

2017 MARINE SCIENCE SYMPOSIUM



Mauricio González, Director MBRP

Prepared by Grace Carter, MBRP Class '17

Photo Credits: Van Wong and Casey Fogarty, VO Class '17

MARINE BIOLOGY / SCIENCE RESEARCH PROGRAM

New York Harbor School

New York

2017

PROGRAM

10:00 AM	Poster Board Set-Up in Hallways	All Marine Research Students
11:00 AM	10 th Grade Judging	Marine Research Seniors
12:00 PM	11 th and 12 th Grade Judging	Adult Volunteers
03:00 PM	Students Move Posters to Mess Hall	All Students
03:20 PM	Lunch	Students in 320 Adults in Mess Hall
03:45 PM	Report to Mess Hall	All
04:00 PM	Introduction and Welcome	Dr. Jeffrey Chetirko, NYHS Principal
04:00 PM	Introduction of Keynote Speaker	MCs
04:10 pm	Keynote Address	Dr. Nathan Dudley, DOE
04:30 PM	Introduction of Student Speakers	MCs
04:32 PM	Baseline Study of the Marine Natural Resources Of the Harlem/East River (HRE, 2017)	Melanie Smith, Erik Wiemer, Grace Carter and Jared Rosin Katha Conklin, NYHS, Class of '17
04:50 PM	Effects of Compost and Compost Tea On Radish Plant Growth	Cindy Isidoro NYHS, Class of 2017
04:55 PM	Awards Ceremony	Presented by Mauricio González
05:35 PM	Closing Remarks	Mauricio González & MCs
06:00 PM	Ferry Departs to Manhattan	

MARINE BIOLOGY RESEARCH PROGRAM STUDENTS AND PROJECT TITLES



Seniors

Project Titles

Carter, Grace	Species Richness and Interaction of Macroinvertebrates in the Lower Hudson River Estuary
Conklin, Katherine:	Phytoplankton in the Harlem River's Waterways
Gathers, Mariah	Applying GIS to the Surrounding World
Isidoro, Cindy	Effects of Compost and Compost Tea on Radish Plant Growth
Rosin, Jared	Species Richness and Interaction of Macroinvertebrates in the Lower Hudson River Estuary
Scott, Kaila	Carbon Mapping the U.S.A.
Smith, Melanie	Discovering the Unknown: A Baseline Study of the East and Harlem Rivers
Valentin, Bella	GIS
Wiemer, Erik	Biodiversity of Invertebrates within the Upper New York Bay

Juniors

Project Titles

Alvarenga, Angie	Using Geographic Information Systems to Support Sustainable Green Technology
Bell, Christopher	I Know a Fungi: Mycelium Buoys and their Impact in the Oceans
Bloom, Philip	GIS
Charles, Marcus	Geographic Information Systems for Sustainability
Chiu, Matthew	Plastic Microfibers: A Marine Catastrophe and a Simple Solution
Grier, Zoe	3D Printing
Hing, Kiyoshi	GIS
Olivier, Julien	Effect of Oyster Beds on Sea Level Rise
Ring, Nicholas	Concrete of the Future: Testing ECONcrete in the Lower Hudson River Estuary for Biological Compatibility
Rivera, Seth	Comparing the Results of Stable Isotopes Analysis, Gastric Lavage Extraction, Cloacal and Mouth Swabs to Determine the Best Sampling Methods for Sharks in NYC
Rodriguez, Nailea	The Species Richness in the Harbor Estuary

Safy, Rena	Restoring Oysters Using a 3D Colonizing Device
Taylor, Malik	How does Compost Tea Affect the Growth of the STEM and Bulb of Basil
Torres, Isabella	Determining the Least Invasive Sampling Method for Adolescent Sharks in New York
Vittore, Jared	Learning How to Make Maps Using ArcGIS
Zhu, Tony	The Use of Geographic Information Systems in Conservation Biology

Sophomores Project Titles

Allen Sutherland, Aaniyla	Your Friend the Microbe: The Difference in Frequency and Locality of <i>Enterococcus faecalis</i>
Ayala, Hailey	A Family in Water
Bloomfield, Cyd	Secrets of the Buttermilk Channel: Species Richness of Macroinvertebrates in the New York Harbor
Elslamony, Rosalia	Algae Identification: Types of Algae that live in an Aquatic Ecosystem
Hernandez, Chantal	The Rate of Change of Ammonia Concentration in an Aquatic Ecosystem Model
Jenkins, Garry	AEM
Levine, Drew	Growing Sweet Basil in an AEM
May, George	Are Aquatic Organisms Happy and Healthy?
McGuinness, Leo	The Succession of Microorganisms when Microplastics are Introduced to the Environment
Onofre, Ashley	pH Levels in an Aquatic Ecosystem Model
Peralta, Yosneidy	AEM
Salitan, Lauren	Effects of Glyphosate on Oyster Spat
Sierra, Hildeberto	The Succession of Microorganisms when Microplastics are Introduced to the Environment
Sumba, Chelsea	The Effects of Nitrates on the Growth of Basil Plants

Freshman Project Titles

Obermayer, Jacqueline	Secrets of the Buttermilk Channel: Species Richness of Macroinvertebrates in the New York Harbor
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KEYNOTE SPEAKER



Dr. Nathan Dudley, DOE, Founding Principal of the NYHS

Nate Dudley is a parent and school administrator and has worked as a principal, teacher, television producer, and community organizer. He has worked overtime to improve equity and opportunity in our society and in our schools, especially for students in poverty. Nate is currently Field Support Liaison for Renewal High Schools in New York City, working with principals, teachers and coaches to turnaround many low performing high schools in Brooklyn, Queens and the Bronx. Prior to this position, Nate was for three years a Network Leader of 30 middle and high schools throughout the 5 boroughs. Nate grew up in inner-city St. Louis and went to high school just outside Chicago, graduating valedictorian from Oak Park-River Forest High School in 1978. He attended Yale University where he played football and majored in history, and wrote his senior essay on the Nicaraguan Literacy Crusade of 1980. After college he worked at community center in Ceilândia, Brazil. Nate then attended the University of the Andes in Bogotá, Colombia. He returned to the United States and began his teaching career in 1983 at Benito Juarez High School in Chicago. He then went to the University of Texas at Austin where he received an M.A. in Latin American Studies in 1988. During this graduate work Nate also received training as a community organizer and worked on Central American organizing campaigns throughout the country. He worked for TV Globo of Brazil as a producer, covering the United States for the nightly news in Brazil. Nate then became vice president for Pan American Sports, and produced international basketball tournaments throughout the Americas, including the 1992 Dream Team Tournament of the Americas in Portland, OR.

After working at the Atlanta Olympics, in 1996 Nate returned to teaching in New York. He taught Humanities, Spanish, Media Studies, and Social Studies at Manhattan Village Academy and Satellite Academy, a transfer high school in the Bronx.

In 2003 Nate worked with Murray Fisher to plan and write the proposal for, and became the Founding Principal of the Urban Assembly New York Harbor School, located in the Bushwick HS campus, in Brooklyn. In 2010 he led the Harbor School as it moved to Governors Island. The Harbor School created six Career and Technical Education programs. All of these CTE programs assist in the Billion Oyster Project, run by the New York Harbor Foundation, which aims to restore the water quality of New York Harbor by putting a billion oysters in the Harbor by 2035. The high school students make this environmental project work in the real world.

In 2012 Nate began his work with the Network and in 2015 he transitioned to working with Renewal High Schools. Nate's began his doctoral work at Seton Hall University in 2011. His dissertation, completed in 2017, analyzes graduation rates for certain important groups of students at New Small High Schools in New York City, like the New York Harbor School. Nate currently lives in Bed-Stuy, Brooklyn, with his wife, Stephanie Jones and daughters Emerson and Jillian.

SENIOR ABSTRACTS



Grace Carter

Project title: Back to Basics: A Baseline Study of Macroinvertebrates in the lower Hudson River Estuary

Mentor: Dr. Alberto Stolfi – NYU Experimental Genetics Lab

Advisor: Mauricio González

Abstract: This project is a baseline study to observe the biodiversity in the ecosystem and to compare different stations to provide a guide and a baseline for future researchers. If invertebrate DNA was extracted from the Upper New York Bay, sequenced, and analyzed with bioinformatics, then a better understanding of the biodiversity in NY could be gleaned, and in this way an accurate level of diversity could be realized. This may be in the form of a list of invertebrates present in the

waters, or organized in some other way where the results are quantifiable. Given this, however, there is certainly a multitude of information having to do with diversity in general. There is, for instance, a study on biodiversity of freshwater macroinvertebrates in New York State (Department of Environmental Conservation, n.d.). While this is not quite the project proposed, it is certainly a good point to start from.

Autobiography: I have been a part of the rowing team (2013-present), Harbor SEALs - A spotlight group bringing together Citizen Scientists to monitor the health of the Hudson River Estuary. [Run by NYHS students] (2014-Present), Harbor Corps - A student-led group to help support the school's Career and Technical Education programs and the Billion Oyster Project. (2015-Present), Boat Building - A student led group that is currently putting the finishing touches on a New York Bay Sloop. The sloop was designed and brought to life by the NYHS students. (2016- Present). My work experience includes me working with Earth Matter and The CIVITAS Project summer of (2015). Duties included: talking to civilians about the project & sampling for invertebrate organisms while on boat, boat safety and line handling, Lab Tech assistant (2015) Duties included: Completing order forms, changing the pH of tanks and making sure the organisms in lab remained healthy, Completed Conservation Genetics course at Cold Spring Harbor (2015), Interned at NYU under Dr. Alberto Stolfi to complete an independent study experiment (2015-2017) and the Director of Operations for the Harbor SEALs* (2015- Present). The awards I've won at Harbor School include "American Meteorological Society Certificate of Outstanding Achievement" (2017), "NYC Science & Engineering Fair 2nd award in Earth and Environmental Science" (2017), "The Brooklyn Navy Yards Award" (2017), "Stockholm Junior Water Prize" (2017), "Clearwater NYC Science & Technology Fair Award" (2017), 1st Place in Icebreaker "Youth North Eastern Regional Open Water Nautical Mile" 2nd's Coxed Fours (2016), 1st Place in Icebreaker "Crewmaster Sprints Race" (2016), 2nd Place in The New York Harbor School's science symposium (2016), 1st Place in The New York Harbor School's Symposium (2015), 1st Place in Icebreaker "Youth North Eastern Regional Open Water Nautical Mile" 2nd Coxed Fours (2015), 1st Place at the Maritime Museum in Vermont - Whitehall Gig 2nds (2015).



Katha Conklin

Project title: Harlem River Phytoplankton

Mentor: Maura Smotrich, CIVITAS

Advisors: Mauricio González

Abstract: In this project the concentrations of three different groups of phytoplankton were analyzed. Using a method based off of Iain M. Suthers and David Rissik methodology, samples were collected using a beta bottle and then preserved with Lugol's iodine. In this study three groups of phytoplankton were analyzed: Filaments, colonial, and unicellular. As a result the main group of phytoplankton that was seen was filaments, then colonial. While moving south there was an increase in population growth of

all three groups, but at site 1 there were hardly any at all.

Autobiography: During my time at Harbor School I was on the Dean's list for my first two years of high school. I was on the rowing team for my freshman year, then during my sophomore year till senior year I was part of the Kung Fu club called Harbor Dragons. I also was part of the after school science community called Harbor SEALs. I won an award for perfect attendance; I also placed first in the 4th annual science symposium. I also was given the honor of becoming captain for Phytoplankton and then mentor. As hobbies I read many science, mystery, action and fantasy books. I also draw my favorite anime characters with my own style, and I sing. I normally keep my singing to myself unless someone wants to hear me sing. I'm now a senior graduating this June and soon going to attend Roger Williams University with marine biology as my major. I'm looking forward to all the things I'm going to accomplish while attending RWU.



Mariah Gathers

Project title: GIS on Mapping Conservation Biology

Advisors: Mauricio González

Abstract: My project is based on GIS a computer mapping program. I have been working on this for the past 3 years and hope to gain my certification in GIS by the end of the year. While my knowledge is mostly based around books I hope to be able one day to showcase this program as my own. With the books I was able to learn the basics and how to use Arc Map and Arc Catalog. Applying GIS to the surrounding world has already started as more and more people teach GIS they are making way to a new way of storing and viewing data. It is my hope that people after me can learn GIS so that it won't seem like such a challenge



Cindy Isidoro

Project title: Effects of Compost and Compost Tea on Radish Plants Growth

Mentor: Marisa DeDominicis, Co-founder of Earth Matter

Advisor: Mauricio González

Abstract: According to the Environmental Protection Agency, in 2013 recycling and composting prevented 87.2 million tons of materials from being thrown away. Compost is made from organic waste such orange and banana peels, newspapers and the list continues. To create compost tea, compost is needed. Composting can decrease the amount of organic waste going away from landfills. Previous studies have shown compost does contain

beneficial nutrients and minerals which plants need. In addition, compost tea may suppress soil-borne pathogens. What effect does compost and compost tea have on radish plants? The results of this project can give more information about compost and compost tea. If compost is added to pots with weekly compost tea applications then the radish plants will grow healthier since there are nutrients and minerals provided from these natural fertilizers. In 2015, compost tea applications were applied on two soil compacted areas, the results showed compost tea reduced soil compaction and an increase of macro organisms compared to the control section.

Autobiography: It was a great experience being in Harbor SEALS I was part of the benthic team. I grew up in East Harlem, being a part of the baseline study for the Marine Natural Resources of the Harlem/ East River Hudson-Raritan Estuary made me feel like I was giving back to my community. I enjoy learning about the environment and issues the world needs to solve. Will be attending SUNY Oneonta this fall as undecided. I'm not sure what career I'll go into but I do know I want to help make a change in this world.



Jared Rosin

Project title: The Biodiversity of Macroinvertebrates within Pier 101, Governors Island

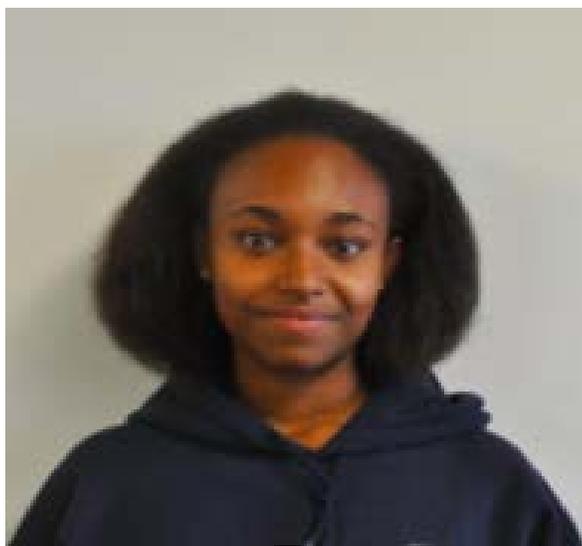
Mentor: Dr. Alberto Stolfi, NYU Brown Building

Advisor: Mauricio González

Abstract: This project is to observe the biodiversity of the Upper New York Bay. To be specific, my team and I were conducting genetic identification tests on what macroinvertebrates resides around Pier 101, Governors Island. We brought 27 specimens to a lab in NYU, to extract their DNA. In return we received 20 complete DNA strands. First, we collected specimens from Pier 101's Flooding Dock, Governors Island. Then we isolated the DNA; here a number of steps had to take place for us to get a pellet of DNA at the bottom of a test tube. Next, a process

called gel electrophoresis was performed to see what DNA was extracted properly and that data is sent to another lab for sequencing were then the gathered Amino acid streams were put through bioinformatics testing and their closest matching organism is given to us. We could see from the data gathered that the New York estuary around Pier 101 actually possesses a healthy ecosystem considering its plentiful and diverse amount of life.

Autobiography: I have participated in the Rowing team, Student Council, Boat Building, and Harbor Seals, as well as working with the Billion Oyster Project during my time at the Harbor School. My hobbies are powered by my curiosity of this world: Being in nature and preserving it, playing video games and sports, All of the sciences and new/interesting scientific as well as engineering discoveries, reading, creating stories of my own, and spending time with my family. Getting my hands dirty is a way of life for me because I'm always busy. The Marine Biology Research Program has allowed me to pursue a project in understand the macroinvertebrates in the New York harbor and how they connect to each other using genetics to identify the organisms that me and my partner, Grace Carter, sample. After finishing this project we, Team Spineless, participated in NYCSEF (New York City Science and Engineering Fair) with our project and placed in second along with 5 other awards.



Kaila Scott

Project title: GIS Mapping

Advisor: Mauricio González

Abstract: I have been working with GIS (Geographic Information Systems) for 2 years. The Big picture and expected outcome of being in the Marine Biology program and studying GIS, is to learn how to analyze Geospatial Data. Even though we have yet to create our own maps and project, GIS has become my project and the end goal is to get certified, and be the first high school student to get certified in the NY State.

Autobiography: I participate in afterschool programs such as 420 sailing and J24 sailing, which I am the Co-Captain of. Even though I love sailing, it is more of a hobby than a career path for me. I am really passionate about helping sexual assault victims, so I want to be a Sexual Assault Lawyer. I am going to be attending John Jay studying Criminal Justice in the fall. Up until then, I will be teaching 8-12 year olds how to sail in Maine during the summer. While at harbor school, I have won 3rd place for 2 years.



Melanie Smith

Project title: A Baseline Study of the Marine Natural Resources of the Harlem/ East River (Hudson-Raritan Estuary 2017)

Mentor: Jim Lodge, Hudson River Foundation

Advisor: Mauricio González

Abstract: The East River Esplanade is a popular place for locals to go for a walk or run along the East and Harlem Rivers, and experience the natural beauty that New York has to offer. However, the East and Harlem River ecosystem has little to no visible wildlife. In hopes of a future living shoreline, compared to the hard seawall that currently exists, a baseline study is necessary to monitor phytoplankton and benthic populations, species richness and biodiversity, and physical chemistry of the

water. Four sites (three along the Harlem River and one at Pier 101 on Governors Island serving as the control) would be observed. This information would help in predicting ecological uplift; create an ongoing monitoring

program of the area, which could help determine the success of different construction materials with the increase of native populations. It is predicted that few organisms are currently able to thrive in the area, while in the past; numerous living organisms were able to flourish. With this year-long baseline study, students are able to better understand an ecosystem along Manhattan, as well as open the door for unique opportunities surrounding restorative efforts.

Autobiography: My name is Melanie Smith, a current senior at the Urban Assembly New York Harbor School from Brooklyn. Since I was 6 years old, I have been interested in marine science, inspired by fishing trips with my uncle, along with movies like Free Willy and Finding Nemo. The water has always been in my life, and my high school is perfect for helping me continue on the path to being a marine biologist. I recently completed a yearlong baseline study monitoring the East/ Harlem River, leading 30 student volunteers as Project Manager. In addition, I will be attending Stony Brook University as Marine Vertebrate Biology, and possibly transferring to Cornell Agriculture and Life Sciences program for the Fall 2018 term.

Aside from my passion for marine science, I am interested in traveling the world (starting with the rest of the United States) and hope to become fluent in French. I was a member of the National Park Service Club in my school, where we would visit and learn about numerous national parks in the area, including Governors Island, where Harbor School is located. I was also editor of my school's newspaper and student representative from my sophomore through senior year.



Erik Wiemer

Project title: Baseline Study of the Marine Natural Resources of the Harlem/East River

Mentor: Matthew De Andrade, Math teacher, New York Harbor School

Advisor: Mauricio González

Abstract: The Harlem/East River was monitored for one year in order to determine the health of the ecosystem based on physical chemistry parameters, littoral invertebrate species richness, benthic populations, and phytoplankton concentrations. It was predicted that there would be differences between sample sites for each component. Sampling occurred at four different stations with the control at the Governors Island Oyster Restoration Project Reef between January 2015 and

October 2016. The collected data supported the hypothesis in that there were differences between the same sites for each component. In addition, the collected data justifies the need for restorative repair.

Autobiography: His name was Erik Wiemer. Beloved friend, son, and brother, he left us once he stepped onto the graduation stage. His tendency to take in the lexicon of the language will live on in the hearts of those who knew him. While in the legally mandated 4 year awkward phase directly preceding his ascension, Erik spent his time with numbers, being the data analyst for a 3 year baseline study to benefit the New York Bight. In doing so, he worked to expand his comfort zone and tried to learn as much about himself as he could during the mad rush to be more than “normal.” He enjoyed gaming, extending his imagination and working with others to overcome obstacles in a safe space with little risk.



JUNIOR ABSTRACTS

Alvarenga, Angie

Project title: Using Geographic Information System to support sustainable Green Technology

Advisor: Mauricio González

Abstract: A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. A geographic information system (GIS) lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. GIS benefits organizations of all sizes and in almost every industry. There is a growing interest in and awareness of the economic and strategic value of GIS. The Map i will be presenting today will be about the management of watersheds in North Carolina. Specifically the location from Dam at Greshams Lake to Neuse River this is the small portion of Perry Creek that is affected. Watershed can be affected in many ways. The neuse river has many reasoning behind its polluted area.

Bell, Christopher

Project title: I know a fungi : Mycelium Buoys and their Impact in the Oceans

Mentor: Dr. Sue Van Hook

Advisor: Mauricio González

Abstract: Pollution is a huge issue in the world. Pollutants effect plenty of ecosystems around the world. One material that could replace nonrenewable materials is mycelium fungi. Mycelial beneficial in recycling nutrients into its environment while decomposing as an 100% renewable material. These two components make mycelium a compatible replacement for numerous pollutants currently in the environment. This is important because mycelium can help restore harmed environments. Therefore mycelium can be a new, suitable replacement for pollutants.

Charles, Marcus

Project title: Geographic Information Systems for Sustainability

Advisor: Mauricio Gonzalez

Abstract: Geographic Information systems are used in a number of modern day professions. These maps can fit very vast amounts of information into small spaces for people to use. Whether if it's a sewage company that wants to plot the points of wastewater discharges and drawing lines for where there pipe lines run through or a touring family trying to make their way around the city, anyone can use GIS for daily use. The systems I am presenting today are for environmentally focused companies that want maps of certain areas to understand where they need to pour their efforts into.

Chiu, Matthew

Project title: Plastic Microfibers: A Marine Catastrophe and a Simple Solution

Mentor: Rachael Z. Miller, Rozalia Project Co-Founder/Executive Director

Advisor: Mauricio González

Abstract: Microfibers are fine fibers that are found in almost all clothing. Microfibers are often used specifically in athletic wear, but can also be found in any type of clothing. Microfibers, hence the prefix -micro, are microscopic, being $\frac{1}{2}$ the diameter of silk fiber. These fibers may be miniscule, but their impact has a tremendously negative affect in our society and in nature. When clothes are washed, microfibers are sent back into our oceans, causing more detrimental danger. Microfibers are a pollutant continuing to grow, and its effects will continue to impact the environment. It is expected that this impact will not be decreasing anytime soon, as it is shown that plastic demand is high all over the globe. The origin of this problem is a simple one, however. Laundry is a direct cause of the microfibers in our oceans. Microfiber debris that directly transfers from our laundry to our water systems can have a major effect on not only marine ecosystems and organisms, but also humans. This research aims to target areas of sustainability and fashion by taking microfibers and transforming them back into fabric. It is hypothesized that the amount of microfibers in the ocean, and, in turn, the risk of human and marine organism harm will be reduced.

Olivier, Julien

Project title: Effect of Oyster Beds on Sea Level Rise

Mentor: Justin Ridge

Advisor: Mauricio González

Abstract: In recent years we have seen the detrimental impact of rising sea levels on our coastlines. Storm surge and flooding have ravaged our coastlines and destroyed thousands of people's homes (Nicholls, 2003). It is imperative that we address this issue due to its wide ranging impact on coastline populations. About 1.2 billion people populate our coastlines and are affected by rising sea levels (Nicholls, 2003). As seaward population increases so does the necessity to find a solution to this issue. My project will address this issue by using oyster beds as method of reducing flooding. I will be testing how oyster beds reduce wave energy in a specific location in New York Harbor. I have hypothesized that there will be reduced wave energy in the location that the oyster bed was placed. The goal of my project is to determine whether oysters can be used as an effect method for controlling sea level rise.

Ring, Nicholas

Project title: The Percent Coverage of Biodiversity on EONcrete, on the Harlem River Sea Wall

Mentor: Jim Lodge, Hudson River Foundation

Advisor: Mauricio González

Abstract: The crumbling east river esplanade is in dire need of rebuilding, one material that could be used is Dr. Shimrit Perkol-Finkel and Dr. Ido Sella CONcrete. Working with CIVITAS and the citizen scientist organisation Harbor SEALS we crafted and deployed EONcrete disks into the Harlem River to test the percent coverage of biodiversity on the disks. This data will then be compared to the Percent Coverage of Biodiversity of the same area on the sea wall. I Predict this data will show that CONcrete has more biodiversity compared to the sea wall.

Rivera, Seth

Project title: Comparing the results of Stable Isotope Analysis, Gastric Lavage Extraction, Cloacal and Mouth Swabs to Determine the Best and Least Invasive Sampling Method for Adolescent Sharks in the New York Area

Mentor: Greg Metzger

Advisor: Christine Marizzi , Mauricio González

Abstract: Sharks are an essential key to all ecosystems as top predators. This study takes into account the fact that the analysis of diet based off of the top predators has been done in a time of high stress or during death, which can create changes in digestive chemicals and other chemicals that may be detrimental to the identification of the fish and animals eaten. So, The purpose of the experiments done would be to not only find the diets of specifically adolescent sharks, but find a method that is less invasive and still as successful as the prior non lethal methods.

Rodriguez, Nailea

Project title: The Species Richness in the Harbor Estuary

Mentor: Jim Lodge, Hudson River Foundation

Advisor: Mauricio González

Abstract: The rising effects of pollution have affected the biodiversity of all invertebrates in the Hudson Estuary. The animals or organisms that classify as invertebrates are animals that neither possesses nor develop a vertebral column. The biodiversity of the Hudson Estuary is important because it would give us a clear understanding of what's growing in the Harbor and how the water chemistry-pH, alkalinity, Dissolved Oxygen, Salinity Phosphates, Nitrate, Nitrite, Turbidity, and ammonia- is affecting the growth of invertebrates. The biodiversity in all ecosystems has slowly decreased over time, however it's still important to measure the diversity among organisms in an ecosystem. When the biodiversity of invertebrates in the Hudson Estuary is identified there will be little to no biodiversity between invertebrate families; there will be little variety between organisms. The organisms could be from the same family or there could be more organisms from organism family a than there organisms from organism family.

Safy, Rena

Project title: Restoring Oysters Using a 3D Colonizing Device

Mentor: Michael McCann, Ph.D. The Nature Conservancy

Advisor: Mauricio González

Abstract: Oysters are dying out because of habitat destruction. Oysters are keystone organisms in the aquatic ecosystem; they keep it healthy and stable. They filter the water, provide habitat to dependent organisms. The

study is focusing on oyster settlement, survival and growth rate on a 3D colonizing device in different water depths in the New York Harbor. The expected outcome is that, the oysters near the top level of the water with the 3D colonizing device will have the most survival, growth and settlement rate.

Taylor, Malik

Project title: How does compost tea affect the growth of the stem and bulb of the plants

Mentor: Jessica Haltzman

Advisor: Mauricio González

Abstract: My experiment was about seeing either radish grow better off compost tea or filtered water In soil, compost, or soil and compost mixed together and what is important about my experiment is that plants can be water by compost tea better than filtered water and compost tea would have a greater effect on the plants then filtered water would. I think compost tea have much of a bigger effect on the plants than filtered due to the compost soil mixed together and compost and soil water by compost tea will have a greater affect.

Torres, Isabella

Project title: Comparing the results of Stable Isotope Analysis, Gastric Lavage Extraction, Cloacal and Mouth Swabs to Determine the Best and Least Invasive Sampling Method for Adolescent Sharks in the New York Area

Mentor: Greg Metzger

Advisor: Christine Marizzi, Mauricio González

Abstract: Sharks are an essential key to all ecosystems as top predators. This study takes into account the fact that the analysis of diet based off of the top predators has been done in a time of high stress or during death, which can create changes in digestive chemicals and other chemicals that may be detrimental to the identification of the fish and animals eaten. So, The purpose of the experiments done would be to not only find the diets of specifically adolescent sharks, but find a method that is less invasive and still as successful as the prior non-lethal methods.

Vittore, Jared

Project title: Learning how to make maps using Arcgis Stem lesson 7

Advisor: Mauricio González

Abstract: Arc GIS (Geographic Information Systems) is a program used by many people to create maps. It can be used to create maps for new areas and unsafe places to travel. In Arcgis stem lesson 7 the map created pinpoints areas that contain a lot of woody biomass. This map shows potential biomass that can be processed and used for renewable energy. Throughout this lesson there were new problems I had to face such as learning the new material and putting it into action when making this map. This map was chosen because it was the most challenging lesson so far and the one where a lot of skills from previous lessons all came together.

Zhu, Tony

Project title: The Usage of GIS in Conservation Biology

Mentor: Mauricio González

Abstract: GIS has many applications in real world situation, and one of its usages is in Conservation Biology. By making a map showcasing the habitats of animals, it can be used to better take care of endangered species. For instance, the map that I created locates the nesting area of Bald Eagles and determines locations for the protection of *Harpella* plants. In addition making this map requires the software ARCGIS and tools such as Multiple Ring Buffer, Clip, and Editor.

THE MARINE BIOLOGY RESEARCH PROGRAM WOULD LIKE TO THANK THE FOLLOWING PEOPLE FOR THEIR SUPPORT:

NYHS Parent/Teacher Association

Alice Tse Chiu	President
Theresa Case Bandouveris	Vice President
Pamela Bailey	Recording Secretary
Nancy Pearson Grier	Treasurer
Celia Baruchin & Miriam Wysoker	Senior Parents-At-Large
Theresa Jordan & Nan Richardson	Freshman Parents-At-Large

NYHS Administrators + Support Staff

Dr. Jeffrey Chetirko	Principal
Aneal Helms	Assistant Principal
Jackye Stephenson	Business Manager
Ronni Ettinger	Parent Coordinator
Jessica Cuevas	NYHS College & Career Counselor
Jeremy Lynch	NYHS Dean of Students
Nellie Garrow-Coleman	Social Worker
Yuderca Castillo	Guidance Counselor
Cadian Leys	Principal's Secretary
Pam Edwards	School Aide
Belia Lopez	School Aide
Bev Means	School Aide
Marlon Scott	School Aide

New York Harbor Foundation

Murray Fisher	President and NYHS Founder
Matthew Haiken	Vice President, Administration
Robina Taliaferrow	Community Liaison & Operations Manager
Sam Janis	Billion Oyster Project , Project Manager
Pete Malinowski	Billion Oyster Project , Director
Ana Ronquillo	Business Manager

Guest Speaker

Nathan Dudley	DOE & Founding Principal of NYHS
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Mentors/Advisors

Jim Lodge	Hudson River Foundation
Maura Smotrich	CIVITAS Citizens
Marissa Dedominicis	Earth Matter
Andrea Lieske	Earth Matter
Rachel Miller	Rozalia Project
Dr. Michael McCann	The Nature Conservancy, NYHF
Dr. Alberto Stolfi	New York University
Dr. Sue Van Hooke	Ecovative©
Justin Ridge	
Greg Metzger	DOE
Matthew DeAndrade	New York Harbor School
Mauricio Gonzalez	New York Harbor School

Volunteers and Judges

Michael Kessler	ConEd; Honoree
Alberto Stolfi	NYU; Honoree
Anita Morawski	Parent
Violeta Gonzalez	SUNY Oswego; Alumni
Jeremy Lynch	NYHS
Michael Porto	ConEdison
Caroline Kretz	ConEdison
Zoryanna Gavrilova	ConEdison
David La Guerra	ConEdison
Nicole Salomon	ConEdison
Neal Phillip	Bronx CC
Rachel Anderson	Bronx CC; Alumni
Maura Smotrich	CIVITAS
Michael Judge	Manhattan College
Daniela Davi	CIVITAS
Nicolle Martinez	Columbia U; Alumni
Zain Bin Khalid	EMT; Alumni
Michael McCann	TNC-NYHF
Thomas Gorrell	SVA
Ronni Ettinger	NYHS; Parent Coordinator
Leslie Chow	NYHS
Celia Baruchin	Parent
Delali Kodah	DOE
Marisa DeDominicis	Earth Matter
Andrea Lieske	Earth Matter
Jessica Cuevas	NYHS College Counselor
Rebecca Grussgott	NYHS
Jessica Haltzman	Earth Matter
Cezanne Bies	Rutgers; Alumni
Shaneza Rohoman	Bronx CC
Charles Maliti	Bronx CC
Jim Hall	DOE; GIS Analyst
Nick Occhipinti	DOE; GIS Analyst
Jane Deng	NYHF Intern
Jenea Robinson	NYHF Intern

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