antibiotic resistant microorganisms such as Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, and Escherichia coli. Scientists are constantly seeking natural therapeutic alternatives like herbs, oils, and seed extracts to combat infections and support better health. Chia, Flax, and Hemp seed oil extracts have been found to support skin health and improve immunity and cardiovascular function. However, very little is known about their effects on biofilm formation of pathogenic microorganisms. This study tested these oil seed extracts for inhibition of biofilm formation against pathogenic bacteria. Using the biofilm assay, it was found that Chia seed oil extract and Hemp seed oil extract had the most effective antibiofilm properties against two strains of P. aeruginosa and S. epidermidis. Preliminary characterization of the chemical composition of Chia seed oil was initiated using the literature to determine which chemical components are displaying anti-biofilm properties . Five chemicals were chosen and tested for their inhibitory effects on biofilm formation. Additional testing will be done to further test antibiofilm properties of these oils and chemicals against other pathogenic bacteria.

SUNY Old Westbury

Investigating Estrogen Effects on Microglial and Glioblastoma Function. Maryann Johnson, Tania Kumar, Mohammed Mian, Sameer Ahmed and Jillian Nissen, SUNY College at Old Westbury, Old Westbury, NY.

Glioblastoma multiforme (GBM) is the most common and most aggressive primary tumor of the brain, and is associated with one of the worst 5-year survival rates among all human cancers. Extensive analysis of patient data has shown a biological sex-based disparity in GBM, reporting that males are 1.5 to 3.5 times more likely to develop brain tumors than females, and subsequently have more extensive tumor necrosis and reduced survival compared to females. Contributing to progression of this disease are the resident immune cells of the brain and spinal cord known as microglia. Microglial cells are inexorably linked to GBM, as they can comprise over 30% of cells found in glioma biopsies. While inflammatory microglia function in an anti-tumorigenic manner, gliomas can disrupt this by releasing factors that polarize microglia to an immunosuppressive phenotype, which in turn secrete cytokines that support tumor growth and spread. Therefore, a shift in microglial populations towards more pro- or anti-inflammatory behavior could greatly impact GBM progression. As the sex-linked steroid hormone estrogen is more prevalent in females, we hypothesized that estrogen may play a role in promoting a pro-inflammatory shift in microglial populations, as well as function in a suppressive manner towards glioblastoma cells. Interestingly, we found that estrogen polarizes microglia to an anti-inflammatory phenotype, but suppresses GBM migration. These conflicting results have refocused our future work on other genetic mediators of microglial function.

Molloy College

Isolation and Characterization of Wild Yeast. Libin Thomas, Andreas Markoulli, Christian Pino, Petrucia Jean-Baptiste and Li Li, Molloy College, Rockville Centre, NY.

To demonstrate fungal diversity, wild yeast strains were isolated from variety of origins and identified by microscopic examination, selective culturing and sequencing. Various phenotypic assays were performed to characterize two wild yeast strains, CPBM1 and LTP2-4, isolated from a mailbox and a fly, respectively. Both strains exhibited comparable growth rate to the laboratory yeast strains, ability to adhere to polystyrene, as well as capability to grow into a mat on semi-solid surface. The potential of identification of putative adhesive molecules in the wild yeast strains may shed light on the mechanisms of biofilm formation and protein aggregation.

Wagner

The Possible Function of the Submucosal Aggregates in the Small Intestine of Urodeles. Kaelin Wolf, Eliza Garcia, Christopher Corbo and Zoltan Fulop, Wagner College, Staten Island, NY.

The function of “submucosal glands” in the small intestine of the group of *Urodeles* such as frogs (*Anura*) and salamanders (*Necturus*) have remained controversial since the late XIX century literature to date. These cellular aggregates are reported either as exocrine glands or structures which are sources of new epithelial cells. Scientific achievements of the past decades have established the presence of specific stem cells in most if not every organ and or tissue type. Our literature review of the historical papers and comparison of them through a modern lens of state-of-the-art biological techniques to the more recent literature allowed us to understand, critique, and hopefully correct the historical conclusions concerning the “submucosal glands” of *Urodeles*. Our morphological findings, together with data published in recent years, strongly support the idea that these submucosal aggregates are not glands, but a bunch of stem cells, similar to the crypts of Lieberkühn found in the majority of different vertebrate intestines. These cellular assemblies may indeed be a group of multipotent stem cells being a source of the different surface epithelial cells of the intestinal villi. Based on migrating patterns of relocating cells, they perhaps may even contribute the endothelial cells of the blood and lymph vessels, not excluding mobile granulocytes and other connective tissue cells