

The 73rd Annual Eastern Colleges Science Conference

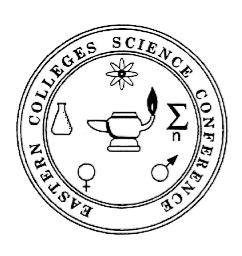
Manhattan College April 6, 2019



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Program Book

Dear Conference participants,

It is with real pleasure that we welcome again the Eastern Colleges Science Conference to the Manhattan College campus. This conference enables undergraduate students, especially from institutions without significant graduate programs, to present the fruits of their research with their faculty mentors, meet and interact with their peers, and appreciate the importance of their own work within the greater spectrum of scientific research.

Manhattan College has had a long commitment to engaging its students in research, either in preparation for further graduate studies, or for working as scientists in the private sector. In either case, "learning through discovery" has been our motto. Hosting the ECSC helps us further promote our efforts in that direction.

This year's conference themes continue to be diverse, transcending many areas of biology, chemistry, psychology, health, environmental science, and computer science. We hope that you will take the time to also appreciate the work in the fields different than your own; at the end all science endeavors are related to one another.

Again we welcome you to our campus and wish you the most fruitful and satisfying experience.

Constantine E. Theodosiou

Theodorin

Dean of Science and Professor of Physics

SCHEDULE OF EVENTS April 06, 2019

8:00 AM to 8:45 AM - Registration and continental breakfast

Smith Auditorium

8:45 to 9:00 AM – Welcome by Dean Theodosiou, Smith Auditorium.

9:00 to noon – platform and poster sessions.

Poster sessions - Smith Auditorium.

Platform sessions- see schedule below.

Noon to 1:00 PM

lunch – students and faculty – Locke's Loft. Your registration tag is your entrance ticket. Third floor of Thomas Hall.

Noon to 1:30 PM

Lunch- Board members – Atrium of Café 1853. First floor of Thomas Hall.

1:30 to 5:30 PM

Poster sessions – Smith Auditorium

Platform sessions – see schedule below.

6:30 PM – Awards Dinner in Kelly Commons

Faculty on Host Committee: Drs. Ghislaine Mayer, Sarah Wacher, Bryan Wilkins and Lance S. Evans.

Students on Host Committee: Shereen Chaudhry, Ana Feliciano, Erin Sanders, and Claudia Ramirez.

HISTORY OF THE EASTERN COLLEGES SCIENCE CONFERENCE

The first Eastern Colleges Science Conference (ECSC) was organized in 1947 by undergraduate Pauline Newman at Vassar College in Poughkeepsie, New York. The aim then, as now, was to stimulate interest in undergraduate research in the sciences and related fields and to provide a lively forum for the presentation of research papers. Pauline Newman received her bachelor's degree in chemistry and went on to receive a Ph.D. in chemistry from Yale. About 22 schools attended the first conference, and the theme was "Science, Philosophy and Society."

The constitution of the ECSC was ratified on April 24, 1948 at Union College in Schenectady NY, making the conference a self-sustaining body.

In 1972 the Pennsylvania State University was named the repository for all official documents of the ECSC. Professor Stanley Shepherd was named the permanent secretary of ECSC. In 1980 Professor Shepherd stepped down and Professor Gerard O'Leary from Providence College was elected to the post. At the 35th annual conference a steering committee was established to assist in directing the activities of the ECSC.

In 1983 the ECSC was incorporated in Rhode Island and now operates with a Board of Directors, elected from faculty of the participating colleges and universities. In 1986 Professor Gerard O'Leary stepped down, and Professor Edward Gabriel of Lycoming College was elected Chair of ECSC.

In 1995, Professor Lance S. Evans of Manhattan College was elected chair of the board. In 2007, Dr. Michael Kotarski of Niagara University was elected to Chair of the Board of Directors, and in 2011 was succeeded by Dr. Donald Stearns of Wagner University.

Interest has increased in the conference and over our 72-year history 50 colleges and universities have attended this annual event. Over time the range of subject matter has also expanded and now covers computer science and behavioral and social sciences, as well as the original areas of biology, chemistry, mathematics, physics and engineering

PREVIOUS EASTERN COLLEGES SCIENCE CONFERENCE MEETINGS

- 1947: Vassar College, Poughkeepsie, NY
- 1948: Union College, Schenectady, NY
- 1949: Adelphi College, Garden City, NY
- 1950: Bernard College, New York, NY
- 1951: Yale University, New Haven, CT
- 1952: PA College for Women, Pittsburgh, PA
- 1953: N.Y. State College for Teachers, Albany, NY
- 1954: Brooklyn College, Brooklyn, NY
- 1955: Seton Hall University, South Orange, NJ
- 1956: Temple University, Philadelphia, PA
- 1957: Georgetown University, Washington, DC
- 1958: Wilkes College, Wilkes-Barre, PA
- 1959: Suffolk University, Boston, MA
- 1960: Hunter College, New York, NY
- 1961: SUNY College of Forestry, Syracuse, NY
- 1962: North Carolina State College, Raleigh, NC
- 1963: Boston College, Chestnut Hill, MA
- 1964: Jersey City State College, Jersey City, NJ
- 1965: Danbury State College, Danbury, CT
- 1966: D.C. Teacher's College, Washington, DC
- 1967: Fordham University, New York, NY
- 1968: Yale University, New Haven, CT
- 1969: Yale University, New Haven, CT
- 1970: Wilkes College, Wilkes-Barre, PA
- 1971: Rosary Hill College, Buffalo, NY
- 1972: U.S. Military Academy, West Point, NY
- 1973: Pennsylvania State Univ., University Park, PA
- 1974: Worcester Polytech. Institute, Worcester, MA
- 1975: Widener College, Chester, PA
- 1976: Rhode Island College Providence, RI
- 1977: Fairleigh Dickenson Univ., Rutherford, NJ
- 1978: Union College, Schenectady, NY
- 1979: Wilson College, Chambersburg, PA
- 1980: SUNY at Cortland, Cortland, NY
- 1981: Jersey City State College, Jersey City, NJ
- 1982: Lycoming College, Williamsport, PA
- 1983: Wilkes College, Wilkes-Barre, PA
- 1984: Providence College, Providence, RI
- 1985: SUNY at Fredonia, Fredonia, NY
- 1986: Duquesne University, Pittsburgh, PA
- 1987: Lycoming College, Williamsport, PA
- 1988: Ithaca College, Ithaca, NY

- 1989: U.S. Military Academy, WestPoint, NY
- 1990: Manhattan College, New York, NY
- 1991: SUNY at Fredonia, Fredonia, NY
- 1992: United States Naval Academy, Annapolis, MD
- 1993: Central Connecticut State University,
- NewBritain, CT
- 1994: Duquesne University, Pittsburgh, PA
- 1995: Ithaca College, Ithaca, NY
- 1996: Lycoming College, Williamsport, PA
- 1997: Central Connecticut State University,
- New Britain.CT
- 1998: Niagara University, Lewiston, NY
- 1999: Sacred Heart University, Fairfield, CT
- 2000: Wagner College, Staten Island, NY
- 2001: Wilkes University, Wilkes-Barre, PA
- 2002: Niagara University, Lewiston, NY
- 2003: Ithaca College, Ithaca, NY
- 2004: Manhattan College, Bronx, NY
- 2005: CentralConnecticutStateUniversity, New Britain, CT
- 2006: St.Joseph's University, Philadelphia, PA
- 2007: College of Mount St. Vincent, Bronx, NY
- 2008: Niagara University, Lewiston, NY
- 2009: Wagner College, Staten Island, NY
- 2010: Pace University, Pleasantville, NY
- 2011: Sacred Heart University, Fairfield, CT
- 2012: William Paterson University, Wayne, NJ
- 2013: Providence College, Providence, RI
- 2014: Marist College, Poughkeepsie, NY
- 2015: Niagara University, Lewiston, NY
- 2016: Western New England Univ., Springfield, MA
- 2017: Wilkes University, Wilkes-Barre, PA
- 2018: Ithaca College, Ithaca, NY
- 2019: Manhattan College, Bronx, NY

MANUSCRIPTS CONSIDERED FOR ECSC 2019 EXCELLENCE AWARDS

Title: Xylem Conductivities of Primary, Secondary and Tertiary Veins of Plant Leaves

First Author: Maya Carvalho-Evans School: Manhattan College

Category: Botany

Title: Performance of Accelerated Solvent Extraction in Comparison to Other Methods in

the Extraction of Active Compounds from Bee Propolis

First Author: Jozlyn Charland School: Pace University Category: Organic Chemistry

Title: Exploring Interactions Between Chromatin and Essential Chromatin Remodeling

Complex in vivo

First Author: Shereen Chaudhry
School: Manhattan College
Category: Chemistry/Biochemistry

Title: Bark Formation for Five Columnar Cacti Species of Central Mexico

First Author: Phillip Dombrovskiy School: Manhattan College

Category: Botany

Title: Differences in Depression and Anxiety Across the Breast Cancer Spectrum

First Author: Kate Fike

School: John Carroll University

Category: Health Science

Title: The Binding Capacity of Nanoceramics with Sulfa Drugs

First Author: Gwen Iannone
School: Pace University
Category: Organic Chemistry

Title: Machine Learning Programs Predict Saguaro Cactus Death

First Author: Cole R. Johnson School: Manhattan College

Category: Botany

Title: Raman Spectroscopy of Different Metformin Tablets

First Author: Elise Krupoff
School: Pace University
Category: Organic Chemistry

Title: Effect of Radix Ginseng on Spatial Learning and Memory and Amelioration of

Anxiety in Long-Evans Rats

First Author: Isabella Lane

School: John Carroll University
Category: Experimental Psychology

Title: Determination of the Temporal and Spatial Variation of Giardia lamblia in Ribbed

Mussels (Geukensia demissa) Collected from Bronx, NY, 2017

First Author: Alexa Marcazzo School: Manhattan College Category: Microbial Ecology/Public Health

Title: Spines of Columnar Cacti from Central Mexico: Novel Changes in Relation to Stem

Bark Coverages

First Author: Catherine A. McDonough School: Manhattan College

Category: Botany

Title: Bark Coverages on Columnar Cacti from Central Mexico

First Author: Catherine A. McDonough School: Manhattan College

Category: Botany

Title: Inducing a Phenotype in bbs2-/- Zebrafish Larvae

First Author: Viktoriya Partyka School: John Carroll University

Category: Physiology

Title: Predicting Bark Coverage on Saguaro Cacti (Carnegiea gigantea)

First Author: Olivia Printy
School: Manhattan College

Category: Botany

Title: Stem and Branch Growth Predicts Seed Yields of Artemisia tridentata

First Author: Claudia S. Ramirez School: Manhattan College

Category: Botany

Title: Quantifying Xylene Mixtures by Raman Spectroscopy

First Author: Lauren Reilly
School: Pace University
Category: Organic Chemistry

Title: Kratom as an Enhancer of Working Memory in Rats

First Author: William Sweeney
School: John Carroll University

Category: Clinical/Counseling Psychology

Title: Antioxidant Activity of Bee Propolis from Different Parts of the World

First Author: Alexander Tielemans School: Pace University Category: Organic Chemistry

Title: Xylem Conductivity in Stems of Artemisia tridentata

First Author: Victoria Webb School: Manhattan College

Category: Botany

Title: Raman Spectroscopic Analysis of Nitrile-Containing Compounds

First Author: Lyric Wyan
School: Pace University
Category: Organic Chemistry

Platform sessions

Morning sessions: Sessions A, D and G only

Session A: Hayden Hall room 507

Session D: Hayden Hall room 409

Session G: Hayden Hall room 210

Presentation 1; 9:00 to 9:20

Presentation 2; 9:20 to 9:40

Presentation 3; 9:40 to 10:00

Break 10:00 to 10:20

Presentation 4; 10:20 to 10:40

Presentation 5; 10:40 to 11:00

Presentation 6; 11:00 to 11:20

Presentation 7; 11:20 to 11:40

Early PM sessions: Sessions B, F, and H only

Session B: Hayden Hall room 507

Session F: Hayden Hall room 409

Session H: Hayden Hall room 210

Presentation 1; 1:30 to 1:50

Presentation 2; 1:50 to 2:10

Presentation 3; 2:10 to 2:30

Presentation 4; 2:30 to 2:50

Presentation 5: 2:50 to 3:10

Late PM sessions: Sessions C, E and J only

Session C: Hayden Hall room 507

Session E: Hayden Hall room 409

Session J: Hayden Hall room 210

Presentation 1; 3:30 to 3:50

Presentation 2; 3:50 to 4:10

Presentation 3; 4:10 to 4:30

Presentation 4; 4:30 to 4:50

Presentation 5; 4:50 to 5:10

Presentation 6; 5:10 to 5:30

PLATFORM SESSIONS:

Session A: Chemistry:

A-1 ACCESSING DIYNES CONTAINING THIOCYANATE END-GROUPS EN ROUTE TOWARDS POLYDIACETYLENES

Oskar Erik Sundberg, Wagner College

A-2 RETARDATION OF PHASE SEPARATION OF LIQUID MIXTURES WITH A CRITICAL POINT OF MISCIBILITY

Janelly Aybar and Filomena Califano, St Francis College.

A-3 SODS ARE HERE!

Stephen Howard, Fordham College.

A-4 NEUROPROTECTIVE EFFECTS OF KCNQ POTASSIUM CHANNELS AFTER TRAUMATIC BRAIN INJURY WITH ACUTE AND CHRONIC ALCOHOL USE

Munoz, Jose, Abreu, Saul, Binn, Megan, Barrett, Rachel, De Souza, William Paterson University.

A-5 THE EFFECTS OF MODULATION OF A POTASSIUM CHANNEL ON SOCIAL BEHAVIOR AFTER A TRAUMATIC BRAIN INJURY

Jose Munoz and Sonya M. Bierbower, William Paterson University

A-6 AN INFRARED SPECTROSCOPIC ANALYSIS OF SHRINK-WRAPPED PLASTICS TO FACILITATE SORTING IN RECYCLING.

Ashley Pavia and Alessandra Leri, Marymount Manhattan College.

A-7 EMPLOYING GREEN CHEMISTRY METHODS TOWARDS THE SYNTHESIS OF HIGH EFFICIENCY ORGANIC DYES

Kelsey Savje and Racquel C. DeCicco, Wagner College

Session B: Psychology and Health:

B-1 "YOU'RE A VERY SMART PERSON BUT YOU'RE ALSO A WOMAN": PORTRAYALS OF GENDER MESSAGES IN TELEVISION SITCOMS

Soren Beck, Maria Khouri, Ithaca College

B-2 SEE THROUGH YOUR MEAL

Quincy Doccy, Pace University

B-3 DO PEOPLE MATTER? THE INFLUENCE OF CONTENT ON EMOTIONAL RECALL MEMORY.

Chandler Cronk, Sarah Kosian, Ithaca College.

B-4 MOMS RULE AND DADS DROOL: PORTRAYALS OF MOTHERS AND FATHERS IN TELEVISION SITCOMS AND TEEN SHOWS

Julia Fitzgerald, Leticia Lynch, Ithaca College

B-5 THE INFLUENCE OF CHOLESTEROL ON NAD+ PRODUCTION MYCOBACTERIUM BOVIS-BCG

Eric Casper and Marcy Peteroy Kelly, Biology Department, Pace University.

Session C: Molecular Biology

C-1 EXPLORING INTERACTIONS BETWEEN CHROMATIN AND ESSENTIAL CHROMATIN REMODELING COMPLEX IN VIVO

Shereen Chaudhry, Manhattan College.

C-2 CLUSTERING OF FUNCTIONALLY RELATED GENES IS A MECHANISM OF TRANSCRIPTIONAL CO-REGULATION IN SACCHAROMYCES CEREVISIAE
Irvin Gamarra, Alanna Cera, Maria K. Holganza, Exequiel M. Sisso, William Paterson University

C-3 TREATMENT OF LDL-DERIVED CHOLESTEROL WITH PHOSPHOLIPASES A2 INHIBITOR ONO TO DETECT LOCALIZED OF STARD3 IN THE ENDOCYCTIC RECYCLYING COMPARTMENT.

Edward Cluett and Zaira Sylvain, Ithaca College.

C-4 CO- LOCALIZATION OF KV2.1 AND FAK DURING ZEBRAFISH EBRYOGENESIS Rocio Ramallo, Manhattan College

C-5 CHARACTERIZATION OF DEREGULATED ANTHOCYANIN ACCUMULATION
MUTANTS IN THE MODEL LEGUME PLANT MEDICAGO TRUNCATULA
Kaila Robinson, Eastern Connecticut State University

C-6 REGULATION OF DNA REPAIR PATHWAYS TO ENSURE GAMETE QUALITY Erika Rosenkranse, Carolyn Turcotte, Julia Laibach, Aidan Nowakowski, Marist College.

Session D: Animal Biology

D-1 THE ROLE OF CANNABINOID 2 RECEPTOR IN MODULATING MICROGLIA ACTIVATION AFTER A TRAUMATIC BRAIN INJURY.

Zamora, Maria F, Canseco-Alba, Ana, Lui Qing-Rong, Emmanuel Onaivi, William Paterson University.

D-2 EFFECTS OF GESTATIONAL STRESS ON BEHAVIOR AND CORTICOSTERONE LEVELS OF PHODOPUS SUNGORUS OFFSPRING

Juhi Kapoor, Ithaca College

D-3 TRANSIENT EXPOSURE TO 450 NM LIGHT ALTERS PHAGOCYTOSIS BY RETINAL PIGMENT EPITHELIUM WITHOUT COMPROMISING VIABILITY

Joseph Fabozzi, Jonathan Blaize, Wagner College.

D-4 GALANIN EXPRESSION IN NODOSE GANGLION FOLLOWING CHRONIC MYOCARDIAL INFARCTION

Lydia G. Loiselle, Ithaca College.

D-5 QUANTIFICATION OF PATHOGENIC FECAL BACTERIA ON NEW YORK CITY SIDEWALKS

Marjan Khan, Alessandra Leri, Marymount Manhattan College

D-6 THE EFFECTS OF MYOCARDIAL INFARCTION ON NEUROPEPTIDE Y RECEPTOR SENSITIVITY IN THE GUINEA PIG CARDIAC GANGLION

Joseph M. Rorick, Jean C Hardwick, Ithaca College

Session E: Technology

E-1 PASSWORD STRENGTH

David Ferker and Mario D'Alicandro, Pace University

E-2 DEVELOPMENT OF JUPYTER NOTEBOOKS TO FACILITATE OPERATIONAL TAXONOMIC UNIT IDENTIFICATION AND ANALYSIS OF 16S rRNA SEQUENCING DATA

Haley Grimason, Barbarar Murdoch, Garrett Danick, Biology Department, Eastern Connecticut State University

E-3 CREATING A DIGITAL PRODIGY

Munir Yousef, Pace University

E-4 THE USE OF OPEN SOURCE DOCKING AND ALIGNMENT SOFTWARE TO EVALUATE THE DANGERS OF PHTHALATE INDUCED ENDOCRINE DISRUPTION Briana Bettencourt, Jonathan Blaize, Wagner College.

E-5 USING CURRENT TRENDS IN TECHNOLOGY TO MAXIMIZE THREAT IDENTIFICATION IN FINANCIAL COMPANIES COMPUTER SYSTEMS

Charles Adams, Pace University

Session F: Microbiology

F-1 THE UNSUSPECTED COMPETITION BETWEEN GREEN AND PURPLE SULFUR BACTERIA IN FAYETTEVILLE GREEN LAKE

Joy O'Brien, Cassandra Marnocha, Niagara University

F-2 EVALUATING THE SCORPION GUT MICROBIOME FOR DIVERSITY AND ANTIBIOTIC PRODUCTION

Lauren Atkinson, Barbara Murdoch, Eastern Connecticut State University

F-3 DETERMINATION OF THE TEMPORAL AND SPATIAL VARIATION OF GIARDIA LAMBLIA IN RIBBED MUSSELS (GEUKENSIA DEMISSA) COLLECTED FROM BRONX, NY, 2017

Alexa Marcazzo, Ghislaine Mayer, Manhattan College.

F-4 THE EFFECT OF THE COMBINATION TREATMENT OF D-LIMONENE AND RIFAMPICIN ON THE SURVIVAL AND BIOFILM FORMATION OF STAPHYLOCOCCUS EPIDERMIDIS RP62A

Wardah Alakrah, Manhattanville College.

F-5 MOLECULAR IDENTIFICATION OF THE SCORPION TELSON MICROBIOME

Christopher Shimwell, Barbara Murdoch, Eastern Connecticut State University.

Session G: Ecology, Plant Biology, Environmental Science

G-1 STEM AND BRANCH GROWTH PREDICTS SEED YIELDS OF ARTEMISIA TRIDENTATA

Claudia S. Ramirez, Manhattan College

G-2 UTILIZING A NEW DEVICE FOR HIGH RESOLUTION SAMPLING WITHIN THE MONIMOLIMNION OF A MEROMICTIC LAKE

Kaleigh Block, Dr. William Edwards, Cassandra Marnocha, Joy O'Brien, Niagara Univ.

G-3 CHARACTERIZATION OF WHITE AND BLACK SEED MUTANTS IN THE MODEL LEGUME PLANT MEDICAGO TRUNCATULA

Roshani Budhathoki, Eastern Connecticut State University

G-4 SCALING RELATIONSHIPS BETWEEN LEAF AREAS AND LEAF VEINS FOR PERCURRENT LEAVES

Gina Marie Leoncavallo, Manhattan College

G-5 ANALYSIS OF THE CYP51 PARALOGS AND THEIR POTENTIAL ROLE IN DIFFERENTIAL SENSITIVITY TO FUNGICIDES IN CALONECTRIA PSEUDONAVICULATA AND C. HENRICOTIAE

Stefanos Stravoravdis, Nicholas R. LeBlanc, Robert E. Marra, Jo Anne, Eastern Connecticut State University

G-6 PREDICTING SAGUARO CACTUS DEATH

Cole Johnson, Manhattan College

Session H: Ecology, Plant Biology, Environmental Science

H-1 IMIDACLOPRID CONTAINING PESTICIDES DISRUPT C. ELEGANS GERM LINE DEVELOPMENT

Beatrix Bradford, Esabelle Gervasio, Biology Department, Marist College

H-2 XYLEM CONDUCTIVITY IN STEMS OF ARTEMISIA TRIDENTATA

Victoria Webb, Manhattan College.

H-3 AN ANALYSIS OF THE EFFICACY OF VARYING SAMPLING PROTOCOLS FOR NECTURUS MACULOSUS

Samuel J. Pallis, Eastern Connecticut State University.

H-4 POPULATION ANALYSIS OF SCAEVOLA TACCADA AND SCAEVOLA PLUMIERI ON CULEBRA, PUERTO RICO, USING MICROSATELLITES

Miranda Ella, Ithaca College

H-5 SPINES OF COLUMNAR CACTI FROM CENTRAL MEXICO: NOVEL CHANGES IN RELATION TO STEM BARK COVERAGES

Catherine McDonough, Manhattan College

Session J: Ecology, Plant Biology, Environmental Science

- J-1 BARK FORMATION FOR FIVE COLUMNAR CACTI SPECIES OF CENTRAL MEXICO Phillip Dombrovskiy, Manhattan College.
- J-2 MOVEMENT IN WHITETAIL DEER (ODOCOILEUS VIRGINIANUS) IN ITHACA, NY Elaina White, Ithaca College.

J-3 XYLEM CONDUCTIVITIES OF PRIMARY, SECONDARY, AND TERTIARY VEINS OF PLANT LEAVES

Maya Carvalho-Evans, Manhattan College

J-4 ISLAND SOUND?

Mary Dushay, Jo-Marie Kasinak, Jennifer Mattei, Sacred Heart University

J-5 PREDICTING BARK COVERAGE ON SAGUARO CACTI (CARNEGIEA GIGANTEA)
Olivia Printy, Manhattan College

Poster Sessions Schedule

Poster session #1. Students will set up their posters by 9:00 AM and leave them until 10:30 AM. Students will only be present at the poster from 9:00 until 10:00 AM and the time from 10:00 until 10:30 will be available for judges to return to the poster without the student present.

Poster session #2. Students will set up their posters at 10:30 AM only and leave them until 12:00 PM. Students will only be present at the poster from 10:30 until 11:30 AM and the time from 11:30 until 12:00 will be available for judges to return to the poster without the student present.

Poster session #3. Students will set up their posters at 1:45 PM only and leave them until 3:15 PM. Students will only be present at the poster from 1:45 until 2:45 PM and the time from 2:45 until 3:15 PM will be available for judges to return to the poster without the student present.

Poster session #4. Students will set up their posters at 3:15 PM only and leave them until 4:45 PM. Students will only be present at the poster from 3:15 until 4:15 PM and the time from 4:15 until 4:45 PM will be available for judges to return to the poster without the student present.

Poster session #5. Students will set up their posters at 4:30 PM only and leave them until 6:00 PM. Students will only be present at the poster from 4:30 until 5:30 PM and the time from 5:30 until 6:00 PM will be available for judges to return to the poster without the student present.

Students presenting posters must look for an easel that has the proper number on it. Numbers of posters may be mixed so a survey of the poster area will be required to find your easel.

Poster abstracts in the alphabetical have two numbers. The first number indicates the poster session number. There are five poster sessions. The entire number indicates the entire poster number. For example, 5-13 is in poster session #5.

Numbered abstracts are poster presentations

The first number indicates the poster session number

There are five poster sessions

The entire number indicates the entire poster number

Alphabetical listing of all abstracts for ECSC 2019

Lettered abstracts are platform presentations

Letters designate the session

There are sessions A, B, C, D, E, F, G, H, and J

Numbers indicate the order within the session

Numbered abstracts are poster presentations

The first number indicates the poster session number

There are five poster sessions

The entire number indicates the entire poster number

DETECTION OF STENOTROPHOMONAS AND ITS PUTATIVE FORMATION OF BIOFILMS DURING DRY WEATHER

Kimberly Acevedo, Dominican College

1-1

The Sparkill Creek, placed on the impaired waters list first in 2010, faces serious issues with stormwater runoff, causing elevated levels of pathogens and decreased oxygen availability. The Creek was previously examined for microbial and coliphage loads as related to weather events. Of note was the detection of *Stenotrophomonas* in dry weather with little to none observed in wet weather. This Gram negative bacterium is known to form biofilms and it is our hypothesis that its involvement in biofilms was more pronounced in dry weather, allowing for its increased presence. We have attempted to isolate *Stenotrophomonas* from sediment and water samples retrieved from the Piermont Marsh, in which it was previously detected in both wet and dry conditions. Phenotypic features of the bacterium, including growth on MacConkey and EMB agars, motility, catalase, DNase, and oxidase activity, in addition to 16S rDNA sequencing were used. Since the taxonomy of this genus is not well-understood, phenotypic identification is difficult. Using biofilm-specific primers for *Stenotrophomonas*, genes associated with biofilm formation in this genus were used on DNA derived from cultured bacteria. Biofilm primer set RpfF amplified a higher molecular weight band than expected when DNA derived from dry samples were used as a template compared to a lower molecular weight band in wet weather samples. These bands are currently being subcloned and sequenced to better understand their identity.

E-5 USING CURRENT TRENDS IN TECHNOLOGY TO MAXIMIZE THREAT IDENTIFICATION IN FINANCIAL COMPANIES COMPUTER SYSTEMS

Charles Adams, Computer Science Department, Pace University

New technologies such as blockchain and artificial intelligence are beginning to become viable to be utilized in production environments. These technologies provide potential benefits to cost allocation, resource utilization and security through threat identification. The myriad of different entities throughout a system which requires complex reasoning to be done very fast so a decision can be made, presents the greatest issue. Humans, software and hardware can be or contain some malicious feature which is ultimately categorized as a threat. Through the technologies of blockchain and artificial intelligence, a proactive approach to the identification of threats can be achieved. This can be achieved through the implementation of a proof of stake or a federated byzantine fault tolerate consensus protocol in combination with a Bayesian network. How these technologies provide a more efficient approach is the true solution. This paper discusses the areas in which blockchain and AI can be implemented in tandem to maximize threat identification.

F-4 THE EFFECT OF THE COMBINATION TREATMENT OF D-LIMONENE AND RIFAMPICIN ON THE SURVIVAL AND BIOFILM FORMATION OF STAPHYLOCOCCUS EPIDERMIDIS RP62A

Wardah Alakrah, Biology Department, Manhattanville College, New York

Staphylococcus epidermidis is a Gram-positive, coagulase-negative staphylococci bacterium. It facilitates nosocomial infections through adherence on catheters and other medical devices. Rifampicin is a widely used antibiotic to treat nosocomial infections. It is used on S. epidermidis infections, but its excessive use has developed the problem of antibiotic resistance and many antimicrobial agents from essential oils are used as alternatives to treat microbial infections. D-limonene was chosen in our studies and is a monoterpene composed of citrus oils that has low toxicity and lacks any mutagenic properties. Previous research at our laboratories have showed a combination of 611.2 µg/mL of D-limonene and 0.005 µg/mL of rifampicin are capable of inhibited the growth of S. epidermidis RP62A after 20 hours when compared to rifampicin and D-limonene treatment alone. In this study, the effect of the rifampicin-D-limonene combination on the survival of RP62A using the alamarBlue® assay and biofilm formation were evaluated. The bacteria were grown for 6 hours before the combination treatment was added and compared to the treatment from the beginning. Results showed that combination treatment of 0.005 μg/mL of rifampicin and 611.2 μg/mL of D-limonene effectively inhibited the growth of RP62A both in the beginning and after 6 hours of the growth (p < 0.05). The results indicate an alternative treatment in Staphylococcal infections through a reduced use of antibiotics in combination with an essential oil, like limonene, is possible.

BacM ISOFORMS ARE GENERATED THROUGH ALTERNATIVE START SITE SELECTION

Christopher Annabi and David Zuckerman, Iona College

1-2

Over time, bacteria have evolved to develop antibiotic resistance. To combat this, new targets of antibiotics must be found. Among these is the bacterial cytoskeleton; a system unique to bacteria are bactofilins. BacM is a bactofilin paralog encoded in *Myxococcus xanthus* and it contributes to its rod-shaped morphology. BacM has been observed in large and small forms. Two hypotheses regarding the generation of these BacM isoforms were considered. The first hypothesis suggested BacM-L is synthesized as a precursor protein cleaved by a protease at the sites of cytoskeleton elongation. The second hypothesis suggested that BacM-L and BacM-S are generated through alternative start site selection by the ribosome. These hypotheses were tested by engineering a bacM plasmid and point mutations were introduced using PCR-directed mutagenesis. Mutants were made to abolish the start codon (M1L), introduce a frameshift after the start codon (K8 frameshift), abolish the putative second start codon (V24L), and abolish a putative internal ribosome binding sequence using silent mutations (ΔRBS2). When observed by immunoblot, mutants M1L and K8 frameshift expressed only BacM-S, whereas mutants V24L and ΔRBS2 expressed only BacM-L. These results support the second hypothesis, that BacM-L and BacM-S are generated through alternative start site selection.

F-2 EVALUATING THE SCORPION GUT MICROBIOME FOR DIVERSITY AND ANTIBIOTIC PRODUCTION

Lauren Atkinson, Barbara Murdoch, Eastern Connecticut State University

The rapid evolution of antibiotic resistance among pathogens, that were previously easily controlled, has made research into potential sources for new antibiotics crucial. Scorpions are a unique potential source of antibiotics, since they have an ancient lineage that has coevolved with terrestrial pathogens for about 350 million years. Scorpions are routinely exposed to potentially deadly microbes since many of their prey, which include mice and insects, are vectors for dangerous pathogens. Recent research has shown that the gut microbiome plays a critical role in building and maintaining strong immune systems in animals, including in those of arthropods. We hypothesize that the scorpion microbiome includes bacteria that produce antimicrobial compounds. To test this hypothesis, we used culture-based techniques to isolate bacteria from the abdominal cavities of Smeringurus mesaensis, the dune scorpion. Isolates were identified by amplifying and sequencing the 16S rRNA gene. Co-cultures tested for antibiotic production against safe relatives of the ESKAPE pathogens, the six most common antibiotic-resistant pathogens. From 102 clonal isolates, 14 different species were identified. For antibiotic testing, 11/23 isolates tested showed a zone of inhibition, indicating antibiotic production. Our results indicate that the scorpion microbiome does include antibiotic-producing bacteria and should be examined further. Our project continues with techniques that do not rely on culturing, but rather are sequence-based.

IDENTIFYING THE MECHANISM OF ACTION FOR REPURPOSED DRUGS WITH ANTIFUNGAL ACTIVITY AGAINST CRYPTOCOCCUS NEOFORMANS

Tiffany N. Arrington, Valerie M. Garcia-Batiz, Megan E. McGraw, Virginia E., Niagara University

1-5

The fungal pathogen Cryptococcus neoformans infects and kills individuals with compromised immune systems. In resource limited countries such as Africa, the rate of infection is high due to the large number of the population who have HIV/AIDS. This results in a greater need for effective and affordable drugs to treat C. neoformans. Repurposing drugs that have been approved by the FDA saves time and money that would go into discovering new drugs that would later have to be determined safe for humans. Previous studies have identified several FDA drugs that have been shown to kill C. neoformans. However, it is not yet clear how these drugs kill C. neoformans and whether their mechanism of action includes effects on known virulence factors. We speculate that drugs that have both antifungal activity and target known virulence factors would be better able to treat C. neoformans infections than drugs with antifungal activity alone. We have screened thioridazine hydrochloride and trifluoperazine for their effects on the well-established C. neoformans virulence factors; capsule formation, melanization and compared growth at 30°C and 37°C.

A-2 RETARDATION OF PHASE SEPARATION OF LIQUID MIXTURES WITH A CRITICAL POINT OF MISCIBILITY

Janelly Aybar and Filomena Califano, Department of Chemistry and Physics, St Francis College,

The Phase Transition Extraction (PTE) process consists of bringing a partially miscible mixture from the single-phase to the two-phase region of its phase diagram by changing either its temperature or its concentration. Its most important characteristics is that the resulting phase separation is very fast. In this work we study two counter-cases, where the PTE process appears to be retarded. First, we consider the ouzo effect, where the mixture phase separates by homogeneous nucleation, forming stable microemulsions. The second retardation technique consists of using very viscous solvents. We found that, in agreement with the predictions of the phase field model, the growth rate of the nuclei during the initial stage of phase separation does not depend on viscosity, while, on the other hand, when the size of the nuclei exceeds their capillary length, gravitational effects become relevant and the settling time is proportional to the viscosity of the continuous phase.

B-1 "YOU'RE A VERY SMART PERSON BUT YOU'RE ALSO A WOMAN": PORTRAYALS OF GENDER MESSAGES IN TELEVISION SITCOMS

Soren Beck, Maria Khouri, Psychology Department, Ithaca College

Studies have shown that media exposure affects people's internalization of gender roles, especially when the shows are perceived as realistic (Behm-Morawitz, Lewallen, & Miller, 2015). Compliments, teases, and put-downs reinforce what is valued for each gender (Diekman & Goodfriend, 2006). Research on the implications of different types of compliments found that compliments about appearance negatively impact cognitive function (Kahalon, Shnabel, & Becker, 2018). Within relationship conflicts, different individual and communal strategies are endorsed, depending on the genders involved (Keener & Strough, 2017). This study involves a descriptive longitudinal content analysis of these gender factors, analyzing 84 situational comedies from the archive of the Center for Research on the Effects of Television (CRETV) at Ithaca College. Programs were selected from 10 different stations videotaped by CRETV during 1985-2016. Historical comparisons were based on the year the program was originally aired (ranging from the 1970s to 2016). Content was coded for incidents of compliments, teases, put-downs, and conflicts within adult interactions for relationships including friends, family, romantic partners, and co-workers. All interactions were also coded for the character's gender, race/ethnicity, and occupation. Findings showed that women received more compliments than men, especially about appearance. Men gave and received more teases than women and occupied higher positions than women in the workforce. Additional findings, including the nature of put-downs and conflicts (including who won) and a qualitative analysis of specific gender messages, will also be reported.

TRANSIENT, LOW-LEVEL COPPER EXPOSURE RESULTS IN DECREASED CELL SURVIVAL AND AXON GUIDANCE DEFECTS

Bryan Bekker, Addel Ibrahim, St. Francis College

1-25

GPCR signaling pathways are one important way that cells to respond to their environment. Using the zebrafish retino-tectal projection as a model system, we previously showed that GPCR signaling is required for developing axons to find their targets during normal development. Our aim was to use this system to understand cell signaling events that translate exposure to environmental pollutants into neuronal developmental defects. We measured elevated copper levels at sites along Newtown Creek, one of the most polluted waterways in New York City and designated Superfund Site. We report generalized developmental and behavioral deficits in zebrafish embryos transiently exposed to low levels of copper ions during development. Cell numbers in copper-treated retinae are significantly reduced compared to controls, and copper-exposed RGC axons fail to cross the midline. To discover the molecular and cellular basis of copper toxicity we identified potential gene targets of copper by analyzing open source gene expression datasets GEO2R datasets, and refined our candidate list to GPCR signaling components expressed in the right time and place to direct growing retinal axons.

RESTORATION OF COASTAL MEADOWS AT STRATFORD POINT CT: IS NATIVE PLANT SEEDING THE BEST METHOD?

Brendan Benitez, Christina Glavan, Adeline DeStasio, Jennifer Mattei, Department of Biology, Sacred Heart University 2-7

Coastal grasslands/meadows are important for the maintenance of our native pollinators. Restoration ecologists often use commercial seed mixes to restore or enhance flowering plant biodiversity. The focus of our study is to measure the success of seed mixes to establish native plant diversity three years after seeding of a ~1000 sq. meter plot on Stratford Point, CT. It was hypothesized that both the diversity of native plant species and pollinators would increase at the site. We also monitored the flowering times of plants through the growing season. The flowering plants attracted 32 Hymenoptera and 43 Lepidoptera species. Of the 42 species used to seed the area, only 14 remained in the meadow by the third year after seeding. We found that at least one plant species flowered every month of the growing season. Annual maintenance is imperative to control non-natives and to increase the survival of native flowering plants.

E-4 THE USE OF OPEN SOURCE DOCKING AND ALIGNMENT SOFTWARE TO EVALUATE THE DANGERS OF PHTHALATE INDUCED ENDOCRINE DISRUPTION

Briana Bettencourt, Jonathan Blaize, Wagner College.

Many physiological abnormalities that manifest within the nervous, reproductive and digestive systems can be attributed to endocrine disruption. Treatment of the adverse health effects born of exposure to endocrine disrupting chemicals (EDC's) cost the United States approximately 340 billion dollars annually. Plasticizers including phthalates have long been associated with induction of the forenamed conditions and have thusly been categorized as EDC's. Diethylphthalate (DEP), a well studied plasticizer, is suspected of dysregulating estrogen signaling; this is particularly heinous as consequences include developmental delays and physical deformation. More than twenty-thousand studies involving DEP are indexed in the National Center for Biotechnology Information (NCBI/Pubmed), yet only seven clinical trials evaluating DEP are available at the time of this submission (Clinicaltrials.org), with fewer having been completed. While there is an increased emphasis on elimination or reduction of phthalate usage and exposure, little is known about preventing phthalate damage caused by pharmacological competition. To more critically elucidate phthalate interaction with suspected targets we have employed computational tools that simulate docking to identify plasticizer binding locations, estimate the affinity to which they are bound (compared to natural ligands) and evaluate whether viable alternatives can be used to outcompete EDC's. Our data shows staggeringly high docking affinity of several common plasticizers, including DEP, to suspected targets within the endocrine system and unsuspected targets throughout the body.

G-2 UTILIZING A NEW DEVICE FOR HIGH RESOLUTION SAMPLING WITHIN THE MONIMOLIMNION OF A MEROMICTIC LAKE

Kaleigh Block, Dr. William Edwards, Cassandra Marnocha, Joy O'Brien, Niagara Univ.

Here we present a new water sampler for taking samples in real time and for conducting water chemistry research. This device is a modified water sampler that incorporates conductivity and temperature sensors, which allows us to take in situ samples in Fayetteville Green Lake, a meromictic lake with a hydrogen sulfide monimolimnion. Green Lake has a plate, or a thin layer, of green and purple sulfur bacteria in the water column. To investigate the physical and chemical properties of this plate, the sampler will be lowered to the depth of the plate, and samples from the water column will be taken above, below and in the plate. The down unit, consisting of temperature and conductivity probes, will be initiated to collect data at varying depths. This data will be collected on a microcontroller and communicated to a surface unit via tether. Data will be transmitted in real-time on the electronic microcontroller. The microcontroller will then initiate the release system, which is controlled by a waterproof servo motor. This sampler will improve our ability to investigate the lake because we will obtain samples with more precision and control due to the microcontroller communicating data in real-time. This will also improve our existing sampling mechanisms because it permits sampling and data collection simultaneously. Deploying our device in the lake will allow us to attain a better understanding of the properties of the plate, and this is of importance because our findings may be used as a model for similar meromictic lakes.

H-1 IMIDACLOPRID CONTAINING PESTICIDES DISRUPT C. ELEGANS GERM LINE DEVELOPMENT

Beatrix Bradford, Esabelle Gervasio, Biology Department, Marist College

Neonicotinoids are a class of pesticide that has been under investigation by the Environmental Protection Agency (EPA) in recent years. A major concern is the possible role they may play in colony collapse disorder in honey bees, wherein neonicotinoids disrupt both their development and behavior. Here, the effects of an imidacloprid-containing pesticide on the development of the model organism Caenorhabditis elegans were investigated. Specifically, we tested the effects of imidacloprid containing pesticides on the C. elegans germ line, a population of cells that is of particular importance as exposure to toxins can affect subsequent generations. Assessment was conducted on five different strains of C. elegans: wild-type, bus-17 and bus-5 which both have a defective cuticle, the transgenic strain ced-1::GFP, and the strain vit-5, a vitellogenin-sensitive strain. To determine the effects of imidacloprid on germ cell development, apoptotic nuclei were scored, and a significant increase in the number of corpses was found. Accordingly, a reduction in fertility in the offspring was discovered, as determined by brood size analysis. The nature of these defects is currently being explored, and they indicate that imidacloprid negatively impacts development and reduces gamete quality. The data collected support findings that neonicotinoids cause widespread harm to multiple species and raise concern about their safety to humans.

LEARNING TO THINK BY LEARNING TO MOVE: LINKS BETWEEN SELF-PRODUCED LOCOMOTION AND EXECUTIVE FUNCTIONING IN INFANCY

Mackenzie Bragan, Kelly Madden, Psychology Department, Ithaca College 4-16

While executive functioning has been shown to be important for academic success, how it develops is unknown. One theory posits that its development is dependent on self-produced locomotion. This claim was investigated through a multi-year interdisciplinary project. Following random assignment to a locomotor or non-locomotor condition, five-month-old infants participated in 12 play sessions. In the locomotor condition, infants could locomote towards a toy using a robotic-controlled device; sessions were identical for the non-locomotor condition except that infants did not locomote. At seven months of age, all infants were assessed on a variety of executive functioning tasks, including the one reported here - a means-end task. Infants viewed a video where a block tower was positioned on a platform; as a screen was placed in front of the tower, they could see the platform move. The tower either shifted to a new location as the platform moved or it remained in the same location (despite the platform moving). We hypothesized that the locomotor group would show more surprise, as measured by pupil dilation, when the tower does not move with the platform, due to the anticipated change in location. Results are reported for 9 infants in the locomotor condition and 11 infants in the non-locomotor condition. Using nonparametric analyses, our hypothesis was supported because we did not find a change in pupil diameter for the non-locomotor group (M= 30.18 vs. M= 30.29) but did for the locomotor group (M= 26.62 vs. M= 29.63), p = .022.

INVESTIGATING BACILLUS SUBTILIS BIOFILM FORMATION STIMULATED BY PLANT EXTRACTS

Alexis Brown and Dr. Sarah Wacker, Department of Chemistry and Biochemistry, Manhattan College

1-6

Bacillus subtilis is a soil-dwelling bacterium that forms biofilms on the roots of plants. Previous research shows that when B. subtilis forms a biofilm on a plant root, it promotes plant growth and protects the plant from pathogens. It is unclear how the plant signals to B. subtilis to colonize and form a biofilm, but tomato root extract has been shown to stimulate B. subtilis biofilm formation. The goal of this study was to characterize the chemical signals present in root extract that stimulate B. subtilis biofilm formation. Further, we sought to explore whether these chemicals are found in a variety of plant roots or are specific to tomato plants. Extracts from tomato, scallion, spinach, potato, and ginger were processed and analyzed in a luciferase assay that reports on the transcription of genes involved in the B. subtilis biofilm pathway. Biofilm pellicle assays were also performed as a qualitative analysis to determine if root extract could directly stimulate the formation of wrinkly biofilms. Our results show that each of the plant samples had some level of stimulation in both the luciferase and the pellicle assays. The intensity of this stimulation varied, with ginger showing the most developed biofilms. This suggests there is a general molecule that B. subtilis recognizes in order to colonize and form a biofilm on plant roots.

G-3 CHARACTERIZATION OF WHITE AND BLACK SEED MUTANTS IN THE MODEL LEGUME PLANT MEDICAGO TRUNCATULA

Roshani Budhathoki, Department of Biology, Eastern Connecticut State University

Anthocyanin and proanthocyanidin (PA) are flavonoid compounds produced by plants that play important roles in human health, and plant tolerance to biotic and abiotic stresses. Wild-type leaves show reddish purple anthocyanin pigmentation whereas seeds are light brown in color due to the accumulation of PA. Discovery of novel transcriptional regulators of anthocyanin and PA will help us to modify crops for improved nutritional value and metabolic engineering to produce these compounds in large quantities for pharmaceutical and industrial applications to improve human life. To identify new regulators of anthocyanin and PA accumulation, we are using a forward genetic approach in the model legume plant Medicago truncatula. By screening M. truncatula Tnt1 retrotransposon mutant population, we identified two mutants with white and black seed phenotypes caused by deregulated PA accumulation. White seed mutant also shows complete loss of anthocyanin pigmentation in vegetative organs such as leaves, petiole and stem. I will present detailed phenotypic characterization of mutants. White (Mttt8) and black seed (MtMYB5) mutants in M. truncatula were reported before. I will test whether white and black seed mutants are novel by using a PCR genotyping assay to detect Tnt1 insertions in known previously reported candidate genes. To recover additional mutations from mutants towards identifying the genes underlying defective phenotypes, I purified genomic DNA from mutants to perform whole genome sequencing.

EFFECTS OF ELECTROCONVULSIVE SEIZURES ON GABA CONCENTRATIONS IN MOUSE MODELS OF AUTISM

Nicholas Buhta, Wagner College.

5-10

Self-injurious behavior (SIB) is displayed in approximately one quarter of individuals with autism spectrum disorder (ASD). Electroconvulsive therapy (ECT) has proven to be an extremely effective treatment for self-injurious behavior in individuals with ASD. Previous research has shown that GABAergic dysfunctions are strongly associated with ASD and SIB phenotypes. Therefore, we hypothesize that the electroconvulsive stimulus (ECS) delivered in ECT may modulate GABAergic systems to suppress SIB in ASD patients. To better understand the effective mechanism in which ECT operates, this study analyzes GABA concentration variations and behavioral changes in response to ECS of two transgenic autistic mouse models, Shank3B-/- and Viaat-Mecp2-/y conditional knockout variants, which express behavior analogous to SIB. This study is not yet complete, however, the data show that Shank3B-/- mice display a significant increase in striatal GABA concentrations in response to ECS.

SYNTHESIS OF ANTIMALARIAL COMPOUNDS

Jordan A. Cabarrus, Jocelyn M. Rodriguez, Clare E. Gutteridge, U.S. Naval Academy 5-19

The continuous discovery and creation of new antimalarial compounds is crucial to the treatment of malaria. As the parasite builds resistance to commonly used drugs, it is important to continue developing new methods to cure the disease. This project aims to synthesize a new series of compounds that targets the PfATP4 activity of the parasite.

ARTIFICIAL INTELLIGENCE IN CYBER SECURITY AND ANTI-CYBER SECURITY SYSTEMS

Andrew J. Cabrera, Muhammad Wajid, Information Technology Department, Pace University

3-28

Artificial intelligence (AI) is a growing technology that is tightly intertwined in the Internet of Things (IoT). While being an incredibly new and promising technology, it does not come without its ramifications. Technology is advancing every year coupled with the fact that the population of internet users are at 4.4 billion and growing at an accelerated rate. Nowadays where all technology is connected across the internet, which makes us question how can we protect them all from security threats? AI has been increasing in popularity and is beginning to be utilized in all areas of technology such as education, manufacturing, healthcare and many other fields. With all these advancements to AI, the main concern arises of how can we use it in Cybersecurity. This poster will report AI methodologies and strategies for combating security weaknesses and taking advantage of them in terms of ethical hacking. By utilizing a system that teaches itself we almost remove all traces of human error. The only remnants of human interaction would be the original code written and an update every now and again. The addition of an AI security system needs to stay in the hands of white hat ethical hackers for security purposes only; If such a system fell into the hands of black hat hackers we would have bigger problems on our hands. AI has the potential to bring out the best of computing in all areas, all that's left is to develop it and watch technology enter a new age.

MAPPING PROTEIN-CHROMATIN INTERACTIONS OF YEAST CELLS IN VIVO

Cesar Cardenas & Dr. Bryan J. Wilkins, Chemistry and Biochemistry Department, Manhattan College

4-26

While there is a decent understanding of proteins that are involved in chromatin function, the mechanisms of these interactions are not fully recognized. This paper details an approach that aims to further our understanding of protein interactions with DNA and nucleosomes inside living cells. We are currently establishing an expanding genetic library which consists of gnomically tagged proteins that have a role in chromatin activity. The targeted gene in this experiment was IOC4. This protein serves as a subunit of the chromatin remodeler ISW1b complex. In yeast cells, we set out to modify the IOC4 gene to create two separate strains. One containing the coding sequence for ioc4-3Myc and another that codes for ioc4-GFP-. These genomic mutagenic integrations were done via polymerase chain reaction (PCR) and homologous recombination methods. PCR products, flanked by homologous ends specific for the target gene, were transformed into living yeast cells (BY4741) and were grown in selective media to ensure the survival of only the modified cells. A verification PCR was then performed, followed by a trichloroacetic acid (TCA) precipitation, and western blot analysis. Further work is being done in order to investigate how ioc4 protein interacts with histone proteins in the living nucleosome.

DOES THE *ODD-2* TRANSCRIPTION FACTOR REGULATE THE WNT SIGNALING PATHWAY IN *CAENORHABDITIS ELEGANS*?

Gregory Carlson, Biology Department, Eastern Connecticut State University 5-11

The *odd-skipped* genes and the Wingless/Integrated (Wnt) signaling pathway both play roles in development across various taxa. Odd-skipped genes encode zinc finger transcription factors. The Wnt pathway is a cell signaling pathway associated with cell proliferation in embryonic development, and with some human cancers. Binding of the ligand, Wnt, to the frizzled receptor results in destruction of GSK-3β and the stabilization of β-catenin. Studies in human cancer have shown that an *odd*skipped gene represses cell proliferation and regulates levels of GSK-3β and β-catenin, but effects on the expression of Wnt itself have not been tested. We are investigating the effects of odd-skipped on the Wnt pathway in the model organism Caenorhabditis elegans, a nematode species. We are utilizing green fluorescent reporter strains for gsk-3 and egl-20 (GSK-3β and a WNT ligand). Cells that express each gene can be visualized by fluorescence microscopy. We plan to knock-down odd-2 expression via RNA interference (RNAi). Because odd-2 feeding RNAi is ineffective in normal worms, we will use the NL2099 (rrf-3 mutant) strain, which shows a much stronger RNAi response due to the rrf-3 mutation. We are crossing NL2099 worms to the reporter strains to create strains that are homozygous for the rrf-3 mutation and the fluorescent reporter. Once these worms are created, we will remove odd-2 function by RNAi and look for changes in fluorescence. Expression changes will indicate an effect of odd-2 on the worm Wnt pathway, and may help us better understand the regulation of the human pathway.

B-5 THE INFLUENCE OF CHOLESTEROL ON NAD+ PRODUCTION MYCOBACTERIUM BOVIS-BCG

Eric Casper and Marcy Peteroy Kelly, Biology Department, Pace University, Microbiology

Mycobacterium tuberculosis is the causative agent for tuberculosis and is reported that about 1/3 of the world's population is infected. The prevalent infection is due to the mycobacteria having the ability to enter into a non-replicative persistent (NRP) phase during latent infection. During an infection, macrophages sequester the mycobacteria into a nutrient diminished granuloma. When M. tuberculosis is exposed to this depleted environment the organism enters into NRP, utilizing cholesterol as its primary carbon source as it decreases its metabolic processes. This is a unique attribute to mycobacterial infections in that the immune response cannot kill the causative agent and is only able to contain the mycobacteria in granulomas. Mycobacterium bovis-BCG (BCG) is a safe model organism to study tuberculosis. We hypothesized that cholesterol up-regulates specific genes that increase NAD+ concentrations in NRP BCG, offsetting the reductive stress caused by glutathione (GSH), a detoxification molecule that has shown to impede viability of BCG. BCG was grown in a minimal medium containing cholesterol for two weeks was resistant to GSH induced killing. These findings are similar to that of NRP BCG, suggesting that a shift to a cholesterol-based metabolism may be responsible for resistance to GSH. We are currently conducting NADH/NAD+ & ATP assays on BCG grown in a cholesterol medium exposed to GSH. We expect BCG to accumulate NAD+ and ATP upon exposure to GSH, when grown cholesterol medium, enabling us to conclude that mycobacteria shift towards an oxidative metabolism as a defense mechanism from GSH reductive stress.

AN INVESTIGATION OF COUNTERFACTUAL THINKING IN INDIVIDUALS DIAGNOSED WITH DIABETES

Jenna Caster, Department of Psychology, Ithaca College

3-14

Diabetes affects both the physical and emotional well-being of over 29 million Americans. Thus, it is important to investigate the psychological factors that can influence appropriate diabetes self-care. The present study investigates whether counterfactual thoughts might be related to how an individual copes with diabetes. The study utilizes a mixed-methods approach consisting of a quantitative survey assessing psychosocial factors, and a qualitative interview with the participant. The interview includes questions about the participant's thoughts and feelings with their experience of diabetes, noting when participants spontaneously generate counterfactual thoughts about how things might be different if they hadn't been diagnosed with diabetes. Currently, 31 people have completed the protocol (11 males and 20 females). These preliminary results suggest that an increase in counterfactual thinking is marginally associated with higher levels of guilt (r(29) = .326, p = .085). Further, these higher levels of guilt are strongly associated with the maladaptive coping mechanisms of self-blame (r(29) = .671, p < .001) and behavioral disengagement (r(29) = .541, p = .002). Notably, high levels of self-blame and behavioral disengagement were marginally associated with lower levels of diabetes self-efficacy (r(29) = -.303, p = .104, and r(29) =-.331, p =.074, respectively). Appropriate diabetes self-care is essential to the prevention of serious complications like blindness and amputation. This preliminary evidence suggests that certain types of counterfactual thoughts may undermine appropriate diabetes self-care. Further research on counterfactual thinking may assist in the design of educational initiatives to encourage successful diabetes self-care.

THE EFFECTS OF MICROFIBERS ON LARVAL FATHEAD MINNOWS

Jackson Cedrone, Ithaca College

2-8

Research on microplastics in aquatic ecosystems has seen a growth over the last decade. However, the relative toxicity of the fibers in comparison to the organism's body size is still a field which needs exploration. Larval fathead minnows are a appropriate species to research due to their common morphology with other aquatic species. Mortality and ingestion rate is being recorded from the 20 larval fathead minnows in the control group, 500 micron group, and 5000 micron group. Each experimental group are exposed to 50 fibers for 72 hours; the fibers are manually manufactured and integrated into their regular diet. The microfibers are made of fluorescent ribbon so they can be seen using fluorescence microscopy through the transparent body of the larval fathead minnows. The crux of the research is to see what size microfibers are small enough to be eaten by the minnows and large enough to be caught in the GI tract of the minnows.

PERFORMANCE OF ACCELERATED SOLVENT EXTRACTION IN COMPARISON TO OTHER METHODS IN THE EXTRACTION OF ACTIVE COMPOUNDS FROM BEE PROPOLIS

Jozlyn Charland, Pace University 5-20

Propolis is a natural resinous substance collected by honeybees from buds and exudates of trees and is used by bees as a glue, general-purpose sealer and draught extruder for beehives. Known in folk medicine since ancient times, propolis has attracted much attention in recent years as a useful ingredient applies in medicine, domestic products and food products since it possesses carious biological properties including antimicrobial, antioxidative and antiulcer properties. In this project, accelerated solvent extraction (ASE) was used to extract the different chemicals from a bee propolis sample. In addition different extraction methods were employed in the extraction of active compounds from the same bee propolis sample to compare their efficiency. The methods employed are soaking method, Soxhlet methods, ultrasonic method, and microwave method. The efficiency of the methods was determined based on the amount of materials extracted as determined by gas chromatography-mass spectrometry (GC-MS) and spectroscopic methods such as absorbance and fluorescence. Results showed samples obtained from ASE gave similar yields to that of ultrasonic and microwave methods.

C-1 EXPLORING INTERACTIONS BETWEEN CHROMATIN AND ESSENTIAL CHROMATIN REMODELING COMPLEX in vivo

Shereen Chaudhry, Manhattan College.

Eukaryotic genetic material is stored as chromatin, wherein DNA is wound around repeating octameric units of histone proteins. This nucleosomal subunit represents the most basic level of DNA compaction. Chromatin remodeling complexes are multi-subunit nucleosome translocases that can physically reposition nucleosomal subunits for the purpose of major biological processes such as DNA replication. The RSC complex is the most abundant remodelling complex of budding yeast, with high evolutionary conservation in animals and plants. Current research of RSC's function and mechanics is limited. In this work, we map interactions between the catalytic subunit of RSC and the nucleosome of living yeast using a genetically encoded unnatural amino acid photo-crosslinker. The crosslinker, p-benzoylphenylalanine (pBPA), is site-specifically encoded into histone proteins and covalently traps histone-remodeler interactions upon exposure to UV radiation. Remodeler binding is then identified using short peptide fusion tags to identify the Sth1 protein. This allows for the illumination of detailed interaction maps of the chromatin remodeler complex, which provides new insights into the biological relevance of previously determined structural data. We verify this conclusion by western blot analysis and clearly visualize crosslinked products between a myc-tagged subunit of RSC with histone H2A and histone H3. We show that an acetylation event at H3K14 controls recruitment and binding of Sth1 to histone H3. Additionally, we identify the bromodomain of Sth1 as a recognition module for the acetylation signal. Cells that lack this essential post-translational modification are unable to sequester Sth1 to the nucleosome, shedding new light on the RSC-nucleosomal mechanistic/functional relationship.

(RE)DISCOVERING GENETIC LINKAGES IN DOGS FROM SVM EXPERIMENTATION

Simon Chu, Justin Bodnar, Justin Sprenkle, Sofya Chepushtanova, Anthony Kapolka,

Wilkes University

3-29

While experimenting on our Wilkes Pet Dataset, a collection of 2000 tagged Veterinary EMR images, two significant, unexpected results were obtained. SVM partitioning of data to predict both animal nose color and ear morphology in dogs appeared independent of image resolution; that is a single pixel (effectively averaging the animal's coat color) proved as effective in predicting the animal's nose color and whether or not it had floppy ears. Examination of published literature has confirmed that a) dog nose and coat color are functions of pigment expression, controlled by the same gene(s) and b) the genes controlling coat color and ear cartilage are genetically linked (by being in close proximity.) In this way, our SVM experimentation can be said to have (independently re)discovered a biological truth.

DESIGNING A MANUFACTURING PROCESS FOR TIDAL TURBINE BLADES IN REMOTE LOCATIONS

Isabel Clark, Austin Clough, Michael Glavin, James Harizi, Roger Williams University

2-25

The goal for our senior design project is to design and manufacture a tidal turbine blade that can be reproduced by any user in a remote location with access to water. We began the concept design process with a literature review of existing designs in the form of either vertical or horizontal axis turbines, as well as looking at tidal patterns. A horizontal axis turbine design for Indonesian waters became the focus of the project. Concept drawings were created based on customer needs and environmental conditions at our selected installation site. We used a concept decision matrix to guide our selection of the final design. Our selected manufacturing process carves an easily accessible block of wood, then layers it with fiberglass to provide strength and durability. The blade will be carved in multiple parts designated by hydrofoil sections to maximize potential power. A kit containing hydrofoil templates will be created for the customer. Our schedule for the spring semester will ensure on time delivery for a detailed manufacturing process and assembled kits. Through prototyping and testing the group will create a complete set of demonstration blades for a tidal turbine rotor.

C-3 TREATMENT OF LDL-DERIVED CHOLESTEROL WITH PHOSPHOLIPASES A2 INHIBITOR ONO TO DETECT LOCALIZED OF STARD3 IN THE ENDOCYCTIC RECYCLYING COMPARTMENT.

Edward Cluett and Zaira Sylvain, Ithaca College.

Cholesterol, a lipid in mammalian cells, is important in the structure and function of membranes and proteins. Cells make cholesterol through receptor-mediated endocytosis and process it to maintain homeostasis by taking up LDL particles along the endocytic pathway to lysosomes. The mechanisms where cholesterol is found and the involvement of membrane tubules in other parts of the cholesterol transport pathway are ill-defined. Phospholipases A2 (PLA2) are proteins that have been shown to play a role in membrane trafficking by formation of membrane tubules. Recent findings suggest that STARD3 may transport cholesterol between the ER and late endosomes (Wilhelm et al, 2016). The amount of transport facilitation was determined using a PLA2 inhibitor, ONO. Using confocal immunofluorescence microscopy, the effect of ONO on the localization of STARD3 was explored to address whether membrane tubules play a role in other cholesterol transport routes and the relationship between tubules and transfer proteins. HeLa cells with a sufficient supply of outside cholesterol, a slight change in the localization of STARD3 was found. In cells that obtain their cholesterol by synthesis, a sufficient amount of cholesterol entering the cell should not be detected in the localization of STARD3. Utilizing imaging techniques, a wider distribution of STARD3 was found in cells treated with ONO as compared to controlled cells. This suggests there is no dynamic factor in the distribution of STARD3 cells with LDL-derived cholesterol due to limited cholesterol from the ER.

DO THE HEPHLI MUTATIONS CARRIED BY TWO DIFFERENT CURLY-WHISKERED MOUSE STRAINS CAUSE TRANSCRIPT AND PROTEIN ALTERATIONS?

Juan Samuel-Constanzo & Taotao Tan, Central Connecticut State University 3-13

We have recently identified two mutant alleles of "curly whiskers" (abbreviated cw and cw^{2J}) that are associated with distinct defects in the Hephl1 gene. The cw allele is linked with a single-base-pair substitution that is located 2 bases 5' to Exon 11; the cw^{2J} allele is linked with a single-base insertion in Exon 14. If these DNA defects are (as we hypothesize) the molecular basis of the mutant curly-whiskers phenotype, then the mRNA and protein products they encode should also be faulty. To test this hypothesis, we isolated total skin RNA from cw/cw, +/cw; cw^{2J}/cw^{2J}, +/cw^{2J}; and control wild-type subjects. We generated cDNA from these samples, and PCR-amplified Hephl1 sequences using forward and reverse primers that annealed in Exons 9 and 12. Electrophoresis of the products based on cw/cw cDNA templates revealed two abnormally-short Hephl1 transcripts. Primer-extension sequencing of these variant products showed that one results from Exon 10 being joined to a cryptic splice acceptor within Exon 11, while the other results from Exon 10 being joined to Exon 12. Products amplified from cw^{2J}/cw^{2J} cDNA samples showed the standard splicing pattern, but the inserted nucleotide (which is predicted to cause an out-of-frame, early stop codon) appears to generate an unstable mRNA that is likely the target of nonsense-mediated mRNA decay. We are currently developing additional protocols for evaluating the electrophoretic mobility, tissue location, cellular location, and enzymatic activity of Heph11 protein in cw/cw mutants, cw^{2J}/cw^{2J} mutants, and in wild-type controls. We will describe our planned approaches and progress-to-date.

BODY SIZE VARIATION AND SEXUAL SIZE DIMORPHISM IN RATSNAKES FROM THE AMERICAN MUSEUM OF NATURAL HISTORY

Alexander Constantine, Dr. Gerardo Carfagno, Manhattan College 3-1

Understanding patterns of geographical variation in body size among and within species has long been a goal of evolutionary ecology because body size affects nearly all life-history traits of an organism. Despite the identification of well-defined patterns accompanied by explanatory hypotheses, there is difficulty in determining if such a universal pattern and explanation exists. Significant research has shown that in endotherms (i.e. mammals and birds), organismal body size increases as latitude increases, and decreases toward the equator. However, recent research has shown this pattern to be the opposite in ectotherms (i.e. reptiles). I explored the body size variation and sexual size dimorphism of North American ratsnakes from the archives of the American Museum of Natural History and studied them across their geographic range. There was no trend in ratsnake body size across their geographic range, but sexual size dimorphism was favored in males as they were generally larger than females. Since there was no evidence of a latitudinal trend in body size, it could be possible that more complicated factors are driving the body size of ratsnakes across their geographic range.

MICROBIAL DIVERSITY ALONG CLIMATE ZONES IN THE ATLANTIC OCEAN

Alexis Costa, Wagner College

1-3

Microorganisms can be found in all environments on Earth, including the oceans. Bacterial community composition can vary from place to place in the ocean. One hypothesis is that bacterial communities in tropical climate zones are different from those in temperate climate zones. For this research, microbiome and metadata were obtained from a database called VAMPS. VAMPS is an abbreviation for The Visualization and Analysis of Microbial Population Structures. These samples were collected at 16 different locations in the Atlantic Ocean, ranging from different climate zones. The computer program R was used, along with various statistical packages, to determine if microbial communities from these two climate zones were different. Using multivariate statistics to analyze the microbiomes, I showed that climate zones have little effect on bacterial composition. Instead, specific environmental variables such as phosphates, temperature, and silicates were correlated to variability in microbiome composition. This may be because, below certain depths, temperatures from each climate zone are actually similar. Future research can focus on how specific environmental variables impact ocean microorganisms.

THE EFFECTS OF SELECTED AYURVEDIC MEDICINES ON STEROID-INDUCED CATARACTS IN RANA PIPIENS (NORTHERN LEOPARD FROG)

Hunter Criollo, Ramandeep Kaur, Saint Peter's University

5-12

According to the World Health Organization, cataracts are responsible for 51% of world blindness (2010). The condition is not difficult to treat surgically, however because of limited access to health care in developing countries, many are left blind. There are no alternative, effective treatments known to reduce/reverse the effects of cataract development. Ayurveda, a holistic medical system native to India, may offer a more affordable, and accessible treatment. The system is known to have various health benefits, its origin dating back to 6th century BCE. Three Ayurvedic mixtures specifically claim to successfully treat cataract and other ocular-related impairments, however data is limited. Triphaladi Ghana Vati is a polyherbal blend used therapeutically for hypoglycemia and wound healing. One of the most prominent components of the eleven herbal-mixture is myrobalan, a fruit native to South Asia. Elaneer Kuzhambu is similar in composition, containing myrobalan, as well as turmeric tree root and camphor. Itone drops (a more recent Ayurvedic nineteen herbal-mixture) are commonly used to treat various eye ailments, including cataracts. Components include myrobalan, turmeric, and honey. This study investigates these herbal mixtures and determines whether they can prevent cataracts or reduce resultant cloudiness. Rana pipiens (Northern leopard frog) larvae are incubated 5 µg/mL and 10 µg/mL of the various mitures. Cataracts are induced at tailbud stage 17 (Gosner, 1960) with the corticosteroid hydrocortisone sodium succinate, a common anti-inflammatory drug known to cause cataracts. A qualitative numerical scale of 0-5 is used to rate the opacity of the lens along with photography.

B-3 DO PEOPLE MATTER? THE INFLUENCE OF CONTENT ON EMOTIONAL RECALL MEMORY.

Chandler Cronk, Sarah Kosian, Ithaca College.

Past research has demonstrated that both emotion and the presence of social content can influence memory. Our study investigated if these two common stimulus variables would display interactive effects in free recall performance. As expected, the analyses revealed main effects of social content and emotion, with greater recall for social pictures versus non-social pictures, and greater recall for emotional pictures than neutral pictures. However, the interaction effect revealed that the influence of content was valence specific. There was no effect of content for negative or neutral pictures, with negative pictures of both content types more frequently recalled than neutral pictures of both content types. In contrast, for positive pictures there was greater recall for social than non-social pictures, and only the social pictures showed a recall enhancement over neutral. Therefore, only negative pictures showed a recall advantage for non-social content. Our findings suggest that memory for social content is enhanced only if it is emotional. We also find support for the concept of 'weapon focus', since negative non-social content is also associated with enhanced memory.

EXPLORING THE EFFECTS OF EMOTION ON RECALL VERSUS RECOGNITION MEMORY

Victoria Cummings, Ascari Chotoosingh, Ithaca College. 3-15

We conducted two studies designed to investigate how people remember emotional pictures of social and non-social content. In one study, we assessed free recall and found main effects of emotion, social content, and a significant interaction between emotion and content. The interaction revealed that both positive and negative emotion enhanced the memory for pictures with social content, but only negative non-social pictures showed a similar enhancement. In the other study, we assessed recognition memory and failed to find any main effects or interactions when based on hit rates, false alarm rates, accuracy, response bias, or remember/ know responses. Since emotional differences in recognition memory are sometimes limited to high confidence memory responses, we reanalyzed this subset of data. However, we still failed to find any evidence of emotional differences in recognition memory. In contrast, we found two main effects of content that did not interact with emotion. Specifically, we found that non-social content was associated with greater false alarm rates and a more liberal response bias than social content. Although our recognition data revealed no significant emotional differences, our recall study suggests that emotion enhances memory. We discuss our inconsistent results across the two studies within the framework of dual-processing theories of memory.

THE POSSIBLE INCOMPATIBILITY OF ORIENTATION TO LAUGHTER AND PERSISTENCE

Brian Dahlin, Casey Foster, Connor Hulme, Mary Crilly, Ithaca College. **3-16**

Laughter is a powerful social phenomenon, although individual differences exist in responses to it. Gelotophobes feel anxious and try to avoid it; gelotophiles use it as a social tool; katagelasts direct it toward others. Our research dealt with personal characteristics associated with these different approaches to laughter, such as grit, diligence, and procrastination. Based on prior research, we hypothesized that as gelotophobia scores increase, so should scores on traits like rationality, diligence, and self-control because such traits would keep them from being in the spotlight. In contrast, we hypothesized that there could be a negative association between gelotophobia and procrastination scores. In comparison, gelotophiles may see no need to adapt their behavior in the direction of diligence, grit and self-control because the shortterm approval at being the funny person may override such characteristics. Katagelasts, who use humor as a tool to direct laughter away from themselves, show low levels of persistence, self-regulation and selfconsciousness, so they may also not put a premium on being fastidious. Our results showed that gelotophobia is negatively correlated with grit but is otherwise unrelated to being fastidious. Gelotophilia and katagelasticism scores, in contrast, were negatively correlated with grit and self-control, but positively correlated with procrastination. Careful attention to laughter may be associated with personalities in which a short-term focus on manipulating the environment through laughter can override other traits associated with responsibility.

MISSION: MAGNIFYING MICROPLASTIC ABUNDANCE IN URBAN PONDS

Tina Dantono, Isabelle Blok, Jancarlos Flores, Florence Li, Cephanie Lumene, Fordham University **2-9**

Recent studies have highlighted the ubiquity of microplastic pollution in the world's marine and freshwater bodies resulting from anthropogenic activities. As such, microplastics threaten human and ecosystem health because of their potential to bioaccumulate and biomagnify throughout trophic levels. The initial objective of this study was to identify microplastic presence in urban ponds located in Brooklyn, New York. Furthermore, upon identifying microplastics, this study was designed to determine whether or not pond macroinvertebrates were ingesting microplastics, if microplastic abundance differed as a result of distance from recognized shorelines, and if microplastic abundance changed as a result of surrounding macroplastic presence. It was hypothesized that (1) microplastics would be found in every sample, (2) microplastic particles would be present in pond macroinvertebrates, (3) microplastic abundance would be greater near pond shorelines, and (4) microplastic abundance would increase as the presence of macroplastic litter increased. To test these hypotheses, 500 mL replicates from various ponds were treated with Nile Red, a lipophilic dye that adheres to plastics. Then, the water samples were vacuum-filtered through glass fiber filter papers. Finally, the microplastic particles that adhered to the filter paper were viewed with a dissecting microscope and an ultraviolet light which causes the stained plastic to fluoresce orange. Ultimately, microplastics were present in every pond surveyed and were also found within macroinvertebrates inhabiting these ponds. Additionally, both the distance from the shoreline and the level of macroplastic litter present were shown to have no effect on microplastic presence in urban ponds.

IMMUNE RESPONSE IN CAENORHABDITIS ELEGANS WHEN EXPOSED TO MYCOBACTERIUM BOVIS-BCG

Alexa DeAnna, Jesse Devlin, Matthew Marcello, Marcy Peteroy-Kelly, Pace University 5-13

It has been established that the nematode Caenorhabditis elegans is a model organism for studying infection with Mycobacterium tuberculosis. This is due to the worm's transparent, streamlined body, and the similarities between its immune response to that of humans due to similar epithelial intestinal cells. The purpose of this research is to study the immune response in C. elegans from infection with Mycobacterium bovis-BCG. BCG is a biosafety level 2 strain of M. tuberculosis missing three genomic regions that attribute to virulence. There are three signaling pathways known in C. elegans that govern its immune response: DAF-2, p38 MAPK, and DBL-1. The DAF-2 pathway is involved in both immune response and aging. Worms genetically engineered to lack the proteins involved in the DAF-2 pathway will be infected with the bacteria to study exactly how these proteins protect the worm from infection. Similarly to humans, C. elegans use lysosomes and reductive oxidative species (ROS) to fight against pathogens such as BCG. The similarities have caused for interest in the science community. Since it is ethically unjust to do in vivo human experiments, C. elegans may prove to be an excellent model organism for looking into the genetic response of BCG when the bacteria comes into contact to human immune system-like environments. The results from this research will give helpful insights to how homologous proteins in humans work to protect the body from M. bovis-BCG infection and open a window for in vivo experimenting for BCG responses.

THE ROLE OF COMPETITIVE INTERACTIONS, PHENOLICS, AND FEEDING BY MESOGRAZERS IN EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM) INVASIONS

Rachel DeMarzo, Jenna Larson, Latina Steele, Sacred Heart University. 2-10

Invasive plants can spread to a degree that disrupts the structure of an ecosystem and causes damage to the environment. Factors contributing to plant invasiveness are incompletely understood, but elevated levels of chemical deterrents may enhance invasion success. This study examined competitive interactions, chemical defense production, and palatability in native Ceratophyllum demersum (coontail) and invasive Myriophyllum spicatum (milfoil). A laboratory competition experiment examined differences in C. demersum and M. spicatum growth in monoculture and polyculture. Since coontail can allelopathically reduce the growth of some plants, M. spicatum was grown in water containing chemical cues from each species. Field-collected samples of each species were freeze dried and ground for phenolic analysis and a palatability experiment. Freeze-dried, ground tissue from each plant species was incorporated into an artificial diet that was offered to amphipods (Gammarus sp.) in a choice feeding experiment. Coontail grew similarly well in both monoculture and polyculture, while milfoil grew better in polyculture. Milfoil growth was lowest in milfoil-conditioned water that contained its own chemical cues, showing that coontail did not allelopathically inhibit the growth of milfoil. Phenolic analysis and the choice feeding experiment are currently underway, but it is expected that milfoil will contain more phenolics than coontail, which should lead to greater amphipod feeding on the agar food made with coontail than with milfoil. Although other factors could affect competitive interactions and plant palatability, the results suggest that coontail can successfully compete with milfoil and that herbivores may alter competitive interactions between these species.

THE SIGNIFICANCE OF INCREASED ACTIVITY: A MICROBIAL AND STATISTICAL ANALYSIS OF THE SKIN USING NEXT GENERATION SEQUENCING

Stephanie Denis and Amanda Saab, Dominican College

5-7

Microbiome describes the bacterial community found in a given location or environment. These bacteria have been correlated with normal functioning of an organ or system in animals, related primarily to the community's metabolic and biochemical profiles. Dysbiosis, or the alteration of the microflora, can have a negative impact on human health. The significance of this work is to inform researchers on bacteria in common among individuals as a result of lifestyle. In the current study, microbiomes of skin were analyzed both prior to and following 30 days of endurance training for two individuals. Sequencing of the V3 region of rDNA was used to assign the bacterial identity to the genus level. We hypothesized that, due to a change in lifestyle, the microbial population of the skin would shift. There was, in fact, a correlation in bacterial genera and specific trends in the community between individuals. For both individuals the incidence of *Staphylococcus* and *Corynebacterium* increased, while *Cutibacterium* and *Propionibacterium* decreased. All other genera detected were not found to increase or decrease in common between the two individuals. Future studies will include analyses of microbiomes in the colon, nasal passageways, and oral cavity to examine for similarities in differential abundances. Additionally, these studies can inform researchers on what types of CRISPR sequences to examine for based on differences in their microbiota rather than human genetic traits.

INTRAMOLECULAR FRIEDEL-CRAFTS ALKYLATION OF N-BENZYL AZIRIDINES: A NOVEL SYNTHETIC METHOD WITH AN APPLICATION TOWARD NATURAL PRODUCT SYNTHESIS

Nicholas J. Di Grandi, and Martin J. Di Grandi, Fordham University 5-21

Pancratistatin, a member of the Amaryllidaceae family of natural products, was originally isolated from a Hawaiian spider lily and subsequently found to have unique anti-cancer properties. While several published syntheses of this compound have been reported, this research explores the potential use of N-benzyl aziridines to serve as precursors to 1,2,3,4-tetrahydroisoquinolines, part of the core ring system of this natural product. This research project plans to expand N-benzyl aziridines in the presence of either Bronsted or Lewis acids, via an intramolecular Friedel-Crafts cyclization, to a 1,2,3,4-tetrahydroisoquinoline ring system. We have been able to accomplish this transformation with simple systems using triflic acid as the acid source under microwave radiation. Current experiments are underway to probe the scope of this reaction.

METHICILLIN RESISTANCE IN STAPHYLOCOCCUS ASSOCIATED WITH WHITE TAIL DEER

Rachisan Djiake-Tihagam and Mark Gallo, Niagara University 1-4

Multiple-drug-resistant strains of *Staphylococcus* are a major concern in human medicine. Humans are not the only hosts for *Staph* however and domestic as well as wild animals have been found to also contain these virulent strains of *Staph*. Resistance to the beta-lactam antibiotic methicillin was previously shown to be due to the penicillin-binding protein known as MecA and strains harboring this are known as MRSA. The goal of this study is to determine if strains of *Staphylococcus* associated with white tail deer, *Odocoileus virginianus* also share the same mechanism, and hence underlying genes, as those found in human-associated MRSA (HA-MRSA). Polymerase chain reaction (PCR) was used to address this issue to reveal the presence of *mec*A as well as surrounding genes.

B-2 SEE THROUGH YOUR MEAL

Quincy Doccy, Pace University

In 2010, NYC Health Department rolled out the letter grade system for restaurants to reduce foodborne illness, increase sanitary practices and provide transparency for diners. Currently, 90% of NYC's 24,000 restaurants hold the letter A grade (the highest score). Consumers generally use these letter grades as a deciding factor for restaurant cleanliness and hygiene. Although the grade system has become an industry standard for sanitation, diners are not fully aware of what goes on behind the scenes as violations may differ for each restaurant even when they have the same letter grade. Would you still want to eat at a restaurant if there were evidence of live mice in facility's food and/or non-food areas? Or should a restaurant's score dictate their next inspection date? The objective of this project is to analyze the NYC Department of Health and Mental Hygiene (DOHMH) health inspections results datasets to identify the deficiencies and limitations of the current letter grade system and determine its effectiveness. Additionally, I will implement an application prototype to explore rather extending inspection citations to restaurant goers influence their perspective on a restaurant.

J-1 BARK FORMATION FOR FIVE COLUMNAR CACTI SPECIES OF CENTRAL MEXICO

Phillip Dombrovskiy, Manhattan College.

Studies have previously examined the process of bark formation on long-lived columnar cacti species within latitudes of 32°N and 32°S. Bark forms as result of fast cellular divisions of epidermal cells, which eventually leads to early cactus morbidity due to hindered metabolic processes. The formation of bark also has physical implications upon the underlying layers of the superficial-most cactus tissues. The current observational study was performed in the San Juan Raya Biosphere of Tehuacán Valley, Puebla, Mexico (18°N, 97°W) via microscopy and technology. The intention of research was to identify the mechanism for formation of bark in endemic cacti species of central Mexico, and to determine the direct effects of bark formation upon tissue layers beneath. Dissimilarities in morphology were noted between five cacti species: Neobuxbaumia macrocephala, Neobuxbaumia mezcalaensis, Neobuxbaumia tetetzo, Pachycereus hollianus, and Cephalocereus columna-trajani. Conclusive evidence was acquired in support of the hypothesis, stating that the presence of bark altered components of cacti's surface tissues.

A COMPARISON OF GROWTH OF MOLDS ON LURIA-BERTANI (LB) AGAR PLATES WITH AND WITHOUT ADDED ANTIBIOTICS

Marinha Domingues, Daniel Pinter, Amber Tucker, Victoria Ruiz, St. Francis College 5-8

Through contamination of some Luria-Bertani (LB) agar plates that were prepared for a course, we learned that there was a significant difference in numbers of molds on plates that were enriched with ampicillin (amp) versus those without amp. The experiment was intentionally repeated with LB plates with and without amp and were exposed to air in a microbiology teaching laboratory under the following conditions: covered or uncovered for three hours at room temperature (21°C), in a refrigerator (10°C) or in a 30° C incubator (this temperature is commonly used to grow molds). There were significant differences in numbers of growths (molds and/or yeasts) between covered and uncovered, with and without ampicillin, and among temperatures. An interesting black mold was noted on the LB plates plus amp that was not noted on the LB plates alone. Mold growth has been known to be a side effect of media that has ampicillin added to it, and has also been noted as a side effect of ampicillin use in humans. We have repeated these experiments with tetracycline and kanomycin but have obtained different results.

A PROPOSED TREATMENT FOR HUNTINGTON'S DISEASE

Ryan Donnelly, Barry Hoopengardner, Central Connecticut State University 5-14

Huntington's disease is a poly Q dominant disorder that has an age of onset relationship inverse to the length of glutamine repeats. Using transgenic Drosophila or cell culture as a model, we intend to knock down mHTT to subclinical levels of expression by utilizing short hairpin RNA to target a mutant HTT sequence. By using the same promoter sequence for the shRNA as the mHTT we hope to achieve a stoichiometric equivalence of expression. shRNA overexpression is known to cause RNA toxicity; in anticipation of this we intend to fine tune the levels of expression by hypermethylation of the promoter sequences.

EFFECTS OF CARBON DIOXIDE ON FLUCONAZOLE SUSCEPTIBILITY IN CRYPTOCOCCUS NEOFORMANS

Kristen N. Donovan, Virginia E. Glazier, Niagara University 4-20

Cryptococcus neoformans, is commonly found throughout the environment within soil worldwide. Inhalation or exposure to *C. neoformans* can cause life-threatening effects to the lungs and central nervous system. The morbidity and mortality risks of this fungus have made the need for more effective and affordable treatments of high global importance. The antifungal drug, fluconazole, is already administered as a treatment option and often paired with the actions of amphotericin B. Once amphotericin has controlled symptoms, fluconazole can act as an effective long term therapy. We are interested in the effects of carbon dioxide on fluconazole susceptibility in *C. neoformans*. The effectiveness of fluconazole will be tested under high carbon dioxide conditions because *C. neoformans* is known to reside in the lungs where CO₂ levels are high. We hypothesize that carbon dioxide will enhance the efficacy of fluconazole. In order to determine the effects of CO₂ on fluconazole activity, MIC and etest results will be compared at 37°C, or at 37°C in the presence of CO₂. Observing effects under these conditions will lead to a deeper understanding of how physiologically relevant conditions adjust the functions of antifungals. This information will be helpful in the development of better treatment options for *C. neoformans*.

J-4 DO 'LIVING SHORELINES' PROVIDE HABITAT FOR LOCAL FAUNA IN LONG ISLAND SOUND?

Mary Dushay, Jo-Marie Kasinak, Jennifer Mattei, Sacred Heart University

Anthropic coastal habitat degradation results in flat and barren shorelines, for example at Stratford Point, Connecticut the fringing salt marsh was removed during remediation for lead shot. A ~280m 'living shoreline' was installed to decrease erosive forces and restore estuarine habitats (2014-2018). We tested if this living shoreline allows the easy passage and recolonization of the area by local fauna. Over the past seven years, spawning horseshoe crabs (Limulus polyphemus) and Eastern oysters (Crassostrea virginica) were surveyed to determine if the living shoreline installation had an effect on their activities prior, during and after restoration. During the years of construction, spawning horseshoe crab counts were low but have now increased. Oyster counts have oscillated and a small population is becoming established at the base of the artificial reef.

EXAMING THE OCCURRENCE OF NON-FATAL SHARK ATTACKS ON BOTTLENOSE DOLPHINS OFF BIMIMI, THE BAHAMAS

Joshua Miller-Dwyer, Kelly Melillo-Sweeting, Maria Maust-Mohl, Manhattan College

1-23

Atlantic bottlenose dolphins (*Tursiops truncatus*) are frequently seen near Bimini, The Bahamas, which is also home to numerous shark species. Gathering data on the occurrence of non-fatal shark attacks on the dolphins can help reveal more information about the status of these dolphins as well as provide insight about the types of sharks attacking the dolphins. The goal of this project was to document the occurrence of shark bites using the photo-ID catalog compiled with the Dolphin Communication Project. We report the number of dolphins with scars and injuries indicative or suggestive of shark bites and describe the regions of the body where scars were typically observed. Based on the regions these scars are located, we estimate the angle of attacks resulting in non-lethal bites and compare these attacks to reports in other parts of the world. This information contributes to the longitudinal study documenting dolphins in this region and provides insight into the predator-prey relationship between shark species and dolphins off Bimini.

EFFECTS OF ANTIBIOTICS ON TWO STRAINS OF MYCOBACTERIUM SMEGMATIS

Denzel Edwards, Dominican College

4-21

Mycobacterium smegmatis is a non-pathogenic microorganism and is classified as an acid-fast bacterium due to the accumulation of mycolic acid outside of its cell wall. Mycobacteria have the ability to survive harsh conditions and treatment with antibiotics due to their complex cell envelope. In this research, the effect of antibiotics on Mycobacterium smegmatis mc²155 and Mycobacterium smegmatis Xeno were investigated. The latter of these two is a strain of bacteria infected with the temperate N cluster mycobacteriophage Xeno. The Kirby-Bauer antibiotic sensitivity test was used to examine if the two strains are differentially susceptible to antibiotics. Prior work done in our laboratory showed that M. smegmatis mc²155 infected with various mycobacteriophage were more or less resistant to certain antibiotics. Our results show that, although there was a difference in the diameters of the zones of inhibition obtained for kanamycin, novobiocin, and penicillin, between the two strains, there was no difference when using isoniazid. A combination of isoniazid and any of the aforementioned antibiotics did not show that the drugs can act synergistically. Future studies include the use of DPH anisotropy and laurdan fluorescence test to investigate changes in membrane physical properties when M. smegmatis is cultured in the presence of antibiotics. In addition, other members of the lab are attempting to create stable lysogens using the phage Juice456 (F1 subcluster) and Patt (K4 subcluster), which will be used to examine for differential antibiotic susceptibility.

H-4 POPULATION ANALYSIS OF SCAEVOLA TACCADA AND SCAEVOLA PLUMIERI ON CULEBRA, PUERTO RICO, USING MICROSATELLITES

Miranda Ella, Ithaca College

Oceanic island ecosystems are entirely populated by dispersal, and species that inhabit these environments are subject to genetic changes that lead to species evolution. Scaevola plumieri is a dune shrub that is now native to Puerto Rico while Scaevola taccada is new and invasive on these beaches. We are interested in studying how the genetics of these species differ specifically regarding the degree of inbreeding and the rate of introduction of new individuals. Samples were collected from Culebra, Puerto Rico and genomic DNA was extracted later in the lab. Microsatellites were amplified using fluorescently-labeled primers and these PCR products were sent to the Cornell University Biotechnology Resource Center. The resulting fragment peaks were analyzed using Geneious and will be followed by analytic tests using Arlequin. These data will answer questions regarding the population genetics of Scaevola, including the farthest physical distance at which alleles are being shared, the degree of inbreeding and gene flow, the rate at which individuals are being introduced to the island, and the degree of genetic diversity. Answers to these questions can reveal how the populations of Scaevola are interacting with each other on the genetic level; however, the analysis of more microsatellite loci is needed before any absolute conclusions are drawn.

A COMPARISON OF VERNIER DISSOLVED OXYGEN AND CARBON DIOXIDE PROBES: WHICH CAPTURES DATA BETTER IN YEAST AND EUGLENA GAS USAGE?

Augustin Espinoza, John Melo, Kathleen A. Nolan, St. Francis College 1-7

Vernier dissolved oxygen and carbon dioxide sensors were used to record respiratory activity in yeast and photosynthesis of Euglena, and respiration of Euglena in the dark. Our hypothesis was that values of both would be much higher for yeast, perhaps because they are larger cells. We also made comparisons of cell sizes of both. We were able to demonstrate that there was a reciprocal relationship between dissolved oxygen and carbon dioxide levels for both respiration and photosynthesis. Preliminary results revealed a significant difference between the amount of oxygen consumed by the yeast and the Euglena in the dark, as well as the amount of carbon dioxide produced by both. In the future, we will repeat these experiments under different conditions, such as temperature and various wavelengths of light. We will also search for a way to better quantify differences in cell numbers and size.

DESIGN AND PROTOTYPING OF A WINDMILL POWERED VESSEL

Nathaniel Estes, Samuel Sumberg, Christopher Reichart, Nathaniel Brown, Sean Travers, Tyler Brett; Roger Williams University **2-26**

A market is identified for an innovative windmill powered boat that gives a boating experience similar to sailing with fewer complications. This market includes those unable to handle the physical demands of conventional sailing, as well as people looking for sustainable alternative to powerboats. In order to gage customer needs, a survey is administered to potential consumers. With the results from the survey in mind, a catamaran with a horizontal axis windmill is chosen from multiple candidate concepts. This choice is based on the superior stability and minimal water drag of a catamaran combined with the high efficiency of a horizontal axis windmill. A Matlab code is used to optimize blade shape, and an initial design is developed using Solidworks. Small groups are formed to finalize sub-assembly designs and to begin fabrication on these sub-assemblies. This way, the design is modular in nature and can be easily transported and assembled at the desired destination. The full-scale prototype is put through an intensive testing campaign on Mt. Hope Bay in various wind and sea conditions.

EFFECTS ON POSTERIOIR REGENERATION IN PLANARIA TREATED WITH AN ANTAGONIST OF RETINOIC ACID SYNTHESIS

Dusan Etienne and Betsy Dobbs-McAuliffe, Central Connecticut State University 5-15A

Planarian flatworms can regenerate any lost or injured body parts, making them an ideal model system to study regeneration. Many molecular pathways mediating cell and tissue regeneration in vertebrates also function during planarian regeneration. We are investigating whether retinoic acid (RA) signaling is one of these conserved pathways. In vertebrates, RA plays a critical role in posterior patterning during embryonic development and in regeneration. To test for RA functions in planaria we are using an RA synthesis inhibitor, diethylaminobenzaldehyde (DEAB) on regenerating planarian fragments. We hypothesized that if RA is needed for posterior regeneration, clearing RA via DEAB treatment will cause posterior regeneration to fail. To begin, we assessed the formation of a regeneration blastema by looking for an accumulation of unpigmented cells at both anterior and posterior cut sites. We found that 45 µM DEAB inhibits or delays the formation of a posterior blastema, but not the anterior blastema. Using immunofluorescence we are assessing for differentiation of cells posterior gut in DEAB treated worms. Currently, we are treating planarian fragments with DEAB or control solution for 1-2 days prior to cutting to clear RA previously synthesized. Fragments are then fixed and incubated with the monoclonal antibody 6C8. This antibody labels the nucleus of cells on the luminal side of the enteric muscle wall, delineating the intestinal branches of the gut. We expect to see gut branches developing posterior to the cut site in control, but not DEAB treated fragments.

J-3 XYLEM CONDUCTIVITIES OF PRIMARY, SECONDARY, AND TERTIARY VEINS OF PLANT LEAVES

Maya Carvalho-Evans, Manhattan College

The purpose of this study was to determine the relationship between (1) xylem characteristics of numbers of xylem cells and cell radii are well scaled among vein types, (2) xylem conductivities are well scaled among corresponding lamina areas, (3) xylem conductivities are well scaled to each other. Water enters leaves through xylem cells in petiole and moves from primary veins to secondary, to tertiary (three tiers of veins), to feed areas. Leaves of thirty-two species of broad-leaved plants with percurrent leaf venation were tested. A total number of 12,301 xylem cells were counted amongst the thirty-two species, and 830 cell radii were measured. Xylem cell radii for primary, secondary, and tertiary veins were 2.1 to 37.7, 7.72 to 34.4, and 3.53 to 18.1 \(\sum \), respectively. Xylem conductivities of primary, secondary, and tertiary veins were 0.0906 to 20.4, 0.00367 to 10.4, and 0.0000297 to 0.103 g·cm·MPa⁻¹, s⁻¹, respectively. Entire lamina, secondary, and tertiary areas were 7.25 to 887, 0.262 to 55.1, and 0.0395 to 3.16 cm², respectively. Xylem conductivities were well scaled to corresponding leaf areas, and to each other, with r² vales between 0.81 and 0.89. Previous studies have shown that an alpha factor ($R_R = N_R^{-a}$) can be used to test Murray's Law, which relates to the distribution of water from one tier to another (eg. primary to secondary veins). Optimally, the alpha factor between tiers should be 0.33. The data of this experiment shows the alpha \Box factors between 0.26 to 0.38. Thus, the leaf areas of our experiment conform to Murray's Law. These following results are new and novel.

D-3 TRANSIENT EXPOSURE TO 450 NM LIGHT ALTERS PHAGOCYTOSIS BY RETINAL PIGMENT EPITHELIUM WITHOUT COMPROMISING VIABILITY

Joseph Fabozzi, Jonathan Blaize, Wagner College.

Phagocytosis of outer segments (OS) and reisomerization of chromophores by the retinal pigment epithelium (RPE) are critical for maintaining visual health. Diseases of the retina, including age-related macular degeneration (AMD), manifest when the aforementioned processes are perturbed or RPE viability is compromised. Numerous factors, hereditary or otherwise, have been implicated as contributors to RPE failure though none are as paradoxical as light exposure since it is required for normal vision. While melanosomes within RPE offer protection from photo-oxidative stressors, chronic irradiation contributes to toxic biretinoid production and accumulation. N-retinyl-N-retinylidene ethanolamine (A2E), a lipophilic cytotoxin, has been shown to reduce cellular viability, slow phagolysosomal digestion of OS and hinder phagocytosis under certain physiological conditions where oxidative phosphorylation mechanisms are stressed. The retina is particularly vulnerable to short electromagnetic wavelengths (<500 nm) and recent studies suggest that increased mobile electronic device usage contributes to disease phenotypes. Several laboratories have demonstrated photo-toxicity of blue light on RPE, though little is known about the consequences of short-term exposure on phagocytosis. Our preliminary results support a hypothesis of phagocytosis perturbation when cells are exposed to blue light, (0.027 micromole), and that the duration and intensity of this exposure does not alter morphology, induce apoptosis or change mitochondrial output.

PHYLOGENETIC ANALYSIS OF GBSSI WITHIN JALTOMATA

Jeffrey Feola, Barry Hoopengardner, Central Connecticut State University 3-8

Our laboratory is looking for conformation of the presence of the granule-bound- starch-synthase gene (GBSSI) within a novel species of genus Jaltomata, Jaltomata propinqua. Primers were designed using DSGene genomic alignments of similar species within both Jaltomata and Solanum. After PCR and gel electrophoresis confirm presence of GBSSI in the novel species of Jaltomata semi-qPCR will be performed to quantify expression within Jaltomata propinqua and related species.

E-1 PASSWORD STRENGTH

David Ferker and Mario D'Alicandro, Pace University

According to Verizon Data Breach Investigations report in 2017, "81% of hacking-related breaches leveraged either stolen and/or weak passwords." For the last several decades the standard advice given regarding the strength of a password was to make the password complex, without using common words. It was believed that the more complex a password is the less likely it could be cracked through various hacking techniques. However, this advice has largely been deemed obsolete due to new hacking methods through more complicated computer systems. Now many cyber security researchers are suggesting that the security of a password is more determined by its character length, rather than its complexity. Passwords are also stolen using social attacks known as phishing scams. This raises the question of how long does a password need to be in order to minimize the risk of having your password compromised.

DIFFERENCES IN DEPRESSION AND ANXIETY ACROSS THE BREAST CANCER SPECTRUM

Kate Fike, John Carroll University

4-18

Identifying patients at highest risk for depression and anxiety is an important factor of breast cancer prevention, treatment, and recovery. Given the advancements in genetic testing, new populations at high risk for breast cancer have emerged and are in need of psychological evaluation. The current study evaluated which populations within the breast cancer spectrum have the highest levels of depression and anxiety. Participants were patients at a local hospital who had a genetic risk for developing breast cancer, current breast cancer patients, and survivors of breast cancer (N=290). All participants completed two self-report questionnaires, the PHQ-9 and GAD-7. The results showed that gene mutation negative patients were significantly more depressed and anxious than breast cancer (BRCA) mutation positive patients. Furthermore, survivors had the highest levels of depression, followed by current breast cancer patients, then genetic risk patients. Both current breast cancer patients and survivors had significantly higher anxiety scores than genetic risk patients. Overall, it was concluded that genetic testing was not related to higher levels of depression or anxiety in patients across the breast cancer spectrum. It is suggested that medical breast teams focus their resources on current breast cancer patients and survivors due to their increased risk for depression and anxiety. More research will be needed to ascertain whether these groups respond similarly to psychological therapy.

B-4 MOMS RULE AND DADS DROOL: PORTRAYALS OF MOTHERS AND FATHERS IN TELEVISION SITCOMS AND TEEN SHOWS

Julia Fitzgerald, Leticia Lynch, Ithaca College

Previous studies have examined the impact television has on beliefs and attitudes of viewers, especially for children and teens. While there have been studies indicating differences in the willingness of children to seek and follow parental advice, there have been many studies on the portrayal of parental guidance on television. The current study represents a content analysis of 110 television shows, including 2 different program types (sitcoms vs. teen shows) that were shown on television in three different decades (1990s, 2000s and 2010s) recorded by the Center for Research on the Effects of Television (CRETV) archive at Ithaca College. Programs were selected for analysis if they contained one or more interactions between parents or caregivers (including step-parents and grandparents) and their children (who were 18 or younger). The interactions were coded for type of parental advice or behavior (e.g., discipline, support/reassurance, problem-solving, enticing bad behavior) and the child's response (e.g., ask for advice, distress, obey, argue, optimism, sass). This analysis explores how those interactions and the child's responses differed by gender of the parent/caregiver and by gender of the child. Results showed that while both maternal and paternal figures were likely to provide similar advice (especially support/reassurance), paternal figures were more likely to discipline the child or use humor emphasized by laugh track, while maternal figures were more likely to approach conflict with sarcasm.

LAUGHTER DOES NOT ALWAYS EQUAL PLEASURE: ANHEDONIA, SENSATION SEEKING, AND IMPULSIVENESS

Casey Foster, Connor Hulme, & Mary Crilly, Ithaca College 3-17

Gelotophobes experience anxiety when they hear laughter because they automatically conclude that it is directed at them. Previous research has shown that they have difficulty forming attachments, are self-conscious, show high levels of public and private self-consciousness, and display a fear of happiness. As such, we hypothesized that they would likely display high levels of social anhedonia, which is lack of pleasure related to being with others. In contrast, they may not show physical anhedonia. They are also unlikely to be impulsive or to score high in sensation seeking. Other the other hand, we hypothesized that gelotophiles, who use laughter as a positive social tool, and katagelasts, who actively work to direct laughter toward others, would be predisposed to pleasure, that is, to score low in social anhedonia but high in impulsiveness and sensation seeking. Our results supported most of our hypotheses. Gelotophiles favor remaining in the background, resisting impulsiveness and stimulation, whereas gelotophobes and katagelasts show more external, social orientations.

EVIDENCE FOR HORIZONTAL GENE TRANSFER OF XENOBIOTIC DETOXIFICATION GENES IN A PLANT PATHOGENIC FUNGUS

Brieanna Fuentes, Jonathan Hulvey, Eastern Connecticut State University 3-9

Fungicide resistance in crop pathogens is a threat to agricultural productivity and understanding the mechanisms and evolution of resistance is important for basic and applied science. Horizontal gene transfer of antibiotic resistance genes is well documented, though in fungal microbes this phenomenon is not well understood. In this study, the genome of Sclerotinia homoeocarpa was examined to determine if horizontal gene transfer served as a mechanism for the acquisition of xenobiotic detoxification genes. A previous RNA-seq experiment identified genes that were overexpressed in fungal isolates with resistance to multiple fungicides. A parallel analysis of the genome identified 380 genes that displayed evidence of being acquired through horizontal gene transfer. These genes were sorted into sixty-one gene clusters based on their proximity to other genes. Comparison of genes identified from both analyses identified a total of 28 that met criteria for potentially being involved in fungicide resistance and having been acquired through horizontal gene transfer. These gene candidates are ideal for future investigations into the mechanisms and evolution of fungicide resistance.

INVESTIGATING THE ROLE OF CDK5 IN ALZHEIMER'S DISEASE AND TYPE-2 DIABETES

Julia Furnari, Brandon Tran, Ann Aguanno, Marymount Manhattan College 1-26

Alzheimer's disease (AD) is a progressive, age-related neurodegenerative disorder. The etiology of this disease remains unclear, although risks factors such as aging, type-II diabetes and obesity have been identified. Hallmarks of AD include extracellular amyloid-beta plaques and intraneuronal neurofibrillary tangles of hyperphosphorylated tau protein. Our lab investigates the role of Cyclin dependent kinase 5 (Cdk5) in mammalian nervous system development using a neuronal cell model PC12. Our early findings have shown that Cdk5 is essential for the establishment of neuronal cell morphology and action. Given Cdk5's role in neuronal development, one of its substrates is tau, we decided to explore a role for Cdk5 in neurodegeneration. Inhibition of Cdk5 revealed aberrations in nerve cell morphology, architecture and function in our PC12 cell line in the presence of neurotrophic factors. Cdk5 has also been implicated in the differentiation of extra neural tissues, including the pancreas. Since some of the risk factors for AD includes obesity and Type II diabetes, we also investigated the effect of Cdk5 inhibition in pancreatic cell models. Recent evidence that dysregulation of brain insulin plays a role in the pathology of AD may explain the associated risk factors of obesity and Type II diabetes with AD. We are extending our research and using another neuronal cell model, N2a, a murine neuroblastoma, and exposing the cells to hyperglycemic and hyperinsulinemic conditions. Here we report our test results of the impact of normal and aberrant Cdk5 activity and examine CDK5 as the link between AD and type II diabetes.

GENE EXPRESSION COMPARISON BETWEEN WILD AND RESTORATION POPULATIONS OF THE EASTERN OYSTER

Andrea Gabriele, Suruj Devi Singh, Chelsi Napoli, Erika Crispo, Pace University 3-10

The Eastern oyster, Crassostrea virginica, is a marine bivalve and a keystone species essential for the structure of the ecological community. The Eastern oyster filters plankton and other particles from the water they inhabit, and thus enhance water quality. The oyster population has suffered historical declines on the East coast, including around New York Harbor. Some of the most important causes of their decline have historically been overharvesting by humans, pollution, and introduced diseases in the marine environment. The purpose of our study is to use genetic techniques to inform oyster restoration programs about how different oyster strains are responding to environmental conditions. We compare Maine hatchery oysters' to wild oysters' genetic responses, by examining expression of functionally important genes. The goal is to determine whether gene expression differs between wild and 'restored' caged oysters, held under the same environmental conditions in the wild. To achieve this goal, we quantify gene expression of the heat shock protein 70, which is important for protecting cells against environmental stress; and beta actin, which is used as a control gene because its expression is not expected to be influenced by the environment. We observe the expression patterns among oysters grown in various locations around the New York Harbor, including Governors Island, Bush Terminal, and Soundview Park. This research will help inform whether restored oyster stock are phenotypically similar to wild ovster, or whether they represent functionally distinct populations.

C-2 CLUSTERING OF FUNCTIONALLY RELATED GENES IS A MECHANISM OF TRANSCRIPTIONAL CO-REGULATION IN SACCHAROMYCES CEREVISIAE

Irvin Gamarra, Alanna Cera, Maria K. Holganza, Exequiel M. Sisso, William Paterson University

Gene expression is a fundamental cellular challenge oftentimes requiring coordinated regulation of large sets of genes to achieve and maintain adaptive homeostasis. Gene spatial positioning is an important layer of regulation that cells utilize in order to properly control gene expression. Within some functionally related gene families, certain members tend to be regulated conjointly via a process called adjacent gene co-regulation, a still under-characterized mechanism with no definitive model. Adjacent gene co-regulation is possible due to the members in functionally related gene families being physically clustered together along the chromosome, which can result in coordinated transcription within the clusters. Here we characterized the relationship between the two-dimensional genomic distance within the functionally clustered genes of the Nitrogen Metabolism, Ribosomal Protein, Toxin Response, and Heat Shock families utilizing Saccharomyces cerevisiae as a model system. We utilized the Spearman's correlation coefficient to demonstrate mathematically that this genomic distribution of functionally related genes is not random, with the clustered members of each family localizing to regions of the chromosome that differ transcriptionally compared to the unpaired gene members of a family.

MULTI-GENERATIONAL EFFECTS OF PESTICIDE TREATMENT

Esabelle Gervasio, Beatrix Bradford, Marist College

currently being explored.

One example of a neonicotinoid is imidacloprid, which is an active ingredient in pesticides used in the agriculture industry along with being found in pesticides which are available to the general public for use in lawn and garden care. The effects of an imidacloprid-containing pesticide on the model organism Caenorhabditis elegans across multiple generations were investigated. The imidacloprid containing pesticide used in the investigation is one which is available to the general public and contains imidacloprid as its active ingredient at a concentration of 1.47%. Assessment was conducted on multiple strains of C. elegans, and the effects of imidacloprid-containing pesticides on the C. elegans germ line across generations were investigated. It was found that imidacloprid caused a significant increase in the number of corpses as a result of imidacloprid containing pesticide exposure in the F1 generation in all strains. An increase in apoptotic cells was seen in both bus mutant strains in the P0 generation. The data collected support findings that neonicotinoids cause widespread harm to multiple species and raise

concern about their safety to humans. The nature of these defects and the effects in the F2 generation is

2-17

THE EFFECT OF PARK VISITORS ON MICROBIAL COMMUNITIES

Jose Gomez, Cassandra Marnocha, Niagara University.

Fillmore Glen State Park, New York, is a campground that allows pets on the premises and also lets humans bathe in their water. Because humans and pets act as vectors for bacteria, having these policies may change the microbial community structure of the water. Some common bacteria that may be found in the water because of increased human activity include Salmonella and Shigella. Pets that may be brought by visitors can also carry Salmonella, as well as E. coli. To further investigate microbial life at Fillmore Glen State Park, samples were collected near the waterfall in three different types of conditions; still, intermediate, and running water. The 16S gene will be sequenced from the total genomic DNA of the water in order to characterize the bacterial communities in said environments. Because the ribosomal gene is strongly conserved and crucial to the organisms' life, it will help us differentiate between taxa in our samples. Depending on the transition of each environment, turbulence and dissolved oxygen concentration may be important factors that impact which bacteria are present in the different water samples. We expect dissolved oxygen concentration to differ between each environment, and depending on the availability of oxygen, different bacteria will be more or less likely to be present. With this information we can compare the bacterial diversity of the waters of Fillmore Glen State Park with parks that are less pristine and more pristine.

2-11

DESIGNING A NEAR NET ZERO BUILDING

Rebecca Gow, Leah Weiss, Lukas Charbonneau, Gregory Philippon, Roger Williams University. **2-27**

Engineering students as part of a senior capstone project, conducted a study of a new laboratories building being constructed on campus for the purpose of implementing strategies to make the building near net zero. Near net zero is achieved by conserving energy usage and generating enough renewable energy on site to satisfy the annual energy consumption. With the current state of the environment, it has become increasingly important to reduce the use of non-renewable energy sources such as coal, oil and gas. Burning fossil fuels contribute to the production of potent greenhouse gases which significantly advance global climate change. The study included a Leadership in Energy and Environmental Design (LEED) analysis and ranking of the facility performed as a benchmark to quantify the current design. The LEED analysis identified those areas where additional actions could be undertaken to approach a near net zero facility. Analyses of these different areas were then performed. These areas included a photovoltaic insolation conversion system, wind turbine generation, thermal energy storage, solar hydronic water heating system and changes to the building envelop and operating schedules. Homer Pro, a simulation tool that provides energy production estimates for wind and solar energy, was used to determine the energy collected and the cost analyses for the photovoltaic and wind turbine proposals. These results were combined with similar analyses used to quantify the energy savings and generation for the overall project and to measure the progress in transforming the facility to a near net zero building.

E-2 DEVELOPMENT OF JUPYTER NOTEBOOKS TO FACILITATE OPERATIONAL TAXONOMIC UNIT IDENTIFICATION AND ANALYSIS OF 16S rRNA SEQUENCING DATA

Haley Grimason, Barbarar Murdoch, Garrett Danick, Biology Department, Eastern Connecticut State University

The analysis of metagenomic data involves sequence assembly of 16S rRNA sequencing data and clustering the sequences into Operational Taxonomic Units (OTUs), which can then be compared across samples. The bioinformatics tool mothur provides a pipeline for this analysis, by processing 16S rRNA sequence data and outputting a table containing the identified OTUs and their taxonomic classification. However, one limitation of mothur is that it does not allow for visualization of results. As a command line tool, mothur can also be difficult to use at first. In this project, we developed a collection of Juptyer Notebooks for identifying OTUs from 16s rRNA sequencing data. The Juptyer Notebooks, which run in a standard web browser, use mothur for data processing and the R package phyloseq for visualization and analysis. We decided on Jupyter Notebooks as a platform because they allow for reproducible research and make metagenomic data analysis more accessible for biologists. We demonstrate the Jupyter Notebooks by analyzing 16S rRNA collected from the tail and telson regions of Hadrurus arizonensis and Smeringurus mesaensis, both scorpions found in North American deserts. Identification of microbes in the telson are of particular interest because of their ability to survive in the precarious environment where scorpion venom is stored. Using the Juptyer Notebooks, we compare bacteria between the telson and tail region as well as between species.

TESTING AND VERIFYING THE 'ENHANCER-PROMOTER' HYPOTHESIS IN SACCHAROMYCES CEREVISIAE

Ahmad A. Hardan, Sarah Elkamhawy, William Paterson University. 3-11

Spatial positioning, is one of the many mechanisms employed by the cell to regulate transcription. The chromosomal location of genes influences transcription – not only on the proximal gene itself but on neighboring genes as well. Co-regulated gene families utilize spatial positioning to coordinate transcription, keeping functionally related genes clustered together, thereby allowing coordinated expression via adjacent gene co-regulation. In this study we aimed to test the 'enhancer-promoter' (EP) hypothesis, which posits that regulatory elements have the capability to exert transcriptional effects on neighboring genes over a broad distance, which could account for coordinated transcriptional coregulation of these gene families. This mechanism has yet to be empirically tested in many organisms – with the sole exception being Caenorhabditis elegans (C. elegans). We tested this hypothesis in the budding yeast, Saccharomyces cerevisiae, using strains containing a HIS3 reporter gene separated by spacers of varying lengths from a galactose inducible promoter. This construct was integrated into two different genomic loci, where we tested the EP hypothesis using a combination of growth assays and quantitative real-time reverse transcription PCR. We found that as spacer size increased both the rate of growth and the rate of transcription decreased, with the magnitude of the effect varying based on the permissiveness at the site of integration. We additionally report that the disruption of transcription to the regions proximal to the integration site vary according to the permissiveness at the locus of integration, validating the EP hypothesis in this species and providing a mechanism underlying adjacent gene coregulation.

RADIATION CHEMISTRY IN MOLTON SALTS AND IONIC LIQUIDS

Chaudhary Harris, Natural Sciences Department, Fordham University, James Wishart, Brookhaven National Laboratory 5-22

Molten salts are under serious consideration for use as heat transfer fluids in next-generation nuclear reactors. They can increase reactor performance and safety because they can operate at very high temperatures (500 – 900 °C) and ambient pressure, thus increasing the system's thermodynamic efficiency while avoiding the hazards of pressurized systems. Molten salt reactors were studied as early as the 1960s, and in some designs the nuclear fuel is dissolved directly in the salt rather than being contained in fuel rods, as is done in water-cooled reactors. Despite previous work on molten salt reactors, little is known about the chemical effects of the reactor's high radiation environment on the composition of the molten salt, the fuel components, and the nuclear fission products dissolved in it. Therefore, we are using the Brookhaven National Laboratory Laser Electron Accelerator Facility (LEAF) to study the radiation chemistry of molten salts using pulse radiolysis kinetic spectroscopy techniques with high-energy electrons. As these electrons pass through samples, they cause secondary electrons to be ejected, creating excess positive and negative charges that induce chemical reactions. We are using ZnCl₂ (m.p. 290 °C) as the molten salt, and chloride salts of Ru³⁺, Ni²⁺ and Co²⁺ to act as scavengers of the excess charges. The primary transient species formed in pure molten ZnCl₂ are Cl₂ and Cl₃. Adding metal ions has been more complicated than expected because their chemistries in ZnCl₂ were previously unknown and do not seem to parallel those in concentrated aqueous chloride solutions.

CHARACTERIZATION OF LEPTOSPIRA BIFLEXA SURVIVAL UNDER VARIOUS OSMOTIC STRESS CONDITION

Yaritza Herrera, Natalia Lizardo, Christopher Pappas, Manhattanville College 4-22

Leptospirosis is the most widespread zoonotic disease worldwide, with more than one million severe cases annually. This disease is usually transmitted by coming into contact with the urine of the rodent. Leptospirosis is caused by a pathogenic genus of bacteria called Leptospira. Leptospira consists of pathogenic species such as L. interrogans and saprophytic species such as L. biflexa. For our purposes we will be studying L. biflexa since its genome is relatively similar (61% homology) to L. interrogans, is not harmful, and can easily be genetically manipulated. However, the survival processes used by this genus has not being thoroughly researched. Our goal is to identify what type of mechanism the pathogenic strain of Leptospira uses to adapt to varying osmotic environments. This study's objective is to locate the genes responsible for osmoadaptation using L. biflexa. For this study, L. biflexa was screened by spectrophotometric analysis using three biological replicates with two technical replicates for growth and survival in 17 mM, 60 mM, 70 mM, 80 mM, 90 mM, and 120 mM salt (NaCl) concentrations with a starting cell concentration of 5 x 10⁵ cells/ mL. A pilot study was also conducted to determine growth of L. biflexa growth at 5×10^5 cells/ mL versus 5×10^4 cells/ mL in salt concentrations of 17mM and 70mM. This data will be used to describe optimized conditions for screening a random transposon mutant library of L. biflexa for salt intolerance. Ultimately helping identify genes responsible for salt tolerance in Leptospira species, elucidating mechanisms of adaptation used by this genus for survival both in a terrestrial and animal environment.

EFFECTS OF ANTIBIOTICS AND BACTERIOPHAGE ON THE SKIN BACTERIUM PROPIONIBACTERIUM ACNES

Denver Hopkins, Elizabeth Gwara, Clarissa Sarmiento, Michael Davis, Central Connecticut State University.

4-23

Existing antibacterial treatments for the skin disease acne include antiseptics or antibiotics. These agents target the common skin bacterium Propionibacterium acnes. We have been developing a novel acne treatment using P acnes-specific bacteriophage, which effectively kill P acnes bacteria by cell lysis during bacteriophage reproduction. Our current work is focused on identifying interactions between two different antibacterial treatments, antibiotics and P acnes-specific phage. Due to the large range of products available for acne therapy, it is expected that acne patients will combine treatments. Since phage and antibiotics act in different ways, we hypothesized that there would be no interactions between subclinical doses of antibiotics and the action of phage. Our experiments were designed to test that hypothesis and to detect any interactions between phage and antibiotics. Work with one phage isolate and the antibiotics clindamycin and erythromycin suggests that low doses of antibiotic do affect the ability of the phage to kill the P acnes bacteria. The tests are preliminary and lack reproducibility. These tests are being altered and repeated to improve reproducibility and add statistical significance.

A-3 SODS ARE HERE!

Stephen Howard, Fordham College.

Superoxide Dismutases (SODs) are enzymes that effectively alter reactive oxygen species and play a significant role in innate immune systems. We studied SODs in the hemocytes of Homarus americanus (American Lobster). Past experiments revealed the presence of SOD 1, a copper zinc SOD, and SOD 2, a manganese SOD, in the cytosol of lobster hemocytes. One objective of this research project was to find and develop methods of locating SODs using confocal microscopy. A second objective was to study the comigration of SODs with hemocyanin. We did this by extracting the hemocytes from the ventral sinus of the lobster. We implemented cellular experiments and biochemical experiments, enabling us to localize these enzymes. In doing so, we were able to localize SOD 1 and SOD 2 using immunofluorescence techniques in conjunction with confocal microscopy. We concluded that SOD 1 and SOD 2 are in the cytosol granules of the hemocytes, and that the SODs are bound to the hemocyanin in the hemolymph.

INVESTIGATING THE ROLES OF TYORSINE KINASES IN B. SUBTILIS BIOFILM FORMATION,

Tameryn Huffman, Sarah Wacker, Manhattan College

2-1

Bacillus subtilis is a model organism for many different developmental pathways. One pathway – biofilm formation – is studied intently by microbiologists for its importance in various fields from agriculture to medicine. In biofilms, B. subtilis secretes a matrix of exopolysaccharides (EPS) and amyloid-like protein fibers to adhere to a surface and protect itself from pathogens. The production of EPS has been shown to be regulated by the proteins EpsA and EpsB, which make up a tyrosine kinase that senses EPS and activates downstream components to produce more EPS. The transcriptional regulator SinR controls the production of biofilm matrix, including the levels of all Eps proteins. The role of a second tyrosine kinase pair, PtkA and TkmA, in biofilm formation is still being elucidated. We created deletion mutants of all tyrosine kinase components in the presence and absence of SinR and conducted thorough analyses of all tyrosine kinase proteins. Bootstrap hypothesis testing and multiple comparison corrections were used to determine and reveal significant differences between the biofilm phenotype of comparable strains. Using this data, we are able to clarify the role of the tyrosine kinases in biofilm formation. These findings show that the deletion of SinR causes increased biofilm formation in most of the tyrosine kinase single and double mutants, but not in the quadruple mutant. We hypothesize this effect is due to the role of SinR in regulating expression of EpsAB proteins. We suggest a model in which TkmA and PtkA regulate biofilm formation through crosstalk with EpsA and EpsB.

CHANGES IN PEPTIDE EXPRESSION IN THE GUINEA PIG NODOSE GANGLION FOLLOWING MYOCARDIAL INFARCATION

Katherine R. Hutton, Jean C. Hardwick, Ithaca College

1-8

Myocardial infarction (MI) occurs when a blood vessel supplying oxygen to the heart is constricted, resulting in ischemia and the eventual death of the heart tissue. Following this type of injury, the nervous system undergoes remodeling to adjust to the damaged state. The nodose ganglion is a parasympathetic collection of neurons associated with sensory reception and motor signaling that includes innervation of the heart. This study looked at possible changes in expression of various modulatory neuropeptides of the parasympathetic nervous system: galanin, somatostatin (SST), and neuronal nitric oxide synthase (nNOS). MI's were surgically induced in guinea pigs by ligating branches of the descending coronary artery. At 1, 2, and 6 weeks post-surgery, nodose ganglia were removed and frozen. qPCR analysis was used to quantify the relative changes in expression of the peptide mRNA levels in MI animals in comparison to control animals. It is hypothesized that galanin, SST, and nNOS will increase expression with cardiac injury at the 1 week time point and decrease expression to return to the control levels towards the 6 week time point. This study aims to characterize the changes in neuropeptide expression that occur as cardiac remodeling proceeds following the onset of heart disease.

BINDING CAPACITY OF NANOCERAMICS AND SULFA ANTIBIOTICS

Gwen Iannone, Pace University

5-23

Sulfa antibiotics or sulfonamides are commonly used in aquaculture as agricultural herbicides and the treatment of respiratory and urinary tract infections in humans. The widespread use of antibiotics like sulfa drugs has led to the dissemination of these compounds into water and soil environments. In this study, several nanoceramics (metal oxides) were mixed with sulfa drugs namely sulfamethazine and sulfamethoxazole. The interaction between the sulfa drugs and nanoceramics was monitored using UV-Vis absorbance and high-performance liquid chromatography (HPLC). Results demonstrate a change in the absorbance of the sulfa solutions added with nanoceramics. There is also a reduction in the peak area of sulfa drugs mixed with nanoceramics. This clearly indicates an interaction taking place between the sulfa drugs used and nanoceramics.

AIRBORNE POLLEN COLLECTED BY GRAVITY TRAP YIELDS SIMILAR RESULTS TO VOLUMETRIC METHOD

Brielle Intorcia, Fordham University.

2-12

In the New York City (NYC) region, airborne pollen is abundant mainly from the beginning of March through the end of October. Twenty (20) years of daily air sampling using a volumetric Burkard Spore Trap have shown that each pollen taxon will typically appear, rise to a peak and then decline at a characteristic time each year. However, little is known about how the amount of pollen or its taxonomic composition varies across the region. The question is of public health interest. For the entire 2014 pollen season, Shaikh and colleagues studied pollen deposition across NYC's 5 boroughs by deployment of 45 modified Tauber Traps (non-volumetric gravity samplers) on light poles at 2.5 meters above street level, a height relevant to human health. Sites were chosen at random among those used in the NYC Community Air Survey. Preliminary results register a real and substantial variability of allergenic pollen influx over NYC. To compare methods, we deployed two additional Tauber Traps, one alongside the Burkard Trap operated by Fordham University at our campus on 60th Street in midtown, the other at Fordham's Calder Biological Station in Armonk. We found a broad correlation between the spectrum of pollen types registered by the Burkard Trap at 60th Street and by the Tauber Trap located alongside it. Both recorded Mulberry and Oak as the major types, followed by Sycamore and a range of lesser taxa. We had similar results at Armonk, where Oak and Birch were the major types.

IMMUNE SYSTEM IMPACTS OF FEXOFENADINE EXPOSURE WITH GFP TAGGED E. COLI ON ZEBRAFISH (DANIO RERIO) EMBRYOS

Lucas Jacisin, Ithaca College

2-13

Pharmaceutical residuals can be found in the majority of freshwater bodies in the United States and the world. Waste water treatment plants are unable to fully filter out the cocktail of chemicals which pass through the human body and eventually into bodies of water. Fexofenadine, an antihistamine commonly known as Allegra, is one of the most widely used allergy medications and is taken by millions of people each year. Fexofenadine blocks the binding of histamine at H1 receptors preventing white blood cells from entering and promoting inflammation, the first step of the immune system response. In an initial experiment fexofenadine exposure at the highest concentration of 200 ug/L caused no developmental or lethal impacts to zebrafish embryos in a 96-hour, 80 embryo trial by itself. In this upcoming trial zebrafish embryos will be exposed to three different concentrations of fexofenadine for 96-hour trials while GFP tagged E coli bacteria is injected into the embryos. Varying levels of bacterial growth will be monitored using an epiflouresent microscope and compared between the different fexofenadine doses. If fexofenadine suppresses the immune system in a dose dependent manner than the highest fexofenadine dose should exhibit the largest expression of GFP E. coli.

G-6 MACHINE LEARNING PROGRAMS PREDICT SAGUARO CACTUS DEATH

Cole Johnson, Manhattan College

Saguaro cacti (Carnegiea gigantea) are one of more than twenty other columnar cactus species in the Americas that show extensive bark coverage. Extensive bark coverage results in premature saguaro cactus death. The results herein demonstrate that three algorithm programs and other analyses can be used to examine plants analyzed over a 23-year period. Rates of bark coverage were found to be constant for the population from 1994-2017. The three algorithm programs used, Validate Model, WEKA 3.8, and Random Forest, accurately predicted bark accumulation and cactus death for cacti that had less than 80% bark coverage on south-facing surfaces. Such analyses were less accurate for cacti with more than 80% bark coverage on these surfaces. However, examining bark coverage of cacti with more than 80% bark coverage on south-facing surfaces over a longer time period (1994-2017) distinguished cacti that lived into 2017 and died by 2017 (p < .05). Overall, the three algorithms produced accuracies above 93%.

A GENERAL APPROACH TOWARD THE CONSTRUCTION OF CHROMENES, COUMARINS, AND FLAVANONES

Noelle Curtis-Joseph and Martin Di Grandi, Fordham University. 3-21

Chromenes, coumarins, and flavanones, broad categories of aromatic heterocycles commonly found in natural products, are known to have a wide variety of biological activity. Our group has interest in Calanolide A and 6,8-Diprenylaromadendrin, two natural products possessing anti-HIV activity. Our interest in these compounds led us to propose a tandem palladium-catalyzed cyclization sequence—a one-pot conversion that combines a Suzuki coupling with a Tsuji-Trost allylation reactions, that putatively would allow access to these cores in short order. The advantages of this proposal are a) relatively short but flexible synthetic sequences, b) potentially mild reaction conditions, and c) a broad tolerance for a wide variety of functional groups. With preliminary data supporting the feasibility of the proposed tandem cyclization reaction, work has focused on improving the reaction conditions. In particular, we were able to improve the synthesis of the requisite Z vinyl halide and broaden the scope of the reacting partners. Future plans will explore the necessity of the Z stereochemistry of the alkene.

THE EFFECTS OF TURBIDITY ON RESPIRATION RATE OF THE BRIDLE SHINER, NOTROPIS BIFRENATUS

David Junga, Kristen Epp, Eastern Connecticut State University 1-14

Turbidity is a measure of suspended particulates in water and causes murkiness by scattering light. From an ecological standpoint, the clarity of an aquatic organism's environment can affect its survival and reproduction. Changes in turbidity have been linked to changes in metabolism and behavior in fish. Changes in turbidity may be a contributing factor to the decline of an imperiled fish species, the Bridle Shiner (Gray et al. 2011). By simulating low levels of turbidity, this study aims to investigate the short-term effects of changes in turbidity on Bridle Shiner metabolism. Using an aquatic respirometry system, respiration rate of subjects will be measured when placed in water with 0, 10, and 25 NTU. If Bridle Shiner respiration rate increases in higher turbidity treatments (10 & 25 NTU) as compared to the clear water control (0 NTU), changes in turbidity may have metabolic consequences in the natural habitat. Perpetual increases in metabolic rate due to turbidity may create an imbalance in Bridle Shiner energy budgeting. An inefficient management of energy budgeting could negatively affect this imperiled species.

INVESTIGATING FIBROBLAST GROWTH FACTOR SIGNALING IN C. ELEGANS.

Leann Kanda, Ithaca College

2-24

Fibroblast Growth Factor Receptors (FGFRs) are receptor tyrosine kinases required for normal development of vertebrates and invertebrates. Mutations in these receptors are deleterious, and in humans they cause some types of cancers and many other developmental disorders. In *C. elegans*, EGL-15 is the sole FGFR, and it plays a role in many processes including sex myoblast migration and fluid homeostasis. Mutations in EGL-15 cause the egl (eggling defective) phenotype.. The receptor tyrosine phosphatase CLR-1 negatively regulates EGL-15. Loss of CLR-1 results in hyperactivation of the EGL-15 pathway and the Clr phenotype (accumulation of clear fluid in the animals). An important part of the EGL-15 signaling cascade is the adaptor protein SEM-5, which binds to two binding sites on the carboxyl-terminal domain of EGL-15. Disruption of SEM-5 causes the Egl phenotype, and result in a Soc (suppression of clear) animal where the Clr phenotype is suppressed.

Using CRISPR/Cas9, endogenous mutations were created to change two tyrosine residues in the binding domains into phenylalanine to hinder phosphorylation. Through these mutations we verified that both sites are required for SEM-5 binding and initiation of the EGL-15 cascade. We also tested the ability of each of these mutations to suppress the Clr phenotype. The fact that none of these mutations was able to rescue the animals from the Clr phenotype suggests that there is another component mediating the interaction between SEM-5 and EGL-15. Other experiments have previously identified cca1 as a potential candidate, and it is currently being tested as potential Soc gene.

D-2 EFFECTS OF GESTATIONAL STRESS ON BEHAVIOR AND CORTICOSTERONE LEVELS OF PHODOPUS SUNGORUS OFFSPRING

Juhi Kapoor, Ithaca College

Organisms may change physiology and behavior dramatically in response to stress. Each organism responds differently and thus an individual's personality is expressed in stress response. The goal of this study is to analyze whether gestational stress results in permanent change of offspring personality and stress corticosterone levels in the Siberian dwarf hamsters (Phodopus sungorus). Current data collection is on offspring of three stressed hamster mothers and two control hamster mothers. Mothers are stressed by being placed in a restricted tube three 30-min sessions a day for 7 days. Offspring at weaning and again as adult (100 days) are tested in a "tunnel maze" assay to determine activity and boldness scores, while fecal samples are used to measure corticosterone levels. Based on our hypothesis, it is expected that offspring that come from stressed mothers will have higher levels of the corticosterone hormone both at weaning age and as they mature. We also expect them to be more active and less bold than control animals, again persisting into adulthood.

OFFSET EFFECTS ON REDUCTIVE STRESS RESPONSES FROM CHOLESTEROL BASED METABOLISM IN NRP BCG EXPOSED TO DETOXIFICATION MOLECULE, GLUTATHIONE

Alexa Karp and Dr. Marcy Peteroy Kelly,

2-2

This study focuses on redox stress responses in a close relative to *M. tuberculosis*, Mycobacterium bovis-BCG (BCG) elicited by a host-derived, thiol-based detoxification molecule, glutathione (GSH). GSH has shown to impede the viability of BCG. Growth and viability of BCG is hampered when exposed to 8 mM GSH but, oxygen depleted persistent BCG (NRP BCG) resisted GSH-mediated killing. BCG that was grown in minimal medium containing cholesterol, as it's only carbon source for two weeks was resistant to GSH induced killing. Through this evidence it can be suggested that a metabolic shift to a cholesterol-based metabolism supports NRP BCG and may be liable for the resistance to GSH. Our hypothesis predicts that cholesterol participates in the process of up-regulating particular genes that increase NAD+ concentrations in NRP BCG. In response, GSH induced reductive stress is off put. To further the testing of our hypothesis, we are now overseeing NADH/NAD+ and ATP assays on BCG that is grown in minimal medium which contains cholesterol exposed to glutathione. The evaluation of both of these molecules will provide insight into the redox state on mycobacterial cytoplasm upon GSH exposure. We hypothesize that BCG will accrue more NAD+ and ATP when exposed to GSH when developed in minimum medium with cholesterol. To conclude, mycobacteria will convert toward an oxidative metabolism in order to secure themselves from the GSH reductive stress.

CAYUGA LAKE MICROPLASTICS: IDENTIFICATION AND QUANTIFICATION THROUGH NILE RED STAINING

Julia Keene and Bruce Franz, Ithaca College

1-15

The complications of identification of microplastics include, but are not limited to, contamination, false positives in visual microscopy, and excessive organic material in the samples. In this study we report our findings of microplastics in Cayuga Lake, Ithaca, NY examining 60 samples from four sites as well as effluent from the Wastewater Treatment Plant. We use several analytical steps, such as density separation with a saturated NaCl solution, and wet peroxide oxidation to reduce organic matter in samples, to process samples from dispersed locations on Cayuga Lake. Many studies utilize a combination of density separation and a wet H₂O₂ digestion, but the identification step has proven to be more challenging than researchers originally thought. Identification and quantification are performed using dilutions of Nile Red dye to detect fluorescence, and wavelength adjustments with the use of optical filters, and creating a grid system to repeatedly and accurately count microplastics. We do not solely rely on visual microscopy; Raman spectroscopy is used to provide a structural fingerprint of molecules to verify their identity. Our study examines microplastics using a combination of these approaches, we report an estimate of over 175 million microplastics are in Cayuga Lake. These calculations are estimated if the entire surface of the lake is similar to the sites that we have sampled.

STUDYING THE EFFECTS OF ACETAMINOPHEN ON AXON DEVELOPMENT IN ZEBRAFISH EMBRYOS

Farheen Khan, Khadija Wali, and Betsy Dobbs-McAuliffe, Central Connecticut State University. **4-7**

Acetaminophen (APAP) is a medication given to pregnant women to relieve pain and fever. While generally considered safe for use during pregnancy, epidemiological studies find an association between prenatal acetaminophen use and complications such as, Autism Spectrum Disorder, ADHD, and neurodevelopmental problems in gross motor development. Considering these associations, we are examining the effects of APAP on neural development using zebrafish as a model. By using zebrafish we can precisely control the timing and dosage of APAP and also detect changes in neuron development. Using the neuro transgenic, Tg (neuro:GFP), we can assess motor neuron axon development. Embryos at 2.5 to 3.0 hpf (hours post fertilization) were selected, divided into three groups with about ten embryos for each treatment, and observed after 24 hours of exposure to APAP. Controls were treated with 0.2% dimethylsulfoxide (solvent for APAP) and experimental groups were treated with 1.25mM and 2.5mM APAP. Fluorescent microscopy was used to view the axons in each embryo and qualitatively analyzed to observe if any had shortened or thinned. We hypothesized that acetaminophen treatment will alter axon growth. In early trials we found that axons at the level of somites 6 through 9 that were treated with APAP differed from the control in axon height and width. However, recent results, have shown that there is not a difference in the axon development between the control group and embryos that were treated with APAP. We are currently repeating experiments with larger populations and gathering quantitative data on axon length and branching.

D-5 QUANTIFICATION OF PATHOGENIC FECAL BACTERIA ON NEW YORK CITY SIDEWALKS

Marjan Khan, Alessandra Leri, Marymount Manhattan College

Evolution has given the genome of pathogenic fecal bacteria such as coliforms and Enterococci the ability to survive in harsh conditions. In the urban environment, poorly maintained sidewalk sanitation in public areas can expose individuals to Enterococci and fecal coliform bacteria via direct or indirect contact. We hypothesized that due to their ability to survive in extreme environments, bacteria originating from dog feces could proliferate on New York City streets. To test this hypothesis, we investigated puddles on NYC sidewalks. The Enterolert and Colilert Quanti-tray systems were used to quantify the most probable number (MPN) of Enterococci and coliform bacteria in diluted puddle water. We observed high variability in our results, with the MPN of Enterococci ranging from 1.3 cells mL⁻¹ to 1,400 cells mL⁻¹. We measured total coliforms at 9.2 cells mL⁻¹ in puddle water. On rainy days, the MPN values were substantially higher than on dry days, due to accumulation of bacteria in natural puddles. We also performed controlled studies with artificial puddles created from sterile water on the sidewalk, and we found that the bacteria proliferate on very short timescales, reaching 4.4 cells mL⁻¹ after transfer times of only 10 minutes. We also measured high levels of both Enterococci and coliforms on shoe soles, indicating that bacteria transfer from sidewalk to shoes. Collectively, this evidence indicates an abundance of pathogenic fecal bacteria on NYC sidewalks, with potential for contaminating the indoor environment and exposing humans to the risk of infection.

POLLEN SPECTRA OF WOODLAND, SAVANNA, AND GRASSLANDS OF PELHAM BAY PARK, BRONX, NY

Mohammed Tanvir Khan, Guy Robinson, Fordham University. **3-6**

Coastal oak savanna landscapes of the northeastern United States are currently not protected. There is some evidence that these ecosystems were extensive before European settlement, but data are scarce. Pelham Bay Park contains a mixture of woodland, savanna, and grassland environments, which may serve as a modern analog to compare with existing Pre-Columbian fossil pollen records in the region. We analyzed the pollen spectra of surface samples from each of these three environments among 12 sites in Pelham Bay Park. Resulting pollen assemblages generally grouped into distinct categories corresponding with woodland, savanna or grassland. Among the six woodland sites, there was a range of 72% to 96% tree pollen. Savannas were intermediate: 66%, 67%, 84%. Grasslands had a large range: 14%, 28%, 91%. Although the sample size is still small, our findings are comparable with earlier work at Rye Marshlands Conservancy. We hope to map the geographic extent of the pre-European coastal savanna by comparing our findings with fossil deposits throughout southern New England and New York.

EFFECTS OF AYURVEDIC MEDICINAL HERBS (GREEN TEA AND TRIPHALA EXTRACT) IN CAUSING WEIGHT LOSS IN ZEBRAFISH WITH DIET-INDUCED OBESITY

Wonja Kim, Saint Peter's University

1-18

Obesity has been a large pandemic among populations worldwide, being especially a continuously growing issue in the United States. Although there are many alternatives when it comes to treatment, such as proper exercise and keeping a well-nutritious diet limited in processed food and sugar, there has also been several more recent studies and research into ayurvedic herbal remedies for the disease. A lot of these ayurvedic herbal medicines are used popularly throughout India, as they have strong beliefs in their natural healing properties. Two particular popular ayurvedic remedies used for weight loss and anti-obesity medication are green tea (*Camellia sinensis*) and *Triphala* (an Indian ayurvedic compound consisting of various ground up Indian dried fruits). The test conducted would be with these two ayurvedic medicines on different experimental groups of zebrafish. Two different concentrations of each herbal treatment would be tested on the zebrafish with diet-induced obesity (these fishes would be fed a diet high in fat), to see if different concentrations increases the potency of their effect on weight-loss. Then, one concentration with mixed equal portions of both the green tea and *Triphala* extracts would be tested on the zebrafish with obesity to see the effects of an combined ayurvedic combination.

RAMAN SPECTROSCOPY OF DIFFERENT METFORMIN TABLETS

Elise Krupoff and Elmer-Rico E. Mojica, Pace University

3-20

One of the oldest and most commonly used blood sugar lowering drugs is metformin (N, N-dimethylbiguanide). Having limited side effects, it has been used since the late 1950s. It was the first line of treatment for patients suffering from diabetes mellitus. It has also been reported to have pleiotropic actions as anticancer agents. In this study, different tablets of metformin were analyzed by Raman spectroscopy. These tablets, coming from the United States and the Philippines, contain different amount of metformin were compared. The effect of glipizide on the Raman spectra was also determined in one of the tablets. Results showed common peaks found in all samples with increased signals observed in tablets containing a higher amount of metformin. These peaks matched with that obtained using density functional theory (DFT) calculations. Lastly, reduction of the Raman signal was observed in tablets containing glipizide.

PROMOTING GOOD PRACTICES IN CORPORATIONS FOR CYBERSECURITY

Ankit Kumar and Ryan Distelhurst, Pace University

3-30

Cybersecurity attacks have been happening more frequently than they use to and are beginning to affect a larger majority of people. As we continue our digital lives, we have begun to give out a lot more of our personal information in order to use the various applications and website we enjoy today. With all the information we give and how valuable information can be, cyber attacks have begun to ramp up, targeting high profile companies. The damages resulting from cyber attacks ends up costing millions of dollars in damages, and investigations over privacy concerns. Early findings suggest that companies either don't know where to start, or they know about Cybersecurity and don't want to spend the money to improve their security posture. For our project, we will be making a poster, discussing the importance of Cybersecurity training and awareness. The poster will focus on promoting good security practices, offering suggestions on how a company can improve to help combat common cyber-attacks, as well as how to reduce the risk, or mitigate the effects, of an attack.

DO ODD-SKIPPED GENES REGULATE ELT-2 EXPRESSION IN C. ELEGANS?

Rebecca Laguerre, Eastern Connecticut State University

5-15B

In humans, there are two odd-skipped related (Osr) transcription factors that are important for the development of many tissues, such as the kidney. They are also involved in pancreatic, gastric and lung cancer. Two homologous genes (odd-1 and odd-2) are found in the microscopic nematode, Caenorhabditis elegans. When odd-2 expression is knocked down with RNA interference (RNAi), worms die as larvae. Both odd genes are expressed in the intestine. We hypothesized that genes that are expressed in the intestine might be transcriptional targets for the odd genes. Elt-2 is expressed throughout the intestine, and its promoter contains a binding site related to known odd-skipped binding sites from mice and flies. We have obtained a reporter strain that has GFP fused to the end of elt-2. We have crossed this reporter strain to a strain that has an increased RNAi response. To determine if the odd genes regulate elt-2, we will perform RNAi in this strain and visualize GFP expression with confocal microscopy. A decrease in ELT-2 expression would indicate that the odd gene normally activates its expression. An increase in ELT-2 expression would indicate that the odd gene normally represses its expression. The results of these experiments will provide insight into the transcriptional network that contributes to intestinal development in worms, and potentially human developmental and disease pathways.

EFFECT OF RADIX GINSENG ON SPATIAL LEARNING AND MEMORY AND AMELIORATION OF ANXIETY IN LONG-EVANS RATS

Isabella Lane, John Carroll University

5-16

Radix ginseng is a dried root that has been used as a "cure-all" in Chinese medicine for centuries. The individual active ingredients in ginseng, ginsenosides, are thought to be responsible for memory enhancing and anxiolytic effects. The present experiment examined the influence of ginseng on spatial learning and memory in rats and examined anxiety as an associated variable. The study was divided into three periods: 1) habituation, 2) experimentation, and 3) withdrawal. During experimentation, a 150mg/kg dose of powdered ginseng was given daily to the experimental group via a 250ul condensed milk treat. Spatial learning and memory were analyzed using a Morris Water Maze test and anxiety was measured utilizing a 1-3 scale. Prior to the maze exercise, the anxiety of each rat was assessed according to the scale. Animals were given two trials during the maze exercise: 1) a sample trial in which the rats learned the location of the platform and 2) a test trial in which rats recalled the location of the platform. Starting and platform locations were changed daily. No significant difference in maze performance was found between the control and experimental groups; however, anxiety of the experimental group was significantly lower than the control group during experimentation. The withdrawal period did not show any difference in performance or anxiety between the two groups. This study does not support the hypothesis that Radix ginseng improves spatial learning and memory in healthy individuals; however, it does suggest positive effects of Radix ginseng on lowering anxiety levels.

ENDOLYSOSOMAL PROTEIN TRAFFICKING IN MOUSE MELANOCYTE

Chloe Lant, Megan Dennis, Marist College

1-9

The development of Hermansky-Pudlak syndrome (HPS) is due to incorrect targeting of enzymes, proteins, and transporters that are required for lysosome related organelle (LRO) biogenesis and function. Patients with mutations in adapter protein-3 (AP-3) and therefore defective LROs develop HPS, a disease characterized by reduced pigmentation, bleeding defects and lung fibroses, which are the leading cause of patient mortality. Immortalized mouse melanocytes from mouse models of HPS are a useful model system to research how protein trafficking changes in response to external stimuli. This work tests the hypothesis that AP-3 prevents delivery of lysosomal proteins to melanosomes upon nutrient stress and starvation. AP-3 is an important protein complex involved in protein trafficking from early endosomes to melanosomes. Preliminary data suggest AP-3 deficient melanocytes and wild type melanocytes respond differently during nutrient stress, but changes in endolysosomal protein trafficking have not yet been fully quantified. My project provides important knowledge regarding specific changes in protein trafficking and organelle identity in AP-3 deficient and wild type melanocytes. My data support the model that lysosomal and endosomal proteins are mistrafficked to melanosomes in AP-3 deficient cells when the cells are under conditions of moderate nutrient stress, resulting in altered LRO function and pigmentation. These data also suggest that wild type melanocytes do not undergo these protein trafficking changes when under starvation, or that the changes are much more subtle

.INVESTIGATING PARAMCIUM CAUDATUM SUSCEPTIBILITY TO HOLOSPORA UNDULATA

Nicole Lee, Winiffer Conce, Lydia Bright, SUNY at New Paltz 2-3

Paramecium caudatum is a multi-nuclear, single-celled ciliate that is susceptible to micronuclear infection by parasitic symbionts. The micronuclei are infected by Holospora undulata, a gram-negative bacterium that is engulfed by the *Paramecium* cell through the oral apparatus during the normal course of feeding. Holospora then breaks out of the acidified food vacuoles and utilizes host actin to move across the cell to gain entry to the micronucleus. Holospora have two developmental forms during their life cycle, reproductive and infectious, depending on the degree of starvation stress the host cell is experiencing. Previous studies have uncovered varying susceptibilities to Holospora infection across different strains of *Paramecium*. We are interested in what genetic factors determine degree of susceptibility in certain whole-genome sequenced Paramecium strains that have been isolated from around the world. Since the driving genetic factors that influence susceptibility are still unknown, we plan to use comparative genomics for strains with similar susceptibilities in an attempt to identify these factors. We have infected six strains of genome-sequenced *Paramecium* from two closely related species and tracked Holospora infection over time, using immobilization, fixation, and staining techniques, to determine which are susceptible. Our preliminary results indicate differential susceptibilities across and within the two species. Early trials found that three strains are highly resistant to *Holospora* and two are highly susceptible, with the last strain yielding inconclusive results. We plan to complete our infection trials and move towards molecular genomics to begin to identify potential genetic factors of susceptibility.

G-4 SCALING RELATIONSHIPS BETWEEN LEAF AREAS AND LEAF VEINS FOR PERCURRENT LEAVES

Gina Marie Leoncavallo, Manhattan College

This study had two main components: (a) to determine the relationships between entire leaf areas and interveinal areas, and the relationships between vein lengths, and (b) to examine how these properties change as a leaf enlarges. For the first part of the study, thirty-nine distinct plant species were examined. For the enlargement aspect of the study, we focused on just 5 species. One criterion that was required in both of the components was that the leaves must be percurrent, meaning that there is one primary vein, with secondary veins extending from that primary vein, tertiary veins extending from one secondary to the next, and quaternary veins filling in the tertiary veins. All thirty-nine species had this percurrent leaf venation pattern. In terms of leaf areas, the entire area of the leaf was called the leaf area, the area between two secondary veins was called a secondary area, and the area between two tertiary veins was called the tertiary area. In this study, we were able to determine that while leaf interveinal areas enlarge as the leaf enlarges, the actual number of areas does not increase. In other words, the size increases but the number does not. We also learned that larger leaves have larger primary, secondary, and tertiary areas.

HEART-BREATH RATIOS IN ACCORDANCE WITH VARIOUS RHYTHMIC ACTIVITY

Charlie Levitz, Catherine Read, Nancy Rader, Ithaca College

not judged 3-35

Heart rate and respiration rate are interacting physiological oscillations and have been frequently examined in relation to physical health, consciousness, and cognitive function. The ratio between heart and breath cycles is posited to be related to changes of consciousness with development in young childhood, and some alternative schools even emphasize rhythmic development. The implications of heart and breathing coordination for pedagogical and clinical practice with children is the basis for this study, which explores the ratios of heart rate and respiration rate during different types of rhythmic activities. As a first step, we have collected data from 20 undergraduate students using a Biopac wireless system for measuring heart rate and respiration. We plan on analyzing heart-breath ratios in accordance with various rhythms and on collecting data from other age groups from preschool through adolescence.

A CLOSED-HEAD MODEL OF MILD TRAUMATIC BRAIN INJURY RESULTS IN FEW IMMEDIATE BEHAVIORAL OR NEUROIMMUNE CONSEQUENCES IN ADOLESCENT AND ADULT MALE AND FEMALE RATS.

Jack C. Lewis, Grant M. Brighter, Madison N. Sluter; Mentor: Tamara L. Fitzwater, Ithaca College. **3-18**

Traumatic Brain Injury (TBI) poses a significant health risk, especially for adolescents. Consequences of TBI include changes in neuroinflammatory processes, and adolescents are known to exhibit differential neuroimmune responses to inflammatory or other environmental challenges compared to adults. The current study employed a closed-head model of mild TBI (mTBI) to investigate potential age and sex differences in the neuroinflammatory response to brain injury in adolescent and adult Sprague Dawley rats. Additionally, behavioral impairments following mTBI were measured. To do this, adolescent males exposed to mTBI (N=18; 150g weight at 1m) were compared to sham controls, whereas adult female (N=16; 250g weight at 1m) and adult male (N=29; 150g, 250g, and 350g at 1m) rats were compared to their age- and sex-matched sham controls. Deficits in the righting reflex were evaluated immediately following mTBI, with motor impairment assessed 24 h post-injury in the Rotarod test. Brains were then immediately collected for evaluation of inflammatory gene expression in the frontal cortex (PFC). Results revealed that only mTBI females exhibited a significant increase in time to regain the righting reflex after injury when compared to controls. In the Rotarod test, no deficits in motor function were revealed following injury for any of the mTBI groups. Similarly, when inflammatory gene expression was examined, no mTBI-induced changes were observed in the PFC. Together, these results indicate very few immediate consequences of mTBI on motor behavior and brain inflammation. Current studies are exploring changes in inflammatory cell populations at a later time post-injury.

IDENTIFICATION OF GLYCOSYL HYDROLASES IN PAENIBACILLUS SPP.

Dayron Leyva and Mark Gallo, Niagara University.

3-12

Blood transfusions are one of the most widely used treatments in a hospital setting. Sometimes this treatment can be a challenge due to the different blood types a person can carry. Sugars found on the surface of blood are responsible for their antigenic properties which give rise to A, B, and O type blood. Removing these sugars should produce a universal blood. It is known that many bacteria can break down complex carbohydrate polymers by using glycoside hydrolases. Glycoside hydrolases are enzymes which can reduce glyosidic bonds. This study involves the investigation of enzymes that are able to break N-acetyl galactosamine linked in an alpha 1,3 configuration to fucose found in A type blood, or Galactose linked in an alpha 1,3 configuration to fucose as is found in B type blood.

THE EFFECTS OF SOX2 ON NT EMBRYOS

Jahniesha Lindo Sandra Marcotte Ashley Vasel, Central Connecticut State University 4-8

Somatic cell nuclear transfer (SCNT) is the process of enucleating a recipient oocyte, and in turn implanting a non-gamete donor nucleus that can result in reproductive or therapeutic cloning. Cloning is important because it can provide a wide range of biological and medical benefits that include, but are not limited to, genetic cloning of an organism, the generation of stem cells, xenotransplantation, and transgenic research. However, the efficiency of this process is very low hindering further progression. This experiment focused on increasing efficiency by targeting the SOX2 transcription factor that regulates embryonic development. Our experiment compared the amount of gene expression of SOX2 between cloned and artificially inseminated bovine embryos with the control housekeeping gene, H3F3B, to determine the role they play in the stem cells ability to differentiate. Donor cells were incorporated to compare how cells that are not reprogrammed express these genes. A loss in the pluripotency of the embryonic stem cells would also result in abnormalities if the embryos developed. Real-time PCR was used to test the expression of SOX2 on the embryos through amplifying specific DNA targets through polymerase chain reaction. The results were significant because the p-value was < 0.001 allowing the rejection of the null hypothesis that there is no difference between the mean expression of the NT embryos, donor cells, and AI embryos. This proved that SOX2 expression is higher in NT embryos than in donor cells and artificial insemination embryos, concluding that SOX2 expression is a necessity for development within NT

SCREENING LEPTOSPIRA BIFLEXA MUTANTS TO IDENTIFY GENES RESPONSIBLE FOR OSMOTIC TOLERANCE

Natalia Lizardo, Yaritza Herrera, Andres Javier Christopher Pappas, Manhattanville College

4-24

Leptospirosis is the most widespread zoonosis worldwide causing more than one million severe cases annually. Infection of pathogenic Leptospira affects the body's central nervous system, kidneys, and liver. The rodent, the main vector, harbors bacterial cells within its proximal renal tubules. Transmission is facilitated through mucosal membranes or openings of the skin through direct contact with water contaminated from the host's urine. The ability of Leptospira to tolerate changes in osmotic pressure is fundamental for its growth and survival. However, these mechanisms used to adapt to various osmotic environments remain poorly understood. The objective of this study was to identify genes involved in osmotolerance of Leptospira biflexa. Random transposon mutagenesis of the L. biflexa genome was completed using a Himar1 system. 2,500 Tn mutants were generated to analyze the sensitivity in varying salt concentrations. Mutants that were sensitive to the higher salt concentration were further analyzed to identify the disrupted genes responsible for osmosensitivity. To date, 10 of the 2,500 Tn mutants have demonstrated sensitivity to increased osmotic pressure. Of these, genes such as tonB dependent receptor; recR; and ubiquinone methyltransferase; among others, have been identified important in osmoadaptation for L. biflexa. Future work will include generating an additional 5,000 Tn mutants and characterization of Tn mutants found sensitive to increased osmotic pressure. This research will provide insight into the mechanisms of adaptation that the Leptospira genus use during the enzootic cycle and may lead to the development of novel antibiotics or vaccines against leptospirosis.

ARTIFICIAL INTELLIGENCE: TOO INTELLIGENT?

Adriana Lobato, Sabrin Guron, Pace University

3-31

According to a survey conducted by the Narrative Science and the National Business Research Institute, 61 percent of businesses in 2017 started to implement artificial intelligence (AI) in their company. AI is a machine's capability to imitate intelligent human behavior but, due to its growth in use, there is corresponding increase in security threats. The three types of security threats that are gaining a lot of attention are political security, physical security, and digital security. Political threats involves hackers manipulating the AI device to fulfil their political agenda, collect and analyze data from other political groups, and etc. Physical security is when AI devices such as drones, become compromised and are used as a weapon. Lastly, digital security deals with cybercrimes like phishing and attacking a network through the use of an AI device. AI is designed as an aid to make tasks easier but, there are those who will use new developments to harm others. In this poster, we will discuss the security threats in AI and potential solutions to these issues.

D-4 GALANIN EXPRESSION IN NODOSE GANGLION FOLLOWING CHRONIC MYOCARDIAL INFARCTION

Lydia G. Loiselle, Ithaca College.

Chronic Heart Disease (CHD) is accompanied by an imbalance in activity within the autonomic nervous system, which results in the inability to properly regulate the heart. Following the induction of a myocardial infarction (MI), there is an increase in sympathetic activity and phenotypic changes in neuropeptide expression in both sympathetic and parasympathetic neurons. Galanin is a neuropeptide that participates in cardiovascular regulation and is hypothesized to increase within parasympathetic neurons following MI. This study focused specifically on galanin expression in the nodose ganglion and change in cell size at three time points following MI (1 week, 2 weeks, and 6 weeks). We hypothesized there would be a gradual increase in galanin expression and cells size over the 6w recovery period following induction of MI. Techniques in immunohistochemistry were used to observe these changes in the nodose ganglion in guinea pigs. The results showed an increase in galanin expression at the three time points following MI. There was also an increase in the percentage of galanin expressing cells 6w following MI, and an increase in cell size at 1w, 2w, and 6w. The findings suggest a change in parasympathetic activity following MI, supporting the original hypothesis. In addition, galanin may be upregulated for neural remodeling purposes in response to cardiac injury as a mechanism to counteract increased sympathetic activity.

COMPARISON OF PLANKTONIC MICROBIAL DIVERSITY IN TWO WATERSHEDS ON THE DINGLE PENINSULA

Nicole Longo, Jessica Zolotarevsky, Sacred Heart University. 2-4

Anthropogenic impacts on water quality in coastal ecosystems is of increasing concern given current land-use and population patterns. In particular, sustainable development in areas of high population/tourism pressure in coastal watersheds is of concern and demands an understanding of the complex relationships between the "natural" and "human" systems affecting the ecosystem. Two adjacent watersheds on the on the Dingle Peninsula in Ireland (Dingle and Ballyferriter) provide an interesting opportunity to separate the effects of natural/agricultural impacts (Balleyferriter) vs. natural/agricultural/tourism (Dingle) effects on water quality in the primary river systems draining the two watersheds. As part of a larger effort to conduct a thorough environment assessment of the two watersheds, we have completed an initial 16S rRNA community profile of the planktonic microbial communities in the Milltown (Dingle) and Feohanagh (Ballyferriter) rivers. Our data indicate substantial and significant differences both within and between sample sites in the different river systems. In addition, instances of clear relationships between microbial community composition and both stream level classification/surrounding terrestrial habitat are apparent.

THE EFFECT OF AN ORGANIC COATING ON ELEMENTAL SULFUR REACTIVITY

Emily Magyar, Cassandra Marnocha, Niagara University

5-24

The biogeochemical use of sulfur compounds is a common means of acquiring energy for microorganisms living in freshwater systems. The large number of oxidation states of sulfur allow for many possible intermediates during sulfur metabolism, including elemental sulfur, which is a product of the oxidation of thiosulfate. This study focuses on the reactivity of both abiotic and biogenic elemental sulfur. Recent work has demonstrated that the only significant difference between abiotic and biotic sulfur is the presence of an organic coating, suggesting that the coating might provide an evolutionary advantage to sulfur dependent organisms. We will compare the reactivities of abiotic globules without a coating, biogenic globules with a coating, and biogenic globules without a coating by taking advantage of the reductive nature of TCEP. Then, based on the reactivity of the sulfur, we can determine whether it is more or less difficult for organisms to deal with coated or uncoated globules, and how the organic coating impacts the rate of crystallization of the globules. Most organisms are unable to consume crystallized sulfur, so an organic coating may help the sulfur remain in a globular form for a longer period of time. This factor may be crucial to other organisms who further use the sulfur as an electron donor or acceptor during their own metabolic processes. Understanding how the coating impacts sulfur reactivity and bioavailability has important implications for entire ecosystems dependent on the sulfur cycle.

"YOU AIN'T NEVER HAD A FRIEND LIKE ME": PORTRAYALS OF TEEN RELATIONSHIPS AND INTERACTIONS IN TEEN SHOWS

Hannah Mahany, Christine Madden, Ithaca College

3-19

While some studies have examined the content of teen drama shows (e.g., Ortiz & Brooks, 2014), few studies have looked at portrayals of teens in teen-oriented situation comedies. The present study is a descriptive, longitudinal content analysis of 91 teen sitcom-style episodes focusing on the presence of gender messages and interactions among teens involved in different types of relationships (e.g., friends, significant others, siblings, enemies). The sample was taken from programs videotaped from 1993-2017 for the Center for Research on the Effects of Television (CRETV) archive at Ithaca College. Episodes were selected based on the presence of unrelated teen characters interacting with one another, with an emphasis on shows that took place primarily outside of the home (e.g., Saved by the Bell, Zoey 101, Victorious). The unit of analysis for coding each show was the presence of a teen dyad (two teenagers interacting together in two or more scenes within the episode). Characters were only coded as teenagers if they were attending middle or high school, or their age was explicitly noted as being between 12-18 years old. Working in pairs, coders tracked the relationship type, frequency of displays of affection, gender messages, and interactions reflecting the nature of the dyad (e.g., put-downs, compliments, conflicts, cooperation). Results showed that teen dyads were most often portrayed as same-gender or mixed-gender friendships, where the teens often experienced conflict resolution within the episode. In addition, teens were more likely to be portrayed as wanting to be in a relationship rather than actually dating.

UTILIZATION OF A MOUSE MODEL OF SORSBY FUNDUS DYSTROPHY TO STUDY MACULAR DEGENERATION

Allison Mancuso, John Carroll University

4-9

1-19

A mouse model for Sorsby fundus dystrophy (SFD) was used to study age-related macular degeneration (AMD) in humans. SFD is characterized by an increase in vascularization in the choroid which leads to vision loss for people affected. Tissue inhibitor of metalloproteinases 3 (TIMP3) is naturally expressed in high levels in the retinal pigment epithelium (RPE) cells and when mutated will cause an increase in vascularization in the RPE and choroid. The specific aim of the current research was to examine how RPE cells are affected by TIMP3 mutations. This was achieved by studying the morphology of mutant TIMP3 cells compared to wild type TIMP3 cells, specifically focusing on the drusen deposits formed. Also, the eyes of mice from four different groups, WT, TIMP3-KI, TIMP3-KI-Het, and TIMP3-KO, were examined to characterize how the RPE is affected in the retina from the mutation in TIMP3. Results show that when TIMP3 is mutated, the morphology of RPE cells along with drusen deposits secreted are significantly affected when compared to wild-type. The mutant cells do not have a uniform size and shape like the wild-type cells and the mutant cells are spread out sporadically on the tissue; whereas, the wildtype cells are laid down uniformly. The results also demonstrate that when there is a mutation in TIMP3 there is hyaluronan-specific inflammation in the RPE and choroid due to the presence of hyaluronan protein in these regions of the retina. Further testing is needed to confirm that inflammation is due to mutated TIMP3.

THE RIGHTING AND BURROWING BEHAVIOR OF JUVENILE CRABS IN DIFFERENT SAND SUBSTRATE

Kaur Mandeep, Mark L. Botton, Fordham University.

We conducted a laboratory study to understand if the burrowing and righting behavior of crabs can explain the distribution of juvenile Limulus at Plumb Beach (Brooklyn, NY). Righting and burrowing behavior of eighteen juvenile horseshoe crabs (average prosoma width=43.2 mm) was observed in aquaria (36 x 22 cm) with 5 L of artificial sea water and 2 cm of either coarse (> 2 mm) or fine (250 µm) sand. For the righting experiments, each animal was placed in an aquarium with either no sand, coarse sand, or fine sand. To begin, the juvenile Limulus was placed upside down in the aquarium and timed until it righted. A trial was terminated if the crab failed to right within 5 min. For the burrowing experiments, the crab was placed right side up on either coarse or fine sand, and timed until it burrowed to its lateral eyes. The treatment order in both experiments was randomly selected using Randbetween in Excel and each treatment was run in triplicate. Results indicated 92.6% success rate in burrowing in fine sand compared to 24.1% success rate in coarse sand. The righting success of Limulus was the same (33.3%) in both coarse and fine sand, but no crabs were able to right themselves in the absence of sand. Juvenile Limulus are vulnerable to predation, and the ability to burrow quickly is advantageous. Most juvenile crabs at Plumb Beach are found on fine sand, which is consistent with the findings of our laboratory burrowing experiments.

F-3 DETERMINATION OF THE TEMPORAL AND SPATIAL VARIATION OF GIARDIA LAMBLIA IN RIBBED MUSSELS (GEUKENSIA DEMISSA) COLLECTED FROM BRONX, NY, 2017

Alexa Marcazzo, Ghislaine Mayer, Manhattan College.

Bivalves are filter feeders which are able to trap parasites in their tissues. We have previously shown evidence of human intestinal parasites in several bivalve species collected in New York City beaches. The goal of this project is to determine the temporal and spatial variation of Giardia lamblia (also known as Giardia duodenalis and Giardia intestinalis) in bivalves collected from beaches in New York City in 2017. Geukensia demissa was collected from Clason Point and Orchard Beach in Bronx, New York, in the fall of 2017. Each sample was dissected to harvest the digestive gland, mantle, gill, abductor muscle, foot, and hemolymph. DNA was extracted from these tissues, and PCR was performed with two specific primers to detect the presence of the β-giardin gene, found only in Giardia lamblia. The prevalence of Giardia lamblia in Geukensia demissa collected from Orchard Beach and Clason Point was found to be 42.0% and 36.1%, respectively, indicating different G. lamblia prevalences at these two locations, which are 10 miles apart. This is different from what was observed in 2016 when the prevalence of G. lamblia was significantly higher at Orchard beach (28%) than at Clason Point (19%). In addition, G. lamblia assemblage C and D, usually associated with dogs, were previously found in the tissues of bivalves collected in 2014. In 2017, assemblage A was most prevalent at Orchard beach (73.68%) and AI was most prevalent and Clason Point (73.46%), indicating different genotypes of G. lamblia at those two locations

OCT4 EXPRESSION IN CLONED BOVINE BLASTOCYSTS

Sandra Marcotte and Sadie Marjani, Central Connecticut State University 2-18

Evidence suggests that the low efficiency of cloning or somatic cell nuclear transfer (SCNT) is due to abnormalities in the nuclear reprogramming of the donor cell. Transcription factors, such as OCT4, SOX2, and NANOG, play an integral part in early embryonic development. Abnormalities in the expression levels of such transcriptional regulators could lead to the abnormal embryonic development seen in clones. The effects of reprogramming malfunctions include embryo death, and abnormalities in the embryos that develop to term. Our previous research found increased expression of SOX2 in cloned bovine embryos via RT-qPCR using the Bio-Rad CFX Connect Real Time PCR machine. This experiment was designed to analyze the gene expression of OCT4 in the same group of in vivo produced and SCNT blastocyst-stage bovine embryos using the same approach. The expression level of OCT4 was measured in the donor fibroblast cells used to generate the SCNT embryos to further assess the extent of nuclear reprogramming.

H-1 SPINES OF COLUMNAR CACTI FROM CENTRAL MEXICO: NOVEL CHANGES IN RELATION TO STEM BARK COVERAGES

Catherine McDonough, Manhattan College

An important feature of cactus plants is their spines, which act as defense from predators, regulate temperature and transpiration. They also play a role in the asexual reproduction of the cactus plants, or vegetative propagation. Bark coverage is a common occurrence among the various columnar cactus species in the Americas. This research examines the types and numbers of spines of five columnar cactus species (Cephalocereus columna-trajani, Neobuxbaumia macrocephala, N. mezcalaensis, N. tetetzo, and Pachycereus hollianus) found in central Mexico. More mature cactus plants (>4 m in height) had fewer original spines than younger cactus plants (<2 m in height). For more mature cactus plants, the number of original spines decreased with increased bark coverage. In C. columna-trajani, N. macrocephala, and N. mezcalaensis, 75% of spines were lost when bark coverage was 80% or more. Since each cactus species has specific numbers of the various types of spines, the formation of bark on surfaces produced a wide range of responses to these various spine types. These three species also produced hair-like spines as well as emergent spines. The presence of hair-like spines was well scaled with emergent spines, but there was no correlation with amounts of bark coverages with numbers of hair-like or emergent spines. These hair-like spines have been identified previously, but their function remains unknown. This is the first report of new, emergent spines on mature cactus stems.

THE ANTIMICROBIAL EFFECTS OF CLOVE OIL, TEA TREE OIL AND LEMONGRASS OIL ON KLEBSIELLA PNEUMONIAE AND ENTEROBACTER AEROGENES

Sarah McGee and Kathleen Bobbitt, Wagner College. not judged

Essential oils such as clove, lemongrass, and tea tree have been known and used for their antimicrobial properties. In the series of experiments of agar well diffusion, molten agar tests, and broth dilutions, Klebsiella pneumoniae and Enterobacter aerogenes were used to test these essential oils and the growth patterns were observed and recorded. The essential oils had an effect in inhibiting the growth of both Klebsiella pneumoniae and Enterobacter aerogenes, which was observed through zones of inhibition, as well as the lack of growth at certain concentrations throughout different types of media. Clove oil was the most effective in inhibiting bacterial growth as compared to lemongrass oil and tea tree oil.

THE EFFECTS OF XANTHINE DERIVATIVES ON TOOTH REMINERALIZATION AND ITS ABILITY TO DEFEND AGAINST AND REMOVE STAPHYLOCOCCUS MUTANS

Sarah McGee, Kayla Diggs, Christopher Corbo and C. Racquel, Wagner College. not judged

3-36

Sodium fluoride (NaF) is a widely used remineralizing agent in dental care. Some municipalities are going as far as incorporating NaF in water supplies; however there are certain risks associated with the excess ingestion of NaF. In a series of experiments we will examine the remineralizing abilities of Xanthine derivatives including theobromine, caffeine, and xanthine in comparison to NaF, particularly in the filling of scratches and other surface deformities in eggshells. In parallel we will test the ability of the Xanthene derivatives to defend against as well as remove Staphylococcus mutans, compared to NaF. The porosity of the eggshells will be measured and examined using Scanning Electron Microscopy. Previously reported work suggests that theobromine has equal if not more potential in remineralizing enamel.

THE EFFECT OF SIMULATED MICROGRAVITY ON THE ABILITY OF PRIMARY CORTICAL CELLS TO PRODUCE NEURONS

John Meade, Barbara Murdoch, Eastern Connecticut State University 1-10

Since the 1960s, spaceflight has been a tactic for exploring our solar system. However, it is no mystery that prolonged spaceflight can also be accompanied by cognitive deficit, which can pose long term issues for astronauts. These symptoms may be due to changes in neuron numbers or differentiation. We hypothesized that exposure to simulated microgravity would result in a decrease in neuron production. To test our hypothesis, we isolated primary cortical cells from embryonic mice (E13.5) and used them to produce neurospheres *in vitro*. Single cells dissociated from the resulting neurospheres were placed under either simulated microgravity or normal gravity conditions for 4 days. After 4 days, the cells were retrieved and tested for their ability to form neurons. Neurons were detected using antibody staining during immunocytochemistry and detected using fluorescent confocal microscopy. Confocal images and Image J were used to quantitate the number of neurons produced. Simulated microgravity resulted in altered neuron numbers. We are continuing with more experiments to test our results.

LIVING SHORELINES: THE GOOD, THE BAD AND THE UGLY.

Benjamin Miller, Sacred Heart University

1-16

Living shorelines may be composed of both live plants and hardened structures like rocks or cement to act as wave attenuation structures. At Stratford Point, Connecticut we have learned that wave attenuation is important for marsh restoration success in areas of high wave energy due to wind and storm events. A living shoreline model was used in designing: 1) low marsh (reef balls and Spartina alterniflora), and 2) high marsh (loose oyster and slipper shells, large anchored woody debris, and S. patens) areas. Preliminary results, using Cera-Diver pressure sensors, revealed 30-40% wave height reduction by reef balls. Loose shell proved less effective. Assessments of the effectiveness of these different methods are crucial to evaluate and produce a cost-effective management plan.

MICROBEADS EFFECT ON THE REPRODUCTION AND MORTALITY RATE OF DAPHNIA

Thomas Minett, Ithaca College

2-14

Is the ingestion of microplastics affecting the reproduction and mortality rate of daphnia? If so, does the microbead diameter matter? To test these questions, daphnia were split into 2 cohorts. The first cohort was exposed to microbeads for 24 hours, and the second was exposed for 10 days. Having two exposure periods allows microbead retention within the digestive tracts to be tracked. When daphnia are exposed to beads for an extended period of time, they're likely to ingest more beads and clog their digestive tract. Each cohort were then separated into 3 groups of 20 daphnia. The first group were a control group and were not exposed to microbeads. The second group were exposed to 1mg of microbeads per 100mL of water, a moderate level of microbeads. The final group were exposed to a very high level of microbeads in their water, 10mg of beads per 100mL of water. This experiment is running multiple times over with various sizes of microbeads ranging from 1-100 micrometers (µm). The experiment is currently on-going, however the trial experiment showed evidence that daphnia within the highest exposure group had a much larger mortality rate.

RECONSTRUCTION OF ATMOSPHERIC CO AND THE STABLE ISOTOPES $\,\delta^{13}C$ AND $\,\delta^{18}O$ OVER THE LAST 8,000 YEARS AND COMPARISON TO PRESENT-DAY ABUNDANCE

Sophia Misiakiewicz, Manhattan College

2-15

This study was an analysis carbon monoxide (CO) concentration and isotopic enrichments from ice cores from the South Pole, Antarctica. Through the use of cryogenic vacuum extraction and a Finnegan MAT 253 Isotope Ratio Mass Spectrometer, CO was isolated. The ice cores are dated based on accumulation rates and seasonality of the South Pole location, going back over 7,000 years before present. Carbon monoxide concentrations are corrected for line background signals, and sensitivity of instrumentations, and then calculated based on sample volume and peak area. There is little variability in the calculated concentration, with a higher expected average compared to modern day values. An isotopic mass balance is used to calculate the sources of CO based on CO's chemical influences in the atmosphere. As major sources, there is a minimal influence of methane oxidation, and an inverse relationship observed between biomass burning and nonmethane hydrocarbon (NMHC) oxidation.

THE ROLE OF SMALL MOLECULE SENSING BY A HISTIDINE KINASE IN BACILLUS SUBTILIS BIOFILM FORMATION

Nadeen Moawiah, Manhattan College

2-5

B. subtilis is a gram-positive bacterium that forms biofilms on the roots of plants. KinD is a protein important for biofilm formation. Scientists have found that KinD binds to pyruvate in vitro, but previously there was no evidence that pyruvate stimulates biofilm formation. I investigated the role of pyruvate in biofilm formation. I worked with strains of B. subtilis that contain a luciferase reporter which is correlated with biofilm formation. I used three strains: the wildtype bacteria with KinD, a bacterium containing a deletion mutant of KinD, and a bacterium containing a mutation in two amino acids of KinD that are in the pyruvate binding pocket. I set up luciferase assays, as well as biofilm assays, in a media that doesn't support biofilm formation to determine whether the addition of pyruvate would cause biofilm formation. I was able to conclude that pyruvate plays a role in the stimulation of biofilm. Knowing that biofilms adhere to surfaces of plants to protect them from pathogens, I wanted to study the binding of KinD to root extracts. I worked with tomato, ginger, spinach, potato and scallion plants, using the same three strands of bacteria. I set up 10 luciferase assays and 1 biofilm assay. I found that potato extract input, potato extract wash, and tomato input were the most successful plants in biofilm production. Overall by studying the role of pyruvate, and root extracts in biofilm production, we were able to provide researchers with the tools to prevent/fight infections due to biofilms.

POPULATION SHIFTS FOLLOWING HERBICIDE TREATMENTS IN A PIERMONT MARSH MICROBIAL COMMUNITY

Stefanie Moncayo, Dominican College.

4-25

The Piermont Marsh is a wetland that extends from the west shore of the Tappan Zee to the Piermont Pier in Rockland County, NY. Although marshes are commonly dominated by herbaceous plant species, the Piermont Marsh has a massive population of an invasive non-native species, Phragmites australis. Moreover, these plants harm aquatic ecosystems by occupying space and monopolizing nutrients, which ultimately reduces biological diversity. For this reason, the Department of Environmental Conservation proposed a management plan utilizing glyphosate, which specifically inhibits an amino acid synthesis pathway in plants (2017). Thus, we hypothesized that the herbicide treatment would only affect actively growing plants, and therefore, there would be no change in the microbial community structure. Sediment and water were collected from the Piermont Marsh and placed into two sterile containers at room temperature. One container remained untreated, while the other container received manufacturer's recommended concentration of herbicide weekly for four weeks. Samples were then collected from both containers and total DNA was extracted each week and sequenced. In addition to sequencing of the V4 region of 16S rDNA, we completed taxonomic classification of the microbial community. Upon observation, putative biofilms were formed on the untreated sample and more noxious gases were produced from the treated sample. Despite the intent of glyphosate to eradicate phragmites from the Piermont Marsh, our work suggests that the microbial populations may also be affected. Therefore, herbicide treatments might have implications when considering management strategies with respect to aquatic environments.

SYNTHESIS OF BIODIESEL FROM MUSTARD OIL AND WASTE SEASHELLS

Yomairis Montes, Yelda Balkir, Manhattan College

4-1

Waste utilization is an essential component of sustainable development and waste shells are rarely used to generate practical products and processes. Most waste shells are CaCO₃ rich, which are converted to CaO once calcined and can be employed as inexpensive and green catalysts for the synthesis of biodiesel. The seafood industry annually produces over 100 million pounds of shell waste, which occupy landfill space and demand the environmentally hazardous burning of shells. In this research project, I utilized waste seashells as green catalysts for the transesterification of mustard oil as feedstock into biodiesel. Mustard oil is as unsuitable for human consumption as it has a high content of a substance known as uric acid which is harmful to human health. The catalysts from waste seashells were characterized by X-ray powder diffraction, Fourier Transform Infrared Spectroscopy, and Scanning Electron Microscope. The product, biodiesel, was studied by ¹HNMR and FTIR spectroscopy.

SYNTHESIS AND TOXICITY OF CELLULOSE-PROCESSING IONIC LIQUIDS

Sultana Morioum, Fordham University.

3-22

Cellulose is the most abundant organic compound on Earth. It can be processed into materials that are bio friendly alternatives to non-degradable materials such as plastic, films etc. However, this requires the breaking down of cellulose's rigid structure. Few solvents are capable of dissolving this polysaccharide without causing harm to the environment. Ionic liquids (IL's) are non-volatile organic salts that can achieve this readily. While some chemists regard ionic liquids as an eco-friendly alternative, this claim is still unclear, particularly in regard to their impact on water ecosystems. Our aim is to assess the validity of IL's being "green solvents," by testing their toxicity on the aquatic species Zebrafish (Danio rerio). Herin is reported the synthesis and purification of two types of ionic liquids that can dissolve cellulose: 1-hexyl-3-methylimidazolium chloride (C₆mim^{+/}Cl⁻) and 1 allyl-3-methylimidazolium chloride (amim^{+/}Cl⁻). We assess the efficiency of using both conventional bench-top and microwave methods. Microwave methods proved to be the most efficient with a ninety-two percent yield of amim^{+/}Cl⁻ after purification. We also tested their impact on the viability of zebrafish. Zebrafish were exposed to various IL concentrations and lethality assays were done over a four-day period. Preliminary data shows that the largest amount of zebrafish viability within IL concentrations were lower than 30mg/L.

A-4 NEUROPROTECTIVE EFFECTS OF KCNQ POTASSIUM CHANNELS AFTER TRAUMATIC BRAIN INJURY WITH ACUTE AND CHRONIC ALCOHOL USE

Munoz, Jose, Abreu, Saul, Binn, Megan, Barrett, Rachel, De Souza, William Paterson University.

Traumatic Brain Injury (TBI) affects millions of people each year. Characterization of TBI is defined as a direct injury to the brain followed by inflammation. Moderate-to-severe TBIs can trigger a range of symptoms over a period of years/decades. Post-TBI recovery is often associated with negative changes in behavior, specifically, alcohol dependence. Studies have shown that alcohol slows down and impedes brain injury recovery. While acute alcohol usage has been suggested to have a neuroprotective effect, chronic usage may have the opposite effect with repeated use. In neurons, "M-type" K⁺ channels, play dominant roles in control over excitability, and thus are implicated in myriad neurological and psychiatric disorders. Recently, M-channel "openers" such as retigabine (RTG) are novel anti-convulsive and anti-nociceptive compounds. Retigabine has been shown to be neuroprotective against cell death, deleterious inflammation and motor impairment after a stroke. Previous data indicates that M-channel openers represent a novel and powerful therapy after a TBI through reducing electrical excitability, inflammation and cell edema which are linked to irreversible brain damage. Thus, this study aims to test the therapeutic target of M-channel activation in combination with acute and chronic alcohol use to reduce the damage of the secondary injury after a severe TBI.

A-5 THE EFFECTS OF MODULATION OF A POTASSIUM CHANNEL ON SOCIAL BEHAVIOR AFTER A TRAUMATIC BRAIN INJURY

Jose Munoz and Sonya M. Bierbower, William Paterson University

Traumatic brain injury (TBI) is one of the leading causes of death and disability among all age groups. Moderate-to-severe TBIs can trigger a range of symptoms and disabilities over a period of years/decades, most notably epilepsy, along with co-morbid anxiety, cognitive dysfunction and depression. Currently, there are no specific treatments after a TBI. TBI can be classified into two types of injury, primary and secondary. The primary injury refers to damage incurred as a result of blunt force, penetrating, or blast trauma. Primary injuries cause significant permanent damage relative to the size of the initial injury to the brain, resulting in destruction of brain tissue. The secondary injury refers to prolonged metabolic processes often leading to cell death far beyond the primary injury. In neurons, "M-type" K⁺ channels, play dominant roles in control over excitability, and thus are implicated in myriad neurological and psychiatric disorders. Recently, M-channel "openers" have emerged as novel anti-convulsive and anti-nociceptive compounds, with the FDA-approved drug, retigabine (RTG), now in the clinic. Previous data indicates that M-channel openers represent a novel and powerful target after brain injury. The research uses a controlled cortical impact "blunt force" TBI model that best simulates trauma after vehicular accidents or falls. The effects of RTG on brain damage are assessed by behavioral analysis.

RATE OF pGLO LOSS WHEN SELECTIVE PRESSURE IS REMOVED

Jessica Nguyen, Jack Klem, and Mark Gallo, Niagara University. **2-6**

Plasmids are extra chromosomal elements that are normally found in most bacteria. One plasmid, pGloTM, is used in *E. coli* for many experiments, especially as part of the Advanced Placement Biology curriculum. This plasmid contains the green fluorescent protein gene under control of the arabinose promoter, the beta lactamase gene whose product provides beta-lactam antibiotic resistance, an origin of replication, as well as a multiple cloning site. The plasmid is retained in the cell due to selective pressure of the antibiotic. However, very little experimentation has been done on the rate of the loss of plasmids in bacteria. Plasmid loss will be explored when under different selective pressures, namely the additional cost of expression of GFP protein on ability to compete for res

BEER, BREAD, AND WINE: THE EVOLUTIONARY GENETIC HISTORY OF DIVERGENCE AMONG DOMESTICATED AND WILD STRAINS OF THE YEAST SACCHAROMYCES CEREVISIAE

Francesca G. Norko, Alexandra Wyluda, Luciana Gizzo, Gabrielle Gontarek, James J. Siclari, Kirk A. Bartholomew, Geffrey F. Stopper, Sacred Heart University. **4-10**

Strains of the yeast *Saccharomyces cerevisiae* are used for the production of bread, beer, and wine. The strains used in these industries appear to be quite variable even within each industry, with many strains showing distinct heritable phenotypes. Variable traits include the profile of metabolic byproducts produced during fermentation, among other variable characteristics. The process of domestication of yeast was probably inadvertently well under way thousands of years ago, but the pattern and timing of the domestication of *Saccharomyces cerevisiae* is poorly understood. For example, it is unknown if strains have historically been frequently passed between these industries, and it is unknown whether there have been multiple individual domestication events from wild ancestors within these industries. Here we seek to identify genetic variation among many strains from these industries through PCR and sequencing of several genes. This identified variation will be used to understand the evolutionary relationships of these strains, and therefore historical patterns of divergence in their use within and among the three industries. We intend to extend this study through whole genome sequencing, and hope to use the variation to also make steps toward developing molecular assays for rapid strain purity screening in the brewing industry.

BLOCKCHAINS POTENTIAL IMPACT ON THE FINANCIAL INDUSTRY

Edward James O'Brien, Pace University

3-32

With Bitcoins limited success, I believe blockchain will make a lasting impact on the financial system as a whole. It is widely believed among technology professionals that blockchains introduction has opened the floodgates on the possibilities for how most markets could operate in the future. The financial industry is speculated to be the first and most affected of any industry. This study is meant to show how blockchain developed, wheres its already implemented and how it'll influence change in the financial industry for the future. As most people are well aware, technology is beginning to replace certain industries as those jobs can be done by AI at a fraction of the cost with less chance of error. Initial research has shown that the financial industry is well aware of blockchain technologies potential, even certain financial institutions, including banks, have created blockchain-oriented products and services. Blockchain technologies have clear improvements over previous forms of monetary capital, and can even be beneficial to certain financial operations, the challenge is being able to scale blockchain to its fullest potential. Current research might be too optimistic about blockchain's potential future in the financial industry. Personally I think blockchain can be seen as one potential option for how money is used postcredit/cash, but this initial iteration isn't perfect in its operation, it still has flaws. It can improve it a point where it can be fully incorporated, or another form with similar principles can take its place. As of right now, it's too early to call how big of an impact blockchain will have on the financial industry, and the socalled revolutionary changes may be further down the road than initially expected.

F-1 THE UNSUSPECTED COMPETITION BETWEEN GREEN AND PURPLE SULFUR BACTERIA IN FAYETTEVILLE GREEN LAKE

Joy O'Brien, Cassandra Marnocha, Niagara University

Fayetteville Green Lake is a meromictic lake located outside of Syracuse, NY. Due to the lack of seasonal mixing and its unique sulfidic conditions, below the chemocline of Fayetteville Green Lake there is an interesting combination of purple and green sulfur bacteria at approximately 22 meters in depth. Green and purple sulfur bacteria both prefer sulfide as an electron donor during photosynthesis, which means that it would be expected for one bacterium to outcompete the other. Therefore, the coexistence of these two types of sulfur-cycling bacteria is interesting in terms of competition for resources because they are normally known to disperse throughout a lake based on their needs. For example, green and purple sulfur bacteria tend to segregate based on light intensity, but this is not the case in Fayetteville Green Lake. The coexistence of green and purple sulfur bacteria may be facilitated based on their metabolic differences. For instance, green sulfur bacteria are known to deposit sulfur globules extracellularly compared to purple sulfur bacteria which keeps its sulfur inside the cell. Purple sulfur bacteria may be reliant on the sulfur that green sulfur bacteria are depositing. To determine the conditions required for green and purple sulfur bacteria to co-exist in the environment of Fayetteville Green Lake, we observe the interactions between lab strains from each genus in co-culture. This allows us to better understand how bacteria contribute to the sulfur cycle throughout a meromictic lake such as Fayetteville Green Lake.

SECURING THE FRAGILE FLAWS OF THE INTERNET OF THINGS

Oscar Quispe and Sandra Matailo, Pace University.

3-33

For this poster, we will discuss the possible solutions and opportunities for the most critical challenges that the Internet of Things (IoT) faces in terms of security and privacy. To date, the majority of the Internet application's main goal is to provide information, interaction and entertainment for humans and businesses. The Internet of Things (IoT) is indispensable for the technological innovations attached to many essential features in the world including healthcare, transportation, entertainment, process automation, smart buildings and among others. Based on the 30% annual growth, predictions stated that there will be at least 20.8 billion connected things by 2020. These countless number of devices connected to the internet allows them to interact with each other associating itself with an exponential amount of data. This level of connectivity can increase the reliability, sustainability and efficiency by improving access to information. However, there are concerns surrounding the Internet of Things and how it defends itself from potential threats and attacks. To provide confidence in IoT system security and privacy, our research will be discussing how security mechanism should provide future devices an embedded security technology, why software development organizations should write stronger code, and why it is important to be aware of the latest security threats and breaches.

H-3 AN ANALYSIS OF THE EFFICACY OF VARYING SAMPLING PROTOCOLS FOR NECTURUS MACULOSUS

Samuel J. Pallis, Eastern Connecticut State University.

The common Mudpuppy (Necturus maculosus) is listed as a state species of special concern and its Connecticut populations are thought to be limited to the Connecticut and Housatonic River drainages by the Connecticut Department of Energy and Environmental Protection (DEEP); however, an intensive survey of Mudpuppy population stability and distribution in Connecticut has not been conducted. Without exhaustive sampling of the Connecticut and Housatonic River drainages, Connecticut Mudpuppy populations cannot be managed, and their presumed decline cannot be quantified. To assess Connecticut Mudpuppy populations, 34 baited trapping events utilizing modified Briggler and minnow traps were conducted at five unique locations in Connecticut waterbodies from April through October of 2018, resulting in no Mudpuppy captures. Additionally, an analysis of the available primary literature sources (n = 24) pertaining to the capture of Mudpuppies was conducted to assess the effects of capture method, habitat type, and predominant sampling season on catch per unit effort (CPUE). Through an Akaike Information Criterion adjusted for small sample size (AICc), linear regression modeling, and subsequent analyses of variance (ANOVA), capture method was determined to best explain variation in the collected CPUE data with active capture (mean \pm CPUE; $\bar{x} = 0.082 \pm 0.017$ CPUE) more efficient than passive capture methods ($\bar{x} = 0.047 \pm 0.027$ CPUE).

MICROBIAL DIVERSITY OFF THE ANTARCTIC PENINSULA

Elizabeth Patton, Wagner College

5-1

Microbial diversity in an ecosystem is important. In a marine environment, various factors can have an impact on microbial diversity. Using a microbiome dataset downloaded from VAMPS (Visualization and Analysis of Microbial Population Structures), this project focused on both environmental data and microbiome data collected off the coast of the western Antarctic Peninsula at four distinct locations. Through the use of RStudio, various analyses were performed to determine if certain environmental factors significantly influenced the diversity of microorganisms found in the samples. The factors that were focused on in this project included the amount of chlorophyll, dissolved oxygen, dissolved organic carbon, phosphate and total nitrogen, the depth of the sample, and whether the sample was taken on or off the coastal shelf. Examination of correlation tests revealed that, of the factors studied, only the depth category, chlorophyll, dissolved oxygen, phosphate and total nitrogen were significant to the diversity of these microbiomes. Comparisons between relative abundance charts and bar graphs quantifying the various significant variables in each sample revealed correlations between similar samples in terms of the diversity of microbes found.

ANALYZING THE CONCENTRATION OF BIOMASS BURNING DERIVED ATMOSPHERIC CO FORM 1700-1800 AD

Peter A. Parlato, Manhattan College.

3-2

Carbon monoxide (CO) is a trace gas that influences atmospheric chemistry interactions. Reconstructing variations in biomass burning is important because biomass burning plays a key role within the earth-atmosphere system. The data presented in this research gives a better understanding of the biomass burning derived CO trend from the past. Also, this data can be used in models as additional constraints.

INDUCING A PHENOTYPE IN bbs2-/- ZABRAFISH LARVAE

Viktoriya Partyka, John Carroll University

1-21

Bardet Biedl Syndrome (BBS) is the second most common syndromic retinal degeneration disorder. It is an autosomal recessive disorder that results in legal blindness in the second or third decade of life. Due to severity of the disease progressing significantly in later stages of life, there is clinical importance to determining an earlier phenotype in order to test potential preventative therapies earlier in life. In the present study, light treatment was used on wildtype and bbs2 mutant zebrafish larvae in order to induce a retinal phenotype. The phenotype was assessed by using optokinetic reflex tests and immunohistochemical staining. It was determined that there was a statistically significant difference in OKR analysis between (homozygous) HO and (heterozygous/wild-type) HT/WT bbs2 light-treated (5000 lux) and untreated zebrafish larvae groups. This finding was consistent for both contrast (P < 0.005) and spatial frequency tests (P < 0.005). Although behavioral differences were demonstrated, histological findings did not indicate that retinal degeneration had occurred in the rod photoreceptor cells of bbs2-/- larvae retina. This was based upon zpr3 staining which showed similar intensity in both the light treated and untreated groups. A novel outcome of this study was the establishment of a new phenotype in bbs2-/- light treated zebrafish larvae.

A-6 AN INFRARED SPECTROSCOPIC ANALYSIS OF SHRINK-WRAPPED PLASTICS TO FACILITATE SORTING IN RECYCLING.

Ashley Pavia and Alessandra Leri, Marymount Manhattan College.

The manufacturing of plastics has increased dramatically over the last few decades since the development of synthetic polymers, and plastics have become ubiquitous in our everyday life. Most plastics end up in landfills, accumulate over time, and result in environmental damage due to the inability to be decomposed. In waste treatment plants, plastics are the most common material that can be recycled and sorted by resin type using automated vision-based sensors, including those applying infrared (IR), nearinfrared (NIR), Fourier transform near-infrared (FT-NIR), Fourier transform infrared (FT-IR), and RAMAN laser spectroscopy. Since the penetration depth of IR radiation is very low, these technologies have difficulty distinguishing containers from their label materials, particularly shrink wraps that obscure the majority of the underlying container. This confounds the automated recycling process at modern recycling facilities that use IR cameras for sorting, including the Sims Municipal Recycling Plant in New York City. Only a small fraction of such materials is being recycled, primarily because of the difficulties in identifying and separating the various types of plastics. We analyzed 20 different plastic containers, encompassing resin types 1-2 and 4-7, by attenuated total reflectance—Fourier transform infrared (ATR-FTIR) spectroscopy, with a particular focus on containers with enshrouding labels. We find that some plastic containers have very different IR spectra than their enshrouding labels, indicating differing composition between the label and the underlying container. In addition, the underlying container cannot be analyzed through the label because the IR beam will not penetrate beyond a few microns (penetration depth

(250 word limit)

DETERMINATION OF HEAVY METALS IN TIBBETTS BROOK

Tatianna Peralta, Dr. Yelda Hangun-Balkir, Manhattan College. 3-3

This experiment consists of the use of Atomic Absorbance Spectrometry to determine the different levels of heavy metal concentrations inside of Tibbetts Brook. Atomic absorption is an analytical method used for elemental analysis of a compound or a mixture. In partnering with The Friends of Van Cortlandt Park Organization, water samples were collected from nine different sites along Tibbetts Brook to determine the levels of iron, manganese, calcium, zinc, and lead. We are also interested in determining whether heavy metal concentrations co-occur with adjacent industrial land use. This research project highlights the importance of environmental science, in the context of determining the various ways that the human population affects our environment.

AN ANALYSIS OF MALE VOCAL PHRASE FLEXIBILITY IN WHITE-HANDED GIBBON (HYLOBATES LAR) SONG DUETS

Tessa Peredy, Fabiana Persic, Victoria Salvatore, Thomas Terleph, Sacred Heart University

1-22

Mated pairs of white-handed gibbons (Hylobates lar), an Asian ape species, produce complex song duets. These vocal interactions are thought to function in territorial defense and may also strengthen or advertise the pair bond. Recent evidence suggests that, during duets, individuals are able to rapidly adjust the onset of their singing relative to that of their mate. If the quality of a pair's duet facilitates the behavior's putative function(s), we predicted that individuals will adjust song structure to compensate for occasions when one's mate fails to produce a full duet contribution. We used field recordings from a population of wild gibbons at Khao Yai National Park Thailand (n=13 mated pairs) to analyze the male responses to a mate's song during the turn-taking portion of duets, comparing normal duets to those in which the female failed to produce a complete call sequence. Our findings suggest that, although males can adjust the timing of their song relative to that of their mate, abnormal female calls do not result in significant short-term changes to male song structure. Future work will address whether individuals can make longer-term adjustments to a mate's song, and thus whether established pairs are able to produce better-coordinated duets.

TO EACH THEIR OWN: A CONTENT ANALYSIS OF PARENTING ON TELEVISION SITCOMS AND TEEN SHOWS (1994-2017)

Chanel Perez, Daniel Sullivan, Ithaca College

4-14

While some studies have examined different types of parental advice and their impacts on children in the real world, there have been very few studies of the portrayals of parents and parenting behaviors in the popular media (despite strong evidence that television and other media often provide role models and social scripts for behaviors such as these). The current study is a descriptive longitudinal content analysis of 110 episodes from 60 different television shows, including both situation comedies and teen shows. These shows were taken from the archive of the Center for Research on the Effects of Television (CRETV) at Ithaca College. Shows were chosen from the years 1994-1997, 2004-2007, and 2014-2017, with a particular focus on selecting programs portraying families of color (especially in sitcoms) as well as white families. Parents included step-parents, adoptive parents and others in a caregiver role (e.g., grandparents, nannies) over the age of 18; children had to be 18 or younger. Coding was conducted by five coders working in pairs using a round robin format. Results showed that parent-child interactions did not differ much by race/ethnicity, and was often shown in a humorous context with a laugh track. While most parenting portrayals involved providing support/reassurance and discipline, but parents often opted out of acting in a parental role in situations where advice and discipline would be expected, or engaged in inappropriate behaviors like offering bribes or enticing bad behavior.

Believe it or not, self-driving cars are on the way. It seems like everyone is jumping on the self-driving bandwagon. This technology is no longer futuristic but accessible to us and it's going to impact our lives in a very short time. Many new cars today already have various semi-autonomous features like automatic braking, lane departure alerts, and even self-parking features. However, these features are not satisfying enough. An entire industry is moving forward at full throttle to reach higher-level autonomous driving capabilities. Automakers, like Tesla and Volkswagen, now look to incorporate Artificial-Intelligence (AI) capabilities to help achieve the greatest levels of automation as safely as possible. The concept of AI in self-driving cars is that engineers feed these programs with an enormous amount of data for them to analyze. Once they processed enough data, they will use it to make decisions and keep learning by themselves base on what happens on the road. AI will enable vehicles to think like human and respond even quicker and more precise to real-world data inputs from hundreds of different sensors. But how can they change our world? Self-driving cars will make our lives much safer while human-driven car accident is the leading cause of death overall among all causes. Also, self-driving cars will allow us to have more free time during commute time so we can be more productive. My poster will represent these topics in full detail.

J-5 PREDICTING BARK COVERAGE ON SAGUARO CACTI (CARNEGIEA GIGANTEA)

Olivia Printy, Manhattan College

More than 20 species of tall, columnar cactus species in the Americas show bark coverages on their surfaces. Saguaro cacti (Carnegiea gigantea) show mortality rates of about 2.3% per year over the period of 1980 to the present. This mortality is due to bark coverages on cactus surfaces. A saguaro population has been studied from 1994 to 2017. When bark coverage on north-facing right troughs of saguaro cactus reach 80% coverage, there is a 95% probability that these cacti will die within 8 years. The purpose of this study was to use bark coverages on several predictor surfaces to predict bark coverage on north-right troughs on surfaces of saguaro cacti (Carnegiea gigantea). For this study, data from twelve surfaces on 1149 cacti for four sampling periods were used to give over 55,000 data points. For this analysis, machine learning programs DEC Trees and Validate Model were used. The use of these programs produced the accuracy of using three surface comparisons to predict bark coverage on the north-right troughs. Overall, the data show that fast cacti (cacti with high rates of bark coverage) were deemed fast because of the rate of bark coverage on north-right troughs only. The other 11 surfaces were of much less significance in determining normal, slow and fast cacti. Machine learning programs Random Forest and kNN were also used to predict the best indicators of barking on the north-right trough. The data show that the north-left trough and the west-left trough are of the most importance in predicting the bark coverage of the northright trough.

THE RELATIONSHIP BETWEEN PULMONARY INJURIES AND PSYCHOPATHOLOGY IN FIRE DEPARTMENT OF NEW YORK FIRST RESPONDERS TO THE 9/11 WORLD TRADE CENTER ATTACKS

Eva Pugliese, Manhattan College

5-18

The terrorist attacks on the World Trade Center in New York, New York on September 11, 2001 caused first responders to witness potentially traumatic events and experience severe stress, resulting in mental illness such as Post Traumatic Stress Disorder (PTSD), depression, and anxiety in many. In addition, first responders were exposed to gas, irritant dust, and various chemicals, causing damage to their respiratory systems, including the onset of Chronic Obstructive Pulmonary Disorder (COPD). Due to these conditions, first responders were not only at risk for experiencing psychological illnesses following the attack, but physical illnesses as well, which continue to affect their lives seventeen years later. The current research will explore and attempt to understand the relationship between physical illness, specifically COPD, and psychopathology, in the form of PTSD, depression, and anxiety. This study will also examine the ways in which this relationship impacts functional impairment in FDNY first responders to the 9/11 World Trade Center attacks.

THE AESTHETICS OF ORIENTED TEXTURE PATTERNS: BEAUTY DOES NOT FOLLOW THE OBLIQUE EFFECT.

Eva Pugliese, Daniella Correa, Christopher Urban-Klein, Manhattan College 5-17

Research has shown that a variety of perceptual tasks are performed more easily for vertical and horizontal lines, the so-called oblique effect (Balikou et. al., 2015). In this study we test whether these cardinal orientations also predict aesthetic preference. We presented 40 undergraduate students with 10x10 arrays of black line segments viewed against a white background on a computer screen and asked them to judge how beautiful they were using a 7-point rating scale. Participants responded by typing in one of these numbers on the keyboard. The patterns consisted of 0° vertical (V), 90° horizontal (H), 45° left-oblique (L), and 45° right-oblique (R) oriented lines. Normalized ratings were analyzed using oneway ANOVA and showed a significant effect for number of elements, F(3, 156) = 570.7, p < .01, and pattern type F(14, 585) = 218.7, p < .01. Displays containing a single kind of line (V, H, L, R) were preferred the most, followed by displays with two elements (LR, VH, HL, HR, VL, VR), followed by displays containing three (VLR, HLR, VHL, VHR) and four (VHLR) elements. The results show a simplicity preference in which patterns containing a smaller variety of different line segments are liked, probably because they are easier to assess based on the processing fluency model (Winkielman et. al., 2003). Cardinal orientations were not always preferred. The results imply that the oblique effect does not apply to ratings of beauty and that images with the greatest orientation anisotropy are not always liked (Grebenkina et al., 2018).

REVENTION OF CONGENITAL HEART DEFECTS IN ZEBRAFISH TREATED WITH N-ACETYLCYSTEINE

Alexander Radecki, Central Connecticut State University

4-11

Zebrafish is an established model for studying fetal alcohol spectrum disorder (FASD). Ethanol treated zebrafish exhibit FASD phenotypes, such as congenital heart defects (CHD), body truncation, and craniofacial defects. N-acetylcysteine (NAC) is a drug that is used to treat acetaminophen overdose and works by increasing glutathione levels, which reduces reactive oxygen species (ROS). Since ROS are also produced by ethanol, we hypothesized that NAC may also reduce phenotypes associated with FASD in the zebrafish model with higher concentrations producing a more complete rescue. To test this hypothesis, we monitored CHD and the survival rate of embryos exposed to 1.5% ethanol. We separated zebrafish embryos at sphere stage (~4 hours post fertilization, hpf) into five control groups that were fish egg water, 1.5% ethanol, 5 μM NAC, 10 μM NAC, 15 μM NAC, and three experimental groups of 5 μM NAC + 1.5% ethanol mixture, 10 μ M NAC + 1.5% ethanol mixture, and 15 μ M NAC + 1.5% ethanol mixture. The embryos from each group were examined at ~52 hpf for survival rate, presence and level of cardiac edema, and hatching. Results showed NAC prevented cardiac edema in developing embryos that were exposed to ethanol. We are currently investigating whether NAC outperforms folic acid at preventing CHD in embryos exposed to ethanol. We also plan to utilize antibody staining to map the effects of embryo exposure to ethanol and NAC mixture on heart chamber formation using fluorescence microscopy and analyze captured images.

ALLELIC HETEROZYGOSITY IN THE CANDIDA ALBICANS BIOFILM TRANSCRIPTION FACTOR ROB1

Julia F. Rak, Virginia E. Glazier, Niagara University

5-2

Candida albicans is an opportunistic pathogen capable of growing both as yeast and filamentous cells. While C. albicans can reside harmlessly as a commensal in the gastrointestinal tract of humans, it can cause systemic infections once outside of the digestive system. C. albicans accounts for >50% of all systemic fungal infections. Candida albicans is diploid in nature and has a limited parasexual cycle, which has resulted in allelic heterozygosity at a given gene loci. One gene with allelic heterozygosity is ROB1, which plays a role in the transcription regulation responsible for providing C. albicans with the ability to initiate hyphal growth. C. albicans' ability to penetrate tissue, colonize organs, and form biofilms on implanted medical devices can be attributed in part to hyphae formation. The deletion of one and/or both alleles of ROB1 has been found to affect the production of the biofilm and the rate of filamentous growth. Our findings indicate that allelic heterozygosity of ROB1 results in desperate transcriptional profiles depending on which allele is deleted. Here we show that the $rob1\Delta A/ROB1B$ has reduced filamentation and provide evidence to suggest that TLO10 may be required for filamentation in the $rob1\Delta A/ROB1B$ mutant.

C-4 CO- LOCALIZATION OF KV2.1 AND FAK DURING ZEBRAFISH EBRYOGENESIS

Rocio Ramallo, Manhattan College

Potassium channels are important for convergent extension (CE) and the development of the brain ventricular system (BVS). The K_v2 subfamily of proteins are believed to play a role in both processes by forming channels that are transported to plasma membrane where the channels function. Furthermore, focal adhesion kinase (FAK), a tyrosine kinase is known to be required for cellular attachment to the extracellular matrix and plays a role in the adhesion and migration of cells as seen during CE and development of the BVS. Recent evidence from cell culture studies suggests k_v2.1 and FAK work together and therefore may also regulate CE and BVS development. In order to test the hypothesis that kv2.1 and FAK interact in vivo during CE and BVS development I used immunohistochemistry (IHC) to localize both kv2.1 and FAK in developing zebrafish embryos. When viewed through wavelength specific filters, antibody positive cells produce fluorescent color, green for kv2.1 and red for FAK. If both kv2.1 and FAK are localized together a third color, yellow, is produced. My work with 24 hours post fertilization (hpf), embryos undergoing BVS development, has suggested positive kv2.1 and FAK colocalization. Preliminary results at the 2-somite stage, during CE development, suggest possible colocalization when viewed at low magnification. Work is now focused on adjusting antibody concentrations and dissecting embryos to view at higher magnification in attempts of confirming colocalization. Taken together my results continue to support the hypothesis that ky2.1 and FAK interact to regulate vertebrate development.

G-1 STEM AND BRANCH GROWTH PREDICTS SEED YIELDS OF ARTEMISIA TRIDENTATA

Claudia S. Ramirez, Manhattan College

Artemisia tridentata ssp. tridentata, better known as Big Sagebrush, is a tall shrub characterized by its green-grey foliage seen during winter and yellow flowers seen in spring. Big Sagebrush shrubs are almost always reproductively successful, producing thousands of seeds during determinate branch growth which is of high ecological importance. Stems of Artemisia tridentata Nutt. ssp. tridentata exhibit a cyclic growth pattern beginning in June and ending in November each year. Terminal stem lengths and the number of branches increase throughout the growing season. Variability is reflected in stem length and number of branches data, respectively 0.81 mm per day with an r^2 value of 0.30 and 0.08 mm per day with an r^2 value of 0.27. Due to increased variation amongst samples, data was standardized using deciles. Results show cumulative length of branches increases linearly with stem deciles for both vegetative and reproductive samples. Within vegetative stems, slopes and y-intercept values ranged from 10.7 to 291 mm per decile, and -185 to 232, respectively. In contrast, within reproductive stems, slopes and y-intercept values ranged from 30.8 to 299 mm per decile, and -430 to 218, respectively. The total seed yield increased linearly with cumulative branch length. The number of seeds increased at a rate of 0.94 seeds per cumulative branch length (y = 0.94x - 147; $r^2 = 0.86$).

A COMPARISON OF SEA LION VOCALIZATIONS AMONG NEW YORK CITY ZOOS AND THE NEW YORK AQUARIUM

Luis Ramirez, Ashara Mitchell, Joshlyn, Mensah, Kathleen, A. Nolan, St. Francis College

1-20

Sea lion vocalizations were recorded in New York City area zoos and aquaria (Bronx Zoo, New York Aquarium, Prospect Park Zoo in Brooklyn, and the Queens Zoo. Data such as number of vocalizations, length of time of vocalizations, length of time between vocalizations, male and female differences, and age differences were recorded. The data was recorded using Audacity, a free-downloadable program that records the waveforms which we then converted to spectrograms. It was also determined whether or not vocalizations could be correlated for a specific behavior. For example, at the Bronx Zoo, the animals were very vocal an hour before a feeding that occurred during a show, and were silent for at least a half hour thereafter. Also at the Bronx Zoo, there was a significant difference between number and types of vocalizations of a male, a female, and a juvenile sea lion.

DEVELOPMENT OF A PUBMED CENTRAL CITATION COLLECTION TOOL AND NETWORK ANALYSIS OF CANCER-RELATED GENES

Anayancy Ramos, Megan Heenehan, & Garrett Dancik, Eastern Connecticut State University

2-19

Identifying relevant research articles is an inefficient task for researchers due to a steadily increasing number of published articles available across journal databases. Citation analysis tools have previously been utilized to quantify the relative importance of published journals through the application of network science measures to citation networks. This study involved the development of a citation collection tool and subsequent analysis of citation networks for articles available within PubMed Central that mention cancer genes, such as BRCA2. The citation collection tool, called pmc2nc, allows users to quickly generate edge lists for articles of interest. The edge list can then be imported into network visualization and analysis tools. The pmc2nc tool, developed in the R programming language, uses the rentrez package to extract citation information, and is available as an R package and as a Shiny application. The Gephi graphing software was used to construct and analyze the networks. Specifically, we used the PageRank and HITS algorithms to identify "important" articles based on the authority, hub, and PageRank weights. The interpretation and utility of these measures for identifying important articles will be discussed.

QUANTIFYING XYLENE MISTURES BY RAMAN SPECTROSCOPY

Lauren Reillya and Elmer-Rico Mojica, Pace University

4-19

Raman spectroscopy is a non-destructive technique that uses the vibrational energy of compounds to describe molecular vibration patterns, interactions and crystalline structures. Unlike IR that uses the change in dipole moment for measurement, the Raman spectrometers utilize the polarizability of a sample for the analysis. This project utilizes bench-top and hand-held Raman spectrometers for quantization of multiple Xylene mixtures containing the 3 xylene isomers (m-xylene, o-xylene and p-xylene). Determination of the amounts of each isomer was found by looking at unique and common peaks and dividing intensities of unique peaks by the intensity of the common peak present in every isomer.

C-5 CHARACTERIZATION OF DEREGULATED ANTHOCYANIN ACCUMULATION MUTANTS IN THE MODEL LEGUME PLANT MEDICAGO TRUNCATULA

Kaila Robinson, Eastern Connecticut State University

Anthocyanins are flavonoid compounds produced by plants responsible for red, blue and purple colors seen in various fruits and vegetables. Anthocyanin is a powerful antioxidant known for its therapeutic benefits to human health and it confers stress tolerance to plants. The goal of my research project is to find novel transcriptional regulator genes that regulate anthocyanin accumulation in the model legume plant Medicago truncatula by performing forward genetics. By screening ~1000 M. truncatula tobacco Tnt1 retrotransposon mutant plants, Dr. Veerappan isolated seven mutants with the following deregulated anthocyanin pigmentation phenotypes: (a) increased number of anthocyanin spots, (b) enlarged anthocyanin spots on leaves, and (c) excessive accumulation of anthocyanin pigments in vegetative organs. Defective phenotype of one of the mutants was already confirmed by a secondary screening. I will present results from the secondary screening of six newly identified mutants to confirm the deregulated anthocyanin expression phenotypes. Mutants will be grown along with the wild-type plants as a control. Phenotypic characteristics of anthocyanin accumulation pattern in various organs of mutants including leaves, petiole, stem and flowers will be analyzed and documented. Some of the anthocyanin mutants also show abnormal seed pigmentation caused by the accumulation of a flavonoid compound proanthocyanidin (PA). Seed phenotype will also be characterized to detect PA levels. The long-term goal of this project is to identify the causative genes underlying the deregulated anthocyanin accumulation in mutants to discover new genes controlling anthocyanin expression.

D-6 THE EFFECTS OF MYOCARDIAL INFARCTION ON NEUROPEPTIDE Y RECEPTOR SENSITIVITY IN THE GUINEA PIG CARDIAC GANGLION

Joseph M. Rorick, Jean C Hardwick, Ithaca College

The autonomic nervous system consists of two branches: sympathetic and parasympathetic. After cardiac trauma, remodeling causes changes in the activity of these branches. The increased activation of sympathetic neurons leads to increased amounts of neuropeptide Y (NPY) being released. Previous studies in our lab have found that parasympathetic neurons in the cardiac ganglion become less responsive to NPY following myocardial infarction (MI). The goal of this study was to determine if this change was due to changes in specific NPY receptor isoform sensitivity. We hypothesized that after MI, the increased release of NPY by sympathetic neurons leads to decreased sensitivity to NPY in the Y1 and Y5 receptors in the cardiac ganglion. To test this hypothesis, MI was surgically induced in guinea pigs. Intracellular voltage recordings from individual cardiac neurons was used to determine how the sensitivity of the receptors to perfusion of Y1-specific and Y5-specific agonists onto the cells. Single action potentials were recorded in individual cells and the time course of recovery to the resting membrane potential was determined with and without NPY agonists. The results from the recordings did not show any significant changes in Y1 sensitivity after MI. However, there was a significant increase in Y5 sensitivity 1 week post MI, but the sensitivity returned back to control levels at 2 and 6 weeks post MI. This data demonstrates changes in specific NPY receptor isoforms as a results of cardiac disease.

SYNTHESIS OF NOVEL ALKYL PIPERAZINYL SALTS AS POTENTIAL ANXIOLYTIC AND ANTIDEPRESSANT AGENTS VIA CHEMOSELECTIVE ALKYLATION OF THIOADATENSERIN

1-27

Abel Rosario, Natalia Perez-Cervantes, Dominican College

Anxiety disorders and depression are the most common mental illnesses in the U.S. in adults ages 18 and older. These disorders develop from a complex set of risk factors including genetics, brain chemistry, alcohol and drug abuse, and life events which can lead to serious life threatening conditions such as addiction and suicide. It is therefore critical that research should continue in this therapeutic area to discover potential drugs that have no side effects of addiction or suicide. Adatanserin is an anti-depressant drug candidate with anxiolytic activity due to its dual activity on 5-HT1A and 5-HT2 serotonin receptors. This research project aims at modifying adatanserin by structurally changing the amide between the adamantyl and ethyl piperazinyl moieties based on the hypothesis that bioisosteric modifications will result in active novel analogs. We therefore developed a 2-step method involving conversion of adatanserine to thioadatanserin followed by alkylations with alkyl and aryl halides. Conversion of adatanserin to its thio analog was achieved in good isolated yield using Lawesson's reagent in toluene at reflux. Thioadatenserin was well characterized by its ¹HNMR, ¹³CNMR, IR and UV spectral data. Alkylation of thioadatenserin at the thioamides functionality with a reactive alkyl halide under basic conditions could theoretically lead to either N-alkylation, S-alkylation or a combination of both. In this study, we demonstrate that chemoselective S-alkylation occurs preferentially over N-alkylation and that further reaction with reactive alkyl halides produces the corresponding alkyl piperazinyl salts of the Salkylated thioadatenserin as evidenced by spectroscopic methods and single crystal x-ray determination.

COMPACT ELECTRO-MECHANICAL APPARATUS FOR MOBILE PHONE SELF-LEVITATION

Matt Rose, Gabe Pasqualucci, Nick Sasso, Gary Schoolcraft, ed, Roger Williams University **2-28**

In this project, an electro-mechanical apparatus is designed to achieve self-levitation of mobile phones. The proposed device enables the mobile phone to move freely in three-dimensions and hold its position while hovering. This project proves beneficial since it further enhances the functionality of mobile phones with the freedom of flight. Thus, the proposed device can make any mobile phone to be employed into surveying, reconnaissance, and emergency situations, as well as and less commercial uses in consumer entertainment. An initial construction of a drone was completed as a prototype. Using the design parameters of the constructed drone, a snap-fit, 3-blade propeller system is developed. Based on the proposed design, thrust calculations of the required motors reveal the feasibility of using 2750KV brushless motors would be sufficient for sustained operation. The structural design will be configured in hard-plastic through injection molding, i.e. 3-D printing. An Arduino based control circuit with Bluetooth connectivity will be implemented between the apparatus and the mobile phone. The apparatus will be controlled by an external Bluetooth control. This external Bluetooth control can either be achieved through a secondary phone or an external remote control. Either option would be sufficient for the project, but the more rational consideration is the external controller to allow for a much broader consumer scope. Additionally, detailed stability and connectivity tests will be conducted upon the completion of the final device. Further functionalities such as rotation and long-range connectivity for the apparatus are planned.

USING CRISPR-CAS9 TO GENERATE GFP AND MCHERRY REPORTERS TO EXAMINE DOPAMINE RECEPTOR EXPRESSION IN C. ELEGANS

Dawn Rosenberg, Massia Atalla, Xandria Blair, Nicole Karpinski, Elizabeth, Central Connecticut State University **2-20**

In humans, dopamine regulates motor function and memory. Loss of dopamine signaling causes Parkinson's disease. Neural activity in C. elegans is also modulated by dopamine. To begin to identify the cellular and molecular mechanisms used by dopamine we plan to identify all cells in C. elegans that express each of the five dopamine receptors. To examine gene expression in worms most labs use 3kb of DNA upstream of a gene's coding sequence to drive expression of GFP despite evidence that these simple promoters do not contain all of the regulatory elements necessary to reveal full endogenous expression. We will use these short promoters, but we also plan to use CRISPR-Cas9 to insert the coding sequences for GFP and mCherry into large promoter sequences found in fosmids and into the chromosomal locus for each receptor. We will compare expression patterns from these reporters to determine how different promoters affect expression.

C-6 REGULATION OF DNA REPAIR PATHWAYS TO ENSURE GAMETE QUALITY

Erika Rosenkranse, Carolyn Turcotte, Julia Laibach, Aidan Nowakowski, Marist College.

Meiotic recombination requires the formation and repair of genome-wide, programmed double-stranded breaks (DSBs). Repair of meiotic DSBs requires homologous recombination (HR), an error-free repair pathway required for crossover formation. Accordingly, error-prone pathways such as non-homologous end joining (NHEJ) are not favored during meiosis due to their propensity for generating mutations and their inability to form chiasmata. How error prone repair pathways are suppressed during meiosis is not well understood. Here, we demonstrate a role for Mi2, the core ATPase subunit of the NuRD chromatin remodeling complex, in coordinating the repair of DSBs and maintaining genomic stability through multiple mechanisms. Our data reveal that the conserved Mi2 homologs CHD-3 and LET-418 promote HR, though in their absence, NHEJ is engaged as a secondary DNA repair mechanism to prevent persisting damage in gametes. In support of this, our findings indicate that a population of DSBs are repaired via NHEJ in situations with compromised LET-418 activity. Though HR mechanisms remain partially intact in let-418 mutants, their germ lines possess multiple defects including increased corpses and presence of structurally abnormal chromosomes in oocytes. These data are corroborated by molecular evidence wherein let-418 mutants have elevated expression of several NHEJ components, indicating a role for NuRD in the transcriptional regulation of repair genes during meiosis. As these genes involved in these processes are highly conserved throughout eukaryotes, our findings have implications for understanding how Mi2 may contribute to the prevention of human disease states such as infertility and cancer.

REFLECTION OF INTERNSHIP AT WAVE HILL PUBLIC GARDEN AND CULTURAL CENTER – INVASIVE SPECIES MANAGEMENT AND HABITAT RESTORATION

Kylie Rothwell, Fordham University

4-6

The purpose of the following research investigation is to outline my semester spent interning with the Youth Programs department at Wave Hill Public Garden and Cultural Center, where I assisted an ongoing phenology project that sought to identify and, when appropriate, remove invasive plant species. The introduction of invasive plant species affects the growth of native plants and disturbs ecosystem health overtime. Using insights gained from iNaturalist, an online database that relies on citizen scientists to provide phenological information on invasive plant species (e.g. dates observed, presence/absence of foliage, photographs documenting observation), weekly surveys of local green spaces – Wave Hill Woodlands (Eastern Deciduous Forest), Riverdale Park North (Oak-Hickory Forest), and Hackett Park (Oak-Hickory Forest) – were conducted to verify the presence or absence of anticipated invasive species. An effort was made to construct a phenology calendar for invasive species of interest, including Aegopodium podagraria (Goutweed), Ailanthus altissima (Tree of Heaven), and Humulus japonicus (Japanese Hops). A phenology calendar studies periodic plant cycles as influenced by seasonal variations in climate, and allows visualization of the first and last foliage date by species for the ultimate purpose of aiding management and removal efforts of these species. The experiment hypothesized that invasive plant species, because of their ability to survive under adverse environmental conditions, will have later foliage dates. This hypothesis informed our approach to data collection, and was ultimately supported in the findings that the invasive species monitored had long growing seasons, with foliage present late into the Winter season.

PHOTOMORPHOGENESIS OF PLANTS

Ameer Rum, Jia Ci Deng and Kathleen A. Nolan, St. Francis College

2-16

The growth and shape of lima beans were recorded that were grown under various wavelengths of light. The company Norman Lamps sells inexpensive colored LED bulbs that emit the following wavelengths in nm: green (550), purple (443), pink (632), orange (560), amber (572), red (680) and blue (470). We tested growth in height, number of leaves, leaf area (using Image J), and dry and wet weight of lima bean plants grown under purple, amber, blue, and pink lights. Initial experiments have revealed that plants grow well when placed under the following lights: (6 plants under each wavelength) pink (632 nm), pink purple (443 nm), blue (470 nm) and amber (560 nm). Plants grown under purple and amber lights had the greatest number of leaves (39 and 32 respectively versus 9 for the blue and 18 for the pink wavelengths). However, even though plants grown in blue and pink light produced less leaves, they had the same average height (25.5 cm. for the blue) or greater (30 cm for the pink), which might indicate that the plants grown under those wavelengths allocate growth resources to height rather than leaf number. In the future, we will add stem diameter and the effects of shading and competition by other plants to our measurements.

RETENTION OF SIPHOVIRIDAE MYCOBACTERIOPHAGE IN DIFFERENT TYPES OF SOILS

Darlenys Sanchez, Dominican College.

5-3

In the current study, mycobacteriophages Penelope2018 was collected from compost-enriched soil. Mycobacteriophage are viruses that infect members of the genus Mycobacterium. It is advised to search for these bacteriophages in soil rich with organic matter. It is hypothesized that phages will be retained in rich soil and not retained in sand or clay, with retention decreasing over time if the host bacterium is not also included. Five soil types were tested, namely, commercial potting soil, clay, compost, peat, and sand. The soils were sterilized and phage Penelope2018 was added along with phage isolation buffer. Certain treatments also contained the host bacterium and phage, or host bacterium alone. The mixtures were incubated at 30°C for 3 and 5 days, after which phage presence was tested using a spot plate procedure. Results indicate that clay does not support phage retention, and the titer of the phage decreased significantly within 5 days. The sand and peat retained phage to the greatest degree, with potting soil and compost to a lower degree. Future studies include an assessment of a shorter tailed phage, such as Guwapp, a Myovridae, to determine if phage tail length is involved in the retention. This research informs those isolating and purifying phage that soils such as sand may also harbor mycobacteriophage.

A-7 EMPLOYING GREEN CHEMISTRY METHODS TOWARDS THE SYNTHESIS OF HIGH EFFICIENCY ORGANIC DYES

Kelsey Savje and Racquel C. DeCicco, Wagner College

Dye-sensitized solar cells (DSSCs) have been the subject of much research in recent years, as the employment of solar energy as a means of generating electricity has drawn increasing interest especially due to it being a renewable green. Organic dyes are particularly attractive, as organic molecules are easier to modify and are derived from more renewable sources compared to metal-based dyes. This project explores the synthesis of conjugated organic molecules that contain similar structural motifs to dyes reported to have high conversion efficiencies. The targets are based on data from Harvard Clean Energy Project, which lists molecules that have demonstrated high energy conversion based on computational analysis. Multiple steps were completed in the synthesis and additional experiments are being pursued as alternative routes towards target molecules that can potentially serve as highly efficient organic dyes.

THE IMPACT OF ANANDAMIDE ON THE AMPK PATHWAY OF C2C12 CELLS

Julia Scherer, Ryan Sledzik, Amanda Witkowski, Suzanne Deschenes, Sacred Heart University. **4-12**

In 2015, the CDC reported that the number of obese adults in the U.S. was 93.3 million. A well-known association between metabolic disorders such as diabetes and obesity exists. Diabetes leads to increased levels of blood glucose due to a decrease in insulin production or insulin resistance. Rather than being used as energy within cells, excess blood glucose is stored in adipose tissue, leading to obesity. The current research literature shows that capsaicin, a constituent of chili peppers, increases glucose uptake in C2C12 mouse skeletal myoblasts, making capsaicin a potential therapeutic for obesity and diabetes. Capsaicin activates the AMP- activated protein kinase (AMPK) signal transduction pathway through binding with the endocannabinoid receptor CB1. AMPK phosphorylates Acetyl-coA Carboxylase (ACC) causing ACC to then become inactive, resulting in increased glucose uptake and decreased lipid synthesis. We would like to explore the potential of other CB1 agonists to stimulate glucose uptake. Differentiated C2C12 cells will be exposed to 25 uM anandamide, a CB1-like agonist, for 30 or 60 minutes along with a solvent control and the positive control of 100µM capsaicin. Phosphorylation of ACC will be detected via western blot and glucose uptake assays will be performed to assess the effectiveness of anandamide in stimulating differentiated C2C12 cells to respond to elevated glucose. Data will be presented and compared to related studies in the literature.

DEVELOPMENT OF BACTERIOPHAGE RESISTANCE AMONG PROPIONIBACTERIUM ACNES BACTERIA

Adam Schirduan, Nicholas Keegan, John Simpson, Michael Davis, Central Connecticut State University. **5-4**

Propionibacterium acnes bacteria are relatively slow growing anaerobes that colonize human skin, commonly causing the skin condition acne in more than 45 million people in the US. Given the general rise in antibiotic resistance, acne monotherapy with oral antibiotics is often ineffective, and using P acnes specific bacteriophage as a complementary treatment for acne is expected to be successful. Bacteriophage reproduction results in death of eh bacterial host cell, and bacteriophage therapy protocols are being developed for a range of infectious diseases. Bacteriophage have a limited target specificity, possess the ability to amplify, rather than deplete during therapy, and are a naturally occurring, rather than a synthetic agent. They also promise easier methods of overcoming treatment resistance. We are working with our extensive collections of bacteria and bacteriophage to investigate the frequency of and mechanisms by which P acnes bacteria develop resistance to bacteriophage killing. We are also subsequently selecting bacteriophage mutants that reacquired the ability to target and kill the resistant mutant bacteria. Our goal is to understand the mechanisms between bacterial resistance and bacteriophage adaptivity to this resistance. Experimenting with frequency, locations, and mechanisms of these mutations may allow bacteriophage therapy to adapt to bacterial resistance and maintain efficacy over time.

AIR QUALITY IN THE NEW YORK CITY AREA

Kieran Schnur, Manhattan College

4-2

The purpose of this experiment is to test various variables within the air, to see what quality of air is present in various areas of New York City. I will be testing the air using three sensors constructed by the Physics department. One sensor tests for CO2, another tests for different particulate sizes within the air, and the third tests for UVA and UVB rays. Locations that will be tested for air quality include Montauk Long Island as a base line for clean air, locations within the Bronx including the famous Van Cortland Park, a couple subway stations including Penn station, and busy locations in the city such as Times Square. The goal is to compare the different levels of these variables between each location to see which location has the worst air quality. This information will bring light to possible dangerous air quality within the city of New York.

EFFECT OF STORM EVENTS ON SUBMARINE GROUNDWATER DISCHARGE MEASURED BY RADON FLUX

Victoria Schoenwald, Sacred Heart University

4-3

The study of submarine groundwater discharge (SGD) is of growing importance due to its potential to carry pollutants into the coastal zone. Radon (222Rn) has been used as a tracer of SGD because its concentration is very high in groundwater but low in seawater, due to its source being naturally occurring uranium in rocks. Determining the flux of SGD is important for establishing marine geochemical mass balances in a system. In areas with high rainfall there is the potential for a high rate of SGD, which in turn carries pollutants into the coastal zone rapidly and in large quantities. To determine the effect of strong rainfall on groundwater intrusion, radon was measured continuously using the RAD-7 automated radon detector at three locations along the Mill River in Dingle, Ireland which empties out into the Dingle Bay. Radon concentrations were measured before and after storm events that carried significant rainfall. After rain events, radon levels and radon flux increased which is likely due increased SGD. These data establish that groundwater is discharging into the Mill River and stronger storms can alter the amount of groundwater influencing a coastal system. These calculations of radon flux can be used to determine the rate of other pollutants entering the coastal system that may have an impact on the ecosystem of the bay.

STUDYING THE LYSOSOMAL DISEASE NIEMANN PICK C1 (NPC1) IN A ZEBRAFISH MODEL

Lela Seekwar; Chaitali Saqcena; Bin Cui; Xin Huang; Steven U. Walkley, Fordham University. **1-28**

Niemann Pick Type C1 commonly known as NPC is a rare genetic lysosomal storage disease that results in the accumulation of unesterified cholesterol and gangliosides such as GM2 in the liver and neurons. The disease usually impacts the juvenile population. Under the supervision of Dr. Steven U. Walkley at Albert Einstein College of Medicine, my study focused on using the zebrafish, *Danio rerio* as a model for the disease. Using zebrafish as a model for NPC offers many advantages, including enhanced imaging due to transparency of fish, and in vivo recording from neurons to test functionality. Adult zebrafish brain were dissected out and sections were obtained by using a vibratome. With vibratome sections I performed the Nissl Stain and was able to characterize the neuron morphology in the fixed npc1 knockout zebrafish brain. I also imaged the sections of the brain using Electron Microscopy. Preliminary electron micrographs show neuron organelles, including lysosomes. This information is critical as it shows feasibility of using EM to compare and quantify lysosomal structural differences in wild type and knockout zebrafish. For future directions we hope to identify that storage bodies are in fact seen in the NPC1 knockout zebrafish. In addition, we hope to perform immunofluorescence on the knockout and wild type zebrafish using Filipin (stain used to identify accumulation of unesterified cholesterol) and GM2 (ganglioside marker.

CREATING STABLE LYSOGEN USING AN F1 SUBCLUSTER PHAGE

Lauren Shields, Elizabeth Chong, Kareilyn Taveras, Dominican College.

It has been a century since Twort and d'Herelle independently discovered bacterial viruses, more commonly known as bacteriophage. A bacteriophage is comprised of a head, where the DNA is stored, attached to a tail that has leg-like fibers. If the phage does not have a host bacterium it cannot reproduce, making it a parasite. Phage genomes can vary widely in terms of both the number and organization of their constituent genes. In the current study, Mycobacterium smegmatis mc²155 was used as a host bacterium to isolate mycobacteriophages using direct isolation techniques from soil. Mycobacteriophage Juice456 and Blexus were isolated, purified, and their genomes were sequenced. These phages both belong to the F1 subcluster with 61% GC content, and are classified as temperate. We hypothesized that they could be used to create stable lysogens in M. smegmatis, a situation in which the bacterial genome maintains the phage rather than allowing it to reproduce and lyse the cell. Phage were serially diluted and spotted onto a confluent lawn of bacteria, after which they were incubated at 37°C and 42°C for 5 days. Mesas, which represent an overgrowth of bacteria, were produced for both Juice456 and Blexus, but not for any other phage used. Following pure culture isolations, a patch test was conducted and putative lysogens were isolated and streaked to purity, with a liquid lysogeny test done to verify stability. Future studies include a sensitivity test with other phages to determine if they are capable of infecting our lysogen.

5-5

F-5 MOLECULAR IDENTIFICATION OF THE SCORPION TELSON MICROBIOME

Christopher Shimwell, Barbara Murdoch, Eastern Connecticut State University

Every year about 23,000 people die from harmful antibiotic resistant bacteria. Antibiotic resistance is a global crisis that needs to be intensively researched by scientists. Unlike humans, some organisms however, have been resistant to the constantly evolving bacteria that contribute to antibiotic resistance. Scorpions, a member of the arthropod family, have been around for over 400 million years with little physical change. This is a sign that scorpions have advantageous traits that keep them safe from harmful bacteria. One possible explanation for the scorpion's successful longevity could be the collection of bacteria found inside of them - their microbiome. There has been little research on the scorpion microbiome and our project is hoping to fill this void. We have cultured bacteria from scorpion guts. DNA from bacterial isolates was subjected to PCR, to amplify the 16S rRNA gene. The sequence analysis of these ribosomal genes is the basis for the identification of individual bacteria. We have sequenced 50 bacterial samples. Interestingly, several identified bacteria are associated with food-borne illness in humans. Our results shed light on the diversity of bacteria found within scorpions and may lead to new sources of antibiotics to help combat antibiotic resistance.

DISTRIBUTION OF EPIPHYTES AND MEIOFAUNA ON LIVE AND DEAD SPARTINA ALTERNIFLORA STEMS IN CONNECTICUT AND GEORGIA SALT MARSHES

Cassie Simonides, LaTina Steele, and Michele Guidone, Sacred Heart University. 3-4

Epiphyte communities are increasingly recognized as important contributors to marsh food webs. However, little is known about the distribution of epiphytic organisms inhabiting Spartina alterniflora stems. This study examined epiphytic algae and meiofauna on S. alterniflora stems at four sites in Connecticut and four sites in Georgia. At each site, the densities of live and dead S. alterniflora stems with and without epiphytes were measured in high and low marsh zones. Samples of live and dead stems with and without epiphytes were collected from each location and analyzed microscopically for the presence of meiofauna. Live stems were more prevalent than dead stems at all sites. However, dead stems tended to support more epiphytic algae and animals than live S. alterniflora stems regardless of marsh zone, site, or state. Epiphytic algae were more common on both live and dead S. alterniflora in Georgia than in Connecticut. Microscopic animals were more abundant on stems with epiphytes than on bare stems at all sites in both states. The composition of the animal communities inhabiting S. alterniflora stems varied from site to site, but the animal communities at sites in Georgia were more similar to each other than they were to sites in Connecticut, with one exception. Differences in animal community composition were driven primarily by higher abundances of nematodes at three of the four Georgia sites than the Connecticut sites and the remaining Georgia site. Our results highlight the importance of even dead marsh plant tissue to the overall marsh food web.

ACTINOMYCIN-D STIMULATES APOPTOSIS IN HELA CERVICAL CANCER CELLS

Logan Slother, Anthony Di Cecca, Eric Benfey, Robert Greene, Niagara University. 1-11

Cervical cancer is the fourth most prevalent variety of cancer found in women worldwide. Cervical cancer arises from abnormal cell growth in the cervix. Treatment of the HeLa cervical cancer cells line with Actinomycin-D directly stimulates apoptosis. Actinomycin-D is a chemotherapy medication produced from Streptomyces parvullus which inhibits transcription by binding DNA at the transcription initiation complex and prevents elongation of the RNA chain by RNA polymerase. We treated HeLa cervical cancer cells with Actinomycin-D to better understand the mechanism for how induces apoptosis. Various concentrations of Actinomycin-D were used to determine the most effective apoptotic treatment for the HeLa cells. The treatments were performed for 24 hours and then analyzed for efficacy. We also treated HeLa cells over the course of 72 hours using a single concentration to determine the effectiveness of Actinomycin-D over an extended treatment time. Future research could be performed using Actinomycin-D in conjunction with phototherapy to more effectively induce apoptosis in cervical cancer cells.

THE INFLUENCE OF ETHNOMEDICINE IN THE CARIBBEAN DIASPORA: A FOCUS ON WOMEN'S HEALTH

Triniece Smith 3-28

Ethnomedicine and herbal healing have been used in the Caribbean for hundreds of years and is still in use today. This study examines how ethnomedical practices are used in the United States within the Carribean diaspora located here. Specifically, this project seeks to understand how and why women use these practices to promote women's health. Caribbeans have immigrated to the United States in various waves. New York City has one of the largest Caribbean populations in the U.S. One way they have maintained cultural traditions is in the form of healing and medicine. This research studies the usage of herbal medicine in the United States, more specifically the New York City area by people of Caribbean descent. The methodologies used in this study included an anonymous online survey. The purpose of the survey was to see if and how herbal medicine has been incorporated into their lives growing up. Interviews were later conducted with women over the age of 40 who were born and raised in the Caribbean to understand the culture behind their medicinal background, how they learned that knowledge, how much of those practices they use and how it is used for women's health. Similarities in women's health concerns have emerged within the Caribbean diaspora. Recognizing these issues and women's health needs and practices can benefit promoting health within the Caribbean diaspora and within Western forms of medicine.

MEASURING PREDATION RATES AND *SPARTINA ALTERNIFLORA* STEM DENSITIES TO DETERMINE STRUCTURE AND FUNCTION OF RESTORED SALT MARSHES

Elizabeth Sosa, LaTina Steele, Sacred Heart University

4-4

To combat declines in salt marshes and loss of ecosystem services, restoration projects seek to restore both marsh structure and function. Because the plant material used in restorations may not be adapted to the local environment, it is unclear whether restored marshes function in the same ways as natural marshes. To compare the structure and function of restored and natural marshes, Spartina alterniflora surveys and field tethering experiments were performed in restored and natural marshes in Connecticut in the summer of 2018. Asian shore crabs (Hemigrapsus sanguineus) were tethered in two restored marsh areas of different age in Stratford, a naturally recolonizing marsh in Stratford, a natural reference marsh in Milford, and in unvegetated areas near these marshes. S. alterniflora density and stem height were measured at these locations, as well as algae and rock percent cover. Crabs survived best in the unvegetated locations in Milford, where algae cover was high, and in Stratford, where rock cover was high. Low crab survival in both the restored and natural marsh areas indicates that predators used these marshes as foraging grounds. S. alterniflora stem densities in the three year old restored marsh were similar to stem densities in the natural marshes, while stem densities were lower in the one year old restored marsh. S. alterniflora was shorter in both of the restored marsh areas compared to the natural marshes. Our results suggest that restored marshes can serve some of the same functions as natural marshes, even when their structures differ.

G-5 ANALYSIS OF THE CYP51 PARALOGS AND THEIR POTENTIAL ROLE IN DIFFERENTIAL SENSITIVITY TO FUNGICIDES IN CALONECTRIA PSEUDONAVICULATA AND C. HENRICOTIAE

Stefanos Stravoravdis¹, Nicholas R. LeBlanc², Robert E. Marra³, Jo Anne, Eastern Connecticut State University

Fungal pathogens commonly threaten the growth of commercial and consumable crops. Calonectria pseudonaviculata and C. henricotiae are two closely related fungal species responsible for the development of boxwood blight disease in ornamental shrubs (Buxus spp.) in the U.S. and Europe. Previous studies have shown the latter species, which is restricted to Europe, to be less sensitive to select demethylation inhibitor (DMI) fungicides than the former. An unpublished study has shown that isolates of C. pseudonaviculata displayed an early stop codon in one of three CYP51 paralogs known to confer resistance to fungicides, CYP51A. In this study we have analyzed the CYP51 paralogs for polymorphism in 25 genomes, representing geographically disparate populations of C. pseudonaviculata (18) and C. henricotiae (7). The widespread prevalence of the early stop codon in isolates of C. pseudonaviculata is a novel discovery for fungi and could have consequences for the evolution of resistance to DMI fungicides in this invasive pathogen.

ENGINEERING A *UAS-FRIED-V5* TRANSGENE FOR PHENOTYPIC ANALYSIS AND RESCUE OF FRIED

Milana Stein, Stephanie Sabido, Fordham College.

4-13

The *Drosophila melanogaster fried* gene was previously identified as the *CG31320* gene that encodes the 845 amino acid HEATR2 protein (Diggle, Morris). Drosophila *fried* mutants exhibit varied phenotypes such as darkening of the trachea, precocious wandering, larval arrest, and death within 7 day after egg deposition. To correlate rescue of *fried* phenotypes with expression in particular tissues, we engineered a *UAS-fried* transgene with a V5 tag using a donor 9kb plasmid, LRPCR of *fried*, and insertion of *fried* sequence into the donor plasmid via Gibson cloning to produce *pUAS-fried*. *UAS-fried-V5* are currently being injected into the fly embryos, and the transgene will be incorporated into the germline to produce a strain of *UAS-fried-V5* flies. It is predicted that the HEATR2 protein's subcellular localization will be determined after our transgenic flies are crossed to several strains of flies with different tissue specific expression of Gal4. Gal4 will bind to the *UAS* sequence and activate transcription of the *UAS-fried-V5* sequence in all the tissues where Gal4 is expressed. We will then correlate the rescue of the various *fried* mutant phenotypes with expression of the transgene. In addition to the *UAS-fried-V5* experiments, we briefly discuss other current and future directions for this project.

KRATOM AS AN ENHANCER OF WORKING MEMORY IN RATS

William Sweeney, John Carroll University

4-17

Kratom (Mitreagyna speciose) is a plant that is indigenous in the region of Southeast Asia and has been used to manage painful demands of physical labor, enhance mood and well-being, and as a substitute for opioids. This study examined the effect of kratom powder on working memory in rats. Utilizing control and experimental rats the study was divided into three periods: 1) habituation 2) experimental and 3) withdrawal. During the experimental period kratom was orally administered to the experimental animals in a chocolate Ensure treat. Spatial working memory was tested utilizing the Morris Water Maze involving two components: 1) the trial run in which the rat discovered the location of the platform and 2) the test run in which the animal recalled the location of the platform. Metabolic parameters of food and water intake and renal adiposity were recorded. It was hypothesized that, compared to control rats, kratom-treated animals would have enhanced working memory with few adverse metabolic side effects. The two groups showed no differences in the time that it took for them to reach the platform during either the experimental or withdrawal periods. Renal fat in the experimental group was significantly higher. Water intake of the experimental group was significantly lower which may be indicative of dehydration, a phenomenon frequently reported in human kratom users. Kratom dehydration can have dangerous consequences for one's health and increase the risk of suffering serious conditions affecting muscles, skin, kidney, and the cardiovascular system. Thus, the hypothesis was not supported.

A-1 ACCESSING DIYNES CONTAINING THIOCYANATE END-GROUPS EN ROUTE TOWARDS POLYDIACETYLENES

Oskar Erik Sundberg, Wagner College

This research explores the synthesis of diynes with sulfur-containing end groups en route towards accessing novel polydiacetylenes (PDAs), a class of conjugated polymers with conductive properties. Diynes containing thiophene and thiocyanate end-groups have been targeted, with the latter being the focus of this project. Thiocyanate (SCN) end-groups are expected to impact the electronic properties of the polymerized system because of the resonance-stabilization and electronic effects of these groups. Efforts to synthesize 1,4-dithiocyanatobuta-1,3-diyne have produced interesting results. While the synthetic protocol is producing consistent ¹³C NMR data, these do not entirely correspond with predicted NMR spectra generated computationally with Gaussian; however IR spectroscopy confirms the presence of alkynes. To further elucidate the structure of the synthesized compound we designed many NMR simulations of various potential products using the general purpose computational software Gaussian. Computationally generating NMR spectra has proven a useful tool in our attempts to determine our exact product. Once the target diyne is obtained and successfully characterized, polymerization efforts will commence.

DISTINCT HEPHL1 MUTATIONS ARE FOUND IN TWO INDEPENDENT MOUSE STRAINS THAT DISPLAY THE SAME MUTANT PHENOTYPE: CURLY WHISKERS

Taotao Tan, Juan Samuel-Constanzo & Nia-Zaire Esgdaille, Central Connecticut State University **2-21**

To assign the "curly whiskers" mutation (cw) to a particular gene, we mapped cw within an interval that contains just three skin-expressed candidates. To evaluate one of these, Hephl1, as the possible basis of cw, we determined the DNA sequence of all 20 exons in mutant and wild-type mice. The only difference we discovered was an A-to-G transition in the splice-acceptor signal 5' to Exon 11. To determine if this mutation is specifically associated with cw, we developed an AluI-sensitivity assay for readily detecting defects at this site. All 57 wild-type strains we tested showed the normal splice-acceptor sequence. In addition, we tested DNA from two strains with curly whiskers: one called "STOCK cw-se-tk", which is distantly related to our "CWD" strain; and another called "B10.SM", which has no known relationship to CWD. While STOCK DNA did show the same splice-acceptor defect as CWD, the B10.SM strain did not! Next, we crossed B10.SM with CWD mice to prove that B10.SM is homozygous for a mutation that is allelic with cw, and sequenced all 20 Hephl1 exons in B10.SM mice. This analysis revealed a singlebase-pair insertion in Exon 14, suggesting that B10.SM encodes a new, spontaneous mutant allele of cw, that we have designated cw^{2J}. Finally, we developed an MlyI-sensitivity assay for readily detecting the Exon 14 insertion, and showed that this defect is specific to cw^{2J}, only. In summary, our work has identified two independent mutant alleles of "curly whiskers" that likely result from these distinct defects in Hephl1.

INHIBITION OF SERUM AMINE OXIDASE PREVENTS POLYAMINE INDUCED AUTOPHAGY: A CAUTIONARY TALE

Kaela Teele, Wagner College

2-22

Polyamines putrescine, spermidine, and spermine are polycationic alkyl amines that are multifunctional in eukaryotes, and one of their main functions is overall cell growth. Therefore, polyamines can be used as a target for antineoplastic drug development. It has recently been suggested that polyamines are critical players in the induction of autophagy. However, all of the studies performed with mammalian cells occurred in the presence of bovine serum, which contains serum amine oxidase. Serum amine oxidase oxidizes polyamines into hydrogen peroxide, an aldehyde, ammonia and a simpler polyamine. The peroxide and aldehydes cause cytotoxicity, thus subjecting cells to a toxic environment when exogenous polyamines are added to media containing bovine serum. However, this enzyme can be inhibited by aminoguanidine. Thus, to determine whether the toxicity was a result of the stressful environment produced by the oxidation of exogenous polyamines, the effects of the addition of polyamines to media containing bovine serum +/- aminoguanidine on markers of autophagy were examined in three cell types; WT HCT116, p53-/-HCT116, and A549. The concentrations examined were 0, 1, 5, 10, 25, 50, 75, and 100 μM. Significant toxicity was observed at 50 μM for both spermidine and spermine after 48-hour exposure. However, when serum amine oxidase is inhibited by aminoguanidine cells were resistant to polyamine addition. To determine whether inhibition of the serum amine oxidase also reduced evidence of autophagy, the cell lines were treated with the polyamines at concentrations of 0, 1, 25, and 50 μM over a 48-hour period and autophagy markers were evaluated.

IONIC LIQUIDS AS ANTIMICROBIAL SURFACES

Marie Thomas, Vicki Flaris, Luke Osborn, Chantale Pierre, Fordham University 3-23

Ionic liquids are "greener" solvents that have melting points below 100 degrees Celsius and very low vapor pressures. Certain ionic liquids have shown antimicrobial properties. We synthesized seven quaternary ammonium salts (QAS), which may be ionic liquids, to test their antimicrobial abilities when incorporated into polymers. These QASs had a 1,4-diazabicyclo [2.2.2]octane (DABCO) head, an alkyl chain, and a halide counter ion. We hypothesized salts with longer alkyl chains would have more of an antimicrobial effect than shorter chains. This is consistent with published reports regarding materials of this type, so we varied the length of the alkyl chain from seven to sixteen carbons. Preliminary data suggests that polymer surfaces which incorporated a DABCO salt with a chain length of twelve carbons were most effective in inhibiting the growth of *Escherichia coli*. However, long reaction times were required for reasonable yields of these QASs. In this report, we discuss the synthesis of these compounds and strategies for increasing the yield, while decreasing the reaction time.

SQUAD GOALS: A CONTENT ANALYSIS OF TEEN SHOWS OVER THREE DECADES ON TELEVISION (1993-2017)

Lindsay Thompson, Kelsey Bocharski, Ithaca College

4-15

This study represents a longitudinal content analysis of the portrayals of teenagers on teen-oriented situation comedies. The sample included 91 shows chosen from the archive of the Center for Research on the Effects of Television (CRETV) at Ithaca College. An initial analysis showed that many teen sitcoms take place mainly inside the home with interactions primarily between teens and their parents or siblings; those shows were excluded from this analysis in order to focus on teen relationships outside of the home. Programs were selected for analysis that were a 30-minute teen-focused situation comedy aired during the years 1994-1997, 2004-2007, or 2014-2017, and had at least 3 non-related teen characters. Content was coded for all teen dyads that occurred within the program (including family members), and demographic information (gender, age, race, relationship, and approximate age) were coded for all characters. The nature of the teen relationship was fully described for each dyad, including displays and discussion of affection, gender messages, discussions of other dyads, and put-downs. Results showed that teen-oriented situation comedies that aired in the 1990s tended to cover more serious issues such as eating disorders and drug use, while episodes that aired in the later years of the study tended to focus more on fluff (such as getting a celebrity to perform at school, or dance competitions at prom). The earlier shows were also significantly more likely to include displays of affection between significant others, while more recent shows focused primarily on same-gender and mixed-gender friendships.

ANTIOXIDANT ACTIVITY OF BEE PROPOLIS FROM DIFFERENT PARTS OF THE WORLD

Alexander Tielemans, Elmer-Rico E. Mojica, Pace University

3-24

Propolis, a natural resinous substance collected by honeybees from buds and exudates of plants, is believed to be used in the beehive as a protective barrier against enemies. Also, known to be a natural medicine, propolis contains beneficial activities such as antibacterial, anti-oxidative, antiviral, and antimicrobial and many more. Depending on the season, bee species, vegetation, and the area of collection, the chemical composition of propolis are qualitatively and quantitatively variable. In this study, the antioxidant activity of several propolis samples obtained from various parts of the world (Europe, Australia, USA and the Philippines) were determined using the DPPH assay. The antioxidant activity was correlated to the phenol content obtained using Folin-Ciocalteu assay. Based on the results, all samples exhibited antioxidant activities of varying degrees with samples from England, New York, and Serbia having the highest antioxidant activity. The antioxidant activity was also related to the phenol content of the propolis samples.

MICROWAVE-ASSISTED HETEROGENEOUS CATALYTIC GAS-PHASE OXIDATION OF 2-PICOLINE

Paula Ustilovsky, Yevgenia Alkayeva, Alexei Shutilov, Galina, Fordham University.

3-25

Oxidation of methyl pyridines is a reaction commonly used in the pharmaceutical and agricultural industries. These reactions are typically conducted in the liquid phase in large batches at a relatively low temperature. However, this method produces many environmentally harmful by-products, and the reaction is cyclic: the entire reaction must be stopped and started repeatedly in order to maintain conditions. Heterogenous catalytic gas-phase oxidation of methyl pyridines reduces or eliminates these issues. This method is also more affordable than liquid-phase oxidation because the oxygen can be taken directly from the air. This research explores microwave-assisted heterogenous gas-phase oxidation of 2picoline using vanadia-containing catalysts with titania, alumina, and zirconia supports. Vanadiacontaining catalysts have excellent microwave energy absorption and redox properties. Previous research using these catalysts has been conducted in a conventional oven. Microwave assistance creates a favorable temperature distribution in catalyst particles and promotes availability for the catalyst surface oxygen to be incorporated into the partial oxidation products: 2-pyridinecarbaldehyde and picolinic acid. Maintaining the reaction at a relatively low temperature (below 200°C) contributes to the absence of pyridine - a decarboxylation product - and to a low amount of CO₂ - a total oxidation product. Unlike other pyridinecarboxylic acids, picolinic acid undergoes polymerization after desorption from the catalyst surface. A new reactor design has been proposed that decreases the contact time between the products with the microwave energy. This updated technique has shown improved results and is currently under further investigation.

SUBSTITUTION REACTIONS IN RHODIUMPINCER COMPLEXES WITH BRIDGING HYDRIDE: NMR STUDIES

Nora Vail, Ithaca College.

5-25

Organometallic compounds are very important to the world of chemistry for their use as catalysts in industrial and laboratory applications, for example, polymerization and cross coupling reactions. Of particular interest to our research group are rhodium hydride complexes with the tridentante PNSi pincer ligand. Using a variety of ancillary ligands with different steric and electron withdrawing factors allows for tunability of these complexes' properties. The unique divalent hydrogen in these complexes is found in the bridging position between the rhodium and silicon atoms. It displays diagnostic changes in chemical shifts and splitting patterns in nuclear magnetic resonance spectra, depending on how the bonding is affected by the presence of the changing ancillary ligands. The study of the bonding in such compounds leads to better understanding of the mechanisms by which related organometallic complexes can catalyze hydrogenation reactions.

ISOLATION OF BACTERIOPHAGE IN STAPHYLOCOCCUS SPECIES

Shania van Nuland, Janelle Fancher, Maria Kajdasz, Mark Gallo, Niagara University. 5-9

Pathogenic *Staphylococcus* strains that are antibiotic resistant can cause infections that are difficult to treat. The use of bacteriophage in treatment of *Staphylococcus aureus* infection has been proposed as a possible alternative to antibiotics. Isolation and identification of new bacteriophage is an exciting area of research that may yield novel treatments for infections that have been challenging to eliminate by traditional means. One previously unexplored source of *Staph* and their corresponding phage are strains associated with wild animals. In this study, *Staph* were isolated from white tail deer, *Odocoileus virginianus*. The resulting bacteria were analyzed for the presence of lytic phage that were active against RN4220, a permissive strain of *S. aureus*. Sixteen independent bacteriophages were detected and their range of activity on other *Staphylococcus* species will be determined. Genetic and morphological properties will be explored.

EFFECTS OF VITAMIN-D TREATMENT ON MCF-7 LUMINAL BREAST CANCER CELLS

Amanda Ventrella, Audrey Dunn, Eric Benfey, Robert Greene, Niagara University 2-23

Breast Cancer begins when the cells in the breast tissue begin growing uncontrollably, forming a benign tumor and eventually spread and grow enough, turning into a malignant tumor. There is growing evidence that treatment of the MCF-7 luminal breast cancer cells line with Vitamin-D directly stimulates apoptosis. Vitamin-D is a fat-soluble vitamin that can be obtained from the diet, as well as a seco-steroidal prohormone that is produced in the skin by UV-light. However, the precise mechanism of Vitamin-D-induced apoptosis on Breast Cancer cells is still poorly understood. To better characterize this effect, we treated MCF-7 cells with different concentrations of vitamin-D and measured their efficacy at 24 hours. We also treated MCF-7 cells over the course of 72 hours to determine how effective vitamin-D was over an extended treatment time. We found that Vitamin D had an IC₅₀ at a concentration of 150 nM and reached a maximal effect by 48 hours.

CAN TUALANG OR MANUKA HONEY PREVENT THE RATE OF DEVELOPMENT CHANGES AND MALFORMATIONS SEEN AFTER BISPHENOL A EXPOSURE IN XENOPUS LAEVIS (CLAWED FROG).

Michael P. Verile, Laura H. Twersky, Christina M. Mortellaro, Saint Peter's University 1-17

Bisphenol A (BPA), a known environmental endocrine disruptor, is a ubiquitous chemical filler used in numerous household items. Some of the negative effects of BPA include increased cancer risk, infertility, and birth defects. BPA interferes with estrogen and thyroid hormone action. Also, BPA is correlated with an increase in oxidative DNA base lesions. Thottumari et al. (2019) showed that BPA, BPS and BPF, individually and in combination, caused malformations in the metamorphosis of Xenopus laevis (clawed frog). Honey's medicinal properties are widely known in both alternative and traditional Chinese medicine. Wisniew (2009) exposed rats to BPA; those exposed to only BPA developed ovarian cysts, those treated with Tualang honey (TH) did not. Research suggests Manuka honey (MH) shares similar protective properties as TH, due to at least partly the activity of kaempferol. This study was conducted to determine if TH and/or MH can prevent and/or reverse BPA-induced malformations. Specimens were incubated or pre-incubated at tailbud stage 25 (Nieuwkoop and Faber stages). Concentrations were: 3μ g/mL BPA, 3μ g/mL TH, 3μ g/mL MH, 3μ g/mL of kaempferol, 5μ g/mL BPA, 5μ g/mL TH, 5μ g/mL MH, and 5μ g/mL kaempferol. Specimens were distributed into four equal groups: preincubated in honey solution prior to BPA solution at the same concentration, incubated in BPA prior to honey solution of the same concentration, incubated in either BPA or honey solution. Incubated in combination of equal parts BPA and honey solution of the same concentrations. Preliminary results indicate differences in mortality, length, rate

H-2 XYLEM CONDUCTIVITY IN STEMS OF ARTEMISIA TRIDENTATA

Victoria Webb, Manhattan College.

Artemisia tridentata, otherwise known as 'Big Sagebrush," is the dominant shrub species in the Great Basin Desert, covering vast regions across the Northwest United States. Sagebrush obtains most of its water from winter snowfall, utilizing moisture to promote the plant's growth. The growth cycle of Artemisia tridentata begins with vegetative growth in the spring and ends with reproductive growth in autumn. Reproductive terminal stems grow to produce approximately 200,000 seeds per plant in late autumn. The purpose of the study was to determine the relationship between xylem conductivity and stem lengths. Twelve stems were processed and over 45,000 cells were counted. Radii of more than 2,200 xylem cells were determined to calculate xylem conductivities. Xylem conductivities were exponentially scaled with stem lengths. Xylem conductivity at the stem terminal was linearly related to stem lengths (y = -0.001x + 0.227; $r^2 = 0.62$). Data demonstrate that shorter, vegetative stems had higher xylem conductivities at the stem terminals than longer, reproductive stems. This result is consistent with the fact that vegetative stems, early in the season, are elongating rapidly while reproductive stems, near the end of the season, have stopped elongating. The data show that xylem conductivities, an important parameter of plant growth, can be determined from stem lengths.

J-2 MOVEMENT IN WHITETAIL DEER (ODOCOILEUS VIRGINIANUS) IN ITHACA, NY

Elaina White, Ithaca College.

Whitetail deer (Odocoileus virginianus) are overpopulated, causing negative consequences both to the environment and to people. Whether it is through overbrowsing of forest vegetation or car accidents, the whitetail deer are leaving an impact. By looking at the space use of deer, we can determine what habitats they prefer to help with management plans. The goal of this study was to determine if whitetail deer prefer certain habitats within a small urban-forest area and if breeding season (rut) affects this. During the study, trail cameras were set out to capture pictures of animals in different habitat patches around Ithaca College (Appalachian oak hickory, successional shrubland, successional Northern hardwood, perched swamp whiteoak, and built campus). Buck were identified by their rack so could be tracked over multiple pictures. Counts of deer in each habitat and season were compared to random use with chi-squared tests or multinomial tests. I found deer do prefer certain habitat types, but were found in different habitats prerut and rut. During the pre-rut deer prefer successional shrubland and during the rut they prefer built campus. In addition, buck movement increases during the rut, and all identifiable bucks moved into the built campus during the rut. Successional shrubland may be used pre-rut since the shrubs provide both food and shelter. The built campus may be a more accessible area for gathering for the rut itself. My results suggest urban landscapes may be attracting deer specifically as a breeding area.

THE ALLELOPATHIC INFLUENCE OF EUCALYPTUS LEAVES ON THE GROWTH AND DEVELOPMENT OF COMMON AGRICULTURAL CROPS OF BRAZIL

Gianni While, Sherane Raymond, Saint Peter's University.

3-5

The suspected allelopathic influence of Eucalyptus in Brazil is a serious issue. Though Eucalyptus are grown extensively in Brazil, the allelopathic effects cause issues for other plants and crops surrounding it. The Eucalyptus may release chemicals that inhibit the growth of other plants. Growing Eucalyptus in low rainfall areas may cause adverse environmental impacts due to competition for water with other species and an increased incidence of allelopathy. To study the effects of Eucalyptus on the growth and development of plants, seeds from indigenous, morning glory plants, corn and tomato were used. The seeds were planted in different concentrations of Eucalyptus leaf material with a 1% and 10% concentration. In addition, seed germination was examined using an aqueous 1% and 10% applied to the seeds to see the impact on germination. The plant growth experiment looked at the plant height, germination rate and plant weight. The germination study looked at germination rates at different concentration for the different seed types. Results indicate the the allelochemicals in Eucalyptus do inhibit both growth and germination in the agricultural crops studied. This could have important impacts for farmers growing these crops and could provide valuable information about placement of crops along with placement of woodlots.

EXPLORING THE ADHERENCE AND PROLIFERATION OF GINGIVAL FIBROBLASTS WITH HYBRID PEPTIDE SCAFFOLDS

Niyasha P. Wijedasa and Ipsita A. Banerjee, Fordham University,

3-27

Gingival derived fibroblasts are known to play a key role in periodontal tissue regeneration. However, successful tissue regeneration requires a series of other growth factors and biomaterial components that can mimic the extracellular matrix. In this work we have developed a new nanoscale biomaterial by integrating synthesized self-assembled nanofibers from gluconic acid derivatives. In order to mimic the extracellular matrix of periodontal tissue, we attached a calcium binding peptide (derived from mollusc species) followed by integration with tricalcium phosphate in order to promote the growth of cementum. The integration of each layer was confirmed by FTIR spectroscopy as well as SEM analysis. We also studied the thermal properties by differential scanning calorimetry in order to ensure that the scaffolds were thermally stable while biomechanical properties were examined by stress-strain analysis. The growth and proliferation of gingival fibroblasts was studied in the presence of varying concentrations of the scaffolds to ensure optimal binding and proliferation. Our results indicated that the biomaterials successfully attached to the cells and proliferation was similar to that of the control. Furthermore, we conducted alkaline phosphatase and alizarin assays to study the mineralization effects of the scaffolds. Results show that the cell-scaffold matrices were highly biocompatible and promoted mineralization of calcium. Thus, such materials may have applications as dental tissue regeneration materials.

RAMAN SPECTROSCOPIC ANALYSIS OF NITRILE-CONTAINING COMPOUNDS

Lyric Wyan, Pace University

3-26

Raman spectroscopy has been used as a quick and non-destructive method to analyze different organic and inorganic samples. It provides information about molecular vibrations that can be used for sample identification and quantification. The nitrile group has a distinct vibrational mode in the 2100-2300 cm⁻¹ region. With the mode being considerably small and sensitive to polarity, bonding interactions, and electric fields, a lot of interest has been taken in the active nitrile stretching. In this study, several nitrile containing compounds were analyzed through Raman spectroscopy. Samples containing nitrile groups, ranging from acetonitrile to nitrile gloves to peptides containing cyanophenylalanine, were examined and compared with one another. The effect on the nitrile Raman shift from the presence of side-chains and other functional groups was determined. Solvent effects on cyanobenzaldehyde and methoxybenzonitrile were also investigated using Raman spectroscopy. Theoretical Raman calculations were then compared with the experimental results.

WILD FERMENTATION: PURSUING THE WILY SACCHAROMYCETACEAE

Marrissa Yost, Katherine Napoli, Nauel Tejada, Sacred Heart University 5-6

The craft beer brewing industry has enjoyed explosive growth over the past decade and as component of this expansion interest in the production of "wild" or spontaneously fermented alcoholic beers and ales has increased dramatically. Unlike traditionally fermented ales, the vast majority of which are brewed with less than a dozen well characterized domestic strains of Saccharomyces cerevisiae, "spontaneous fermentation typically depends on environmental yeasts of the Saccharomycetaceae family. We report here a recharacterization and comparison of a number of previously isolated yeast species from various environmental sources as their characteristics relate to their usefulness in the craft brewing industry. In addition, characterization of a strain newly isolated from a New England malting facility is presented. This comparison has confirmed that yeasts of potential use in the brewing industry can vary widely in terms of species, secondary metabolite production, carbohydrate use, and fermentation characteristics.

E-3 CREATING A DIGITAL PRODIGY

Munir Yousef, Pace University

This paper will focus on the application of a machine learning model that could be used in the field of data analysis and security. Machine learning algorithms are limited to four basic learning methods that are designed to optimize the learning process so that the machine may develop intelligence over time. Reinforcement learning, supervised learning, semi-supervised learning and unsupervised learning are the systems being utilized to advance the machine learning processes. Although machine learning has allowed data scientists to reap its benefits in the marketing, financial, healthcare and security sectors, I believe the true potential of machine learning algorithms remains untapped. When comparing the ability of a child to learn and the ability of a machine to learn, it becomes obvious that the learning model falls short due to our inability to reproduce vital human characteristics such as common sense, reasoning skills and an intrinsic value system. If a machine can approach problems with practicality, curiosity and a system to determine value, the potential benefits of applying this model to real world problems would be tremendously beneficial. A curious machine that has predetermined objectives and understands why completing those objectives is preferable to not completing them, joined with an infinite resource of data such as the internet, bears incredible untapped potential. This paper will seek to determine how concepts such as value, curiosity and common sense may be translated into programming algorithms in order to unlock the true potential of machines and the data at their disposal.

LOSS OF AP-3 SENSITIZES MELANOCYTES TO AUTOPHAGY

Rebecca Yunker, Megan Dennis, Marist College

1-12

Defects in lysosome related organelle (LRO) biogenesis and function cause Hermansky-Pudlak Syndrome (HPS). HPS is characterized by oculocutaneous albinism, lung fibroses and clotting disorders, resulting from mistrafficking of proteins, including adaptor protein 3 (AP-3), during LRO biogenesis. Mouse melanocytes from models of HPS are used to study mechanisms of LRO biogenesis, due to the accessibility of these cells for basic research and common pathways of protein trafficking to all LROs. In melanocytes lacking AP-3, modest nutrient stress induces changes in pigmentation that are not observed in wild-type melanocytes (cells expressing AP-3). These changes include perturbations in melanosome size and mistrafficking of proteins within the endolysosomal. Since AP-3 protects other cell types from excessive autophagy induction, and many of the changes to melanosome and lysosome morphology are consistent with autophagosome formation. Our hypothesis is that the loss of AP-3 sensitizes melanocytes to starvation-induced autophagy, and that induction of autophagy in these cells specifically targets melanosomes for inclusion in autophagosomes. This model is consistent with phenotypic changes observed in mouse melanocytes upon nutrient stress and starvation, such as large aggregated melanin granules and localization of lysosomal proteins such as LAMP-1 to pigmented structures. To test this hypothesis, we have used several approaches, including western blotting and quantitative immunofluorescence microscopy, to investigate the role of autophagy in this phenotype. Our preliminary findings confirm that wild-type cells are less sensitive to induction of autophagy than cells lacking AP-3, and address the spatial formation of autophagosomes within the cell.

OBSERVING COMMON ABNORMALITIES AND INJURIES IN ATLANTIC HORSESHOE CRABS (LIMULUS POLYPHEMUS)

Sara Zakrzewski and Mark L. Botton, Fordham University

4-5

Carapace condition and the frequency of injuries was collected on a sample of 241 live adult horseshoe crabs from Jamaica Bay in Spring 2018. The following data was collected on each individual: size (prosoma width) sex, telson length, eye condition, shell condition, and leg condition. Lateral eye condition was rated on a scale of 0 to 5, ranging from a perfect eye (clear, with all facets intact) to a completely rotted eye, respectively. Lateral eyes that were classified 4 to 5 on this scale, along with missing eyes and eyes covered by fouling organisms were considered injured/abnormal. Carapace condition was scored as 1 (new molt), 2 (intermediate), or 3 (heavily worn and pitted). The mean carapace condition of the adult horseshoe crabs in Jamaica Bay was 2.5. The finding that most of the sample consisted of animals with older, worn-out exoskeletons may indicate low rates of recruitment to the population. Eye and leg injuries occurred more frequently in individuals in poorer carapace condition. Injuries or abnormalities of the lateral eyes (52%), and legs (35%) were the most common anomalies in the Jamaica Bay population. Males were more likely to have damaged pedipalps than females, which we attribute to the use of this appendage as the male "clasper" during amplexus. The frequencies of other kinds of injuries were similar between males and females. A number of unusual injuries and malformations to the prosoma, opisthosoma, and telson were documented, and the probable causes (mechanical injury, disease, or developmental abnormality) are discussed.

D-1 THE ROLE OF CANNABINOID 2 RECEPTOR IN MODULATING MICROGLIA ACTIVATION AFTER A TRAUMATIC BRAIN INJURY.

Zamora, Maria F, Canseco-Alba, Ana, Lui Qing-Rong, Emmanuel Onaivi, William Paterson University.

Traumatic brain injury (TBI) occurs when a sudden trauma is applied to the head and causes damage to the brain. TBI can result from a multitude of events including most commonly from sports injuries, vehicle collisions, violence, falls, and war. It is estimated that there are 1.4 million cases of TBIs in the USA every year. Injury can result in permanent disabilities and in severe cases it can be fatal. Symptoms after a TBI can be mild, moderate and severe depending on the extent of brain damage as well as location. Long-term behavioral effects can be characterized including depression, anti-social behavior, and fear/anxiety. Additionally, TBI injuries have shown symptoms that are closely related to Parkinson's and Alzheimer's like-symptoms. Currently, there are no specific treatments for a TBI injury. TBI occurs in two phases, the primary injury (physical aspect of the injury) and the secondary injury which consists of cellular process activated hours, days, and months after the initial injury. Neuroinflammation arising during the secondary injury can lead to neuronal death and involves the activation of microglia. The Endocannabinoid system (ECS) consist of two major receptors CB1 and CB2, including the endocannabinoids that activate these receptors and the enzymes involved in their synthesis and degradation. Previously published in vitro data indicates that activation of CB2 receptors in microglia decreased the production of pro-inflammatory factors; thus expression of CB2 receptor in microglia may play a role in the modulation of the immune response. This research evaluated the role of microglia activation after TBI by using CB2 receptor knockout mice (Cx3-Cnr2) which would not express the characteristic neuroprotective effects on local neural circuits. The mechanism of action in which this occurs is not fully understood.

PLANT TRACER REVEALS PLANT DYNAMIC QUALITIES IN THE BIOLOGY TEACHING LAB

Winnie Zhao, Samantha Ciarfello, Natalie Wayland, Brookelynne Verrette, Eric D. Brenner, Pace University.

1-24

Plant biology is a subject that is often glossed over by biology students. Yet, plants are actually fascinating in many ways. One captivating aspect is that all plants move, as revealed through the use of time-lapse photography. To stimulate interest in plants, *Plant Tracer* was created to track and quantify movement (speed, angle, and distance) of Arabidopsis thaliana shoots from time-lapses that students create in the biology teaching lab using their cellphones. To determine if *Plant Tracer* can improve student perceptions of plants as dynamic vs. static (the incorrect concept), Pace University's Spring 2018 biology students were divided into two groups. One group used *Plant Tracer* to analyze time-lapses, while the other group used the traditional method of taking still-photographs every 15 minutes and measuring positional changes with a ruler. Students measured two types of movement in Arabidopsis: gravitropism (the reorientation of the plant apex to a vertical position after the plant has been placed on its side) and circumnutation (regular swaying of the plant apex). Both pre- and post-surveys were collected and analyzed, with results revealing that there was a 28% corrected perception that plants are a dynamic biological organism and 9% increase of correct survey answers. Additional results indicated that there was also a small increased interest (4%) towards the study of plant biology as a career. By enabling students to use *Plant Tracer* to quantify plant movement, students are able to better understand plant function in a new perspective and become less distant from the plant world.

Alphabetical Listing for Registrations for ECSC 2019

(Presentations listed for first authors only)

Central Connecticut State University

Dr. Kathy N	Iartin
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Dr. Michael Davis

Dr. Betsy Dobbs

Dr. Barry Hoopengardner

Dr. Martin Kapper

Dr. Daniel Chase

Dr. Thomas King

Dr. Saddie Marjani

Deana Aljamal

Sajao Arja

Massia Atalla 2-20

Benjamin Barnes

Xandria Blair 2-20

Sean Byrne

Hannah Critello

Betty Darko

Ryan Donnelly 5-14

Nia-Zaire Esgdaille 2-21

Dusan Etienne 5-15

Matthew Gotta

Rodric Grant

Brenden Grifith

David Hernandez

Emma Hintz

Star Hooker Nolan Hurst Yara Ibrahim Madelyn Kaprelyan Nicole Karpinski 2-20 Mary Krasnicki Sabrina Kruy Jahniesha Lindo 4-8 Austin Lopez Amellia Lyn Sandra Marcotte 4-8, 2-18 Mckenzie Marza Nyla Merritt Daniel O'Brien Dulian Progonati Alexander Radecki 4-11 Kastriot Rexhaj Dawn Rosenberg 2-20 Devan Roy Juan Samuel-Constanzo 3-13 Jesus Santiago Britany Schultz Nabila Shah Cory Singleton Sophia Solis Taotao Tan 3-13 Christina Torres

Ashley Vasel 4-8

Lindsey Wainwright

Khadija Wali 4-7

Schanzeh Waraich

Aylssa Welch

Nicolle White

Taylor Woike

Peala Zayas Garcia

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Dr. Bernadette Connors

Kimberly Acevedo 1-1

Elizabeth Chong 5-5

Stephanie Denis 5-7

Denzel Edwards 4-21

Stefanie Moncayo 4-25

Natalia Perez-Cervantes 1-27

Amanda Saab 5-7

Darlenys Sanchez 5-3

Lauren Shields 5-5

Karilyn Taveras 5-5

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Dr. Vijay Veerappan

Dr. Joshua Idjadi

Lauren Atkinson F-2

Roshani Budhathoki G-3

Greg Carlson 5-11

Brieanna Fuentes 3-9

Haley Grimason E-2

David Junga 1-14

Rebecca Laguerre 5-15B

John Meade 1-10

Sam Pallis H-3

Maxime Parent

Anayancy Ramos 2-19

Kaila Robinson C-5

Christopher Shimwell F-5

Stefanos Stravoravdis G-5

Fordham College at Lincoln Center

Dr. Grace Vernon

Dr. Marie Thomas

Dr. Mark Botton

Dr. Yevgeniya Alkayeva

Dr. Martin DiGrandi

Dr. Alma Ruano-Rudenas

Dr. Guy Robinson

Adam Agababayev

Noelle Curtis Joseph 3-21

Tina Dantono 2-9

Courtney Gainous

Chaudhary Harris 5-22

Stephen Howard A-3

Brielle Intortica 2-12

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Luke Osborn 3-23

Kylie Rothwell 4-6

Lela Seekwar 1-28

Mingnao Yang

Sara Zakrewski 4-5

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Dr. Brandy Bessette-Symons

Dr. Susan Allen-Gil

Soren Beck B-1

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Mackenzie Bragan 4-16

Grant Brighter 3-18

Jenna Caster 3-14

Jackson Cedrone 2-8

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Sarah Kosian B-3

Charlie Levitz 3-35

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Lydia Loiseele D-4

Leticia Lynch B-4

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Kelly Madden 4-16

Hannah Mahany

Tom Minett 2-14

Chanel Perez 4-14

Joseph Rorick D-6

Madison Sluter 3-18

Danny Sullivan 4-14

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Nora Vail 5-25

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Allison Mancuso 4-19

Viktoriya Partyka 1-21

William Sweeney 4-17

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Dr. Ghislaine Mayer

Dr. Sarah Wacher

Dr. Bryan Wilkins

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Cesar Cardenas 4-26

Shereen Chaudhry C-1

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Cole Johnson J-6

Gina M. Leoncavallo G-4

Alexa Marcazzo F-3

Catherine McDonough H-5

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Nadeen Moawiah 2-5

Peter Parlato 3-2

Olivia Printy J-5

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Wardah Alakrah F-4

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Ben Miller 1-16

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Tessa Peredy 1-22

Fabiana Persic 1-22

Victoria Salvatore 1-22

Julia Scherer 4-12

Victoria Schoenwald 4-3

Cassie Simonides 3-4

Ryan Sledzik 4-12

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