28TH ANNUAL BROOKLYN COLLEGE SCIENCE DAY

Brooklyn College Science Day is sponsored by the NIH MARC, NYS CSTEP and NYS CSTEP programs.

PROGRAM

9:30 AM	**POSTER SETUP (Student Center)**
10:00—12:00	**STUDENT PRESENTATIONS AND JUDGING (2nd floor)**
12:15 PM	**LUNCH IN THE GOLD & MAROON ROOMS (6th floor)**
12:30 PM	**WELCOME AND REMARKS**
	PRESENTATION OF AWARDS **High School (HS) Division** **Undergraduate (UG) Division** **Graduate (GRAD) Division**

ALL ARE INVITED TO LUNCH IN THE GOLD & MAROON ROOMS

Thanks to the staff of the Brooklyn College Student Center and the office of Government and External Affairs for their assistance.

Cover Photo by Kelly Eckenrode.
"Spider wasp, mounted in oil media. Imaged with a Nikon anti-mould light compound microscope. Plan-achromat, phase contrast, 40x total magnification. Brooklyn College students in the Biais lab were motivated to explore microscopy techniques after we found a dead bug in lab. This image is a product of our students' enthusiasm for scientific exploration."

BIO - 1 THE EFFECTS OF FRESH AND AGED GARLIC ON HEK 293 CELLS

Fatima Ahmed (UG), New York City College of Technology

Garlic has been widely known to be therapeutic for centuries, bringing several health benefits as well as playing a big role in preventing many diseases. It has been proven to reduce the risk of heart disease, treat hyperlipidemia, thrombosis and diabetes, while also containing anti-microbial and anti-tumor effects. Garlic and garlic extracts are also known to be linked with the reduction of cancer risk. Alongside researching garlic for medicinal purposes, aged garlic extracts is also seen as another beneficial factor in maintaining a healthy lifestyle. Kyolic is a widely known brand of aged garlic extract. It ages naturally for up to 20 months before being put on sale. The substances that are commonly found in raw garlic to be predominately inactive, substances such as, allicin are chemically transformed into 'stable and standardizable components' that are then made active. The decision to use HEK 293 cells, or better known as Human Embryonic Kidney 293, was due to them often used because of their high efficiency of transfection and protein production as well as being simple to maintain.

Support by NIH Bridges to the Baccaulaureate.

BIO - 2 EXPLORING PHAGE EVOLUTION ALONG A REPRODUCTION-MORTALITY TRADEOFF

Abraham Alex (UG) and Jeremy Draghi, Brooklyn College

Phage evolution is constrained by a compromise between seemingly unrelated life history traits. Previous work has suggested a positive correlation between burst size and mortality rate. However, the interplay between ecological and evolutionary factors that shape phage evolution along this tradeoff remain unclear. We developed and implemented a stochastic model of phage-bacteria interaction to elucidate this relationship. In this model, phages evolved with a constant mutation rate while the bacteria population remained genetically fixed. Simulation results show that, in conditions of stable bacteria equilibrium, phage burst size increases, resulting in minor disturbances in the stable host density. Evolution in such an ecological condition favors a low biodiversity in phage population as the success of a higher burst size mutant phage results in the demise of the lower burst size resident phage. However, as phage evolve higher fecundity their hosts transition from stable to cyclic dynamics, changing selection pressure on the phage. In conditions of cyclic host equilibrium, phage burst size approaches a limit, presumably due to the fact that cyclic conditions increases the probability of extinction relative to stable conditions. These results help explain diversity of phage in nature, and highlight how an evolutionary trade-off can prevent host extinction and ensure continued phage survival.

BIO - 3 USING MORPHOLOGY AND DNA TO ELUCIDATE NEW SPECIES OF DISTICHOPATHES (CNIDARIA: ANTHOZOA: HEXACORALLIA: ANTIPATHARIA)

Mercer R. Brugler and **Nadia Alomari** (UG), New York City College of Technology

During a recent (September 2017) research cruise to the Flower Garden Banks National Marine Sanctuary (NW Gulf of Mexico) aboard the NOAA Research Vessel Manta, we used the remotely operated vehicle Mohawk to collect 3 individuals of species putatively classified in the black coral genus Distichopathes (Phylum Cnidaria; Class Anthozoa; Order Antipatharia; Family Aphanipadathidae; Subfamily Acanthopathinae). Individuals were collected from Elver's Bank at around 140-172 m. We propose to apply molecular, morphological and bioinformatic techniques to reveal the identity of these newly collected black corals. To date, there are only 2 known species within the genus Distichopathes, all of which were created based solely on morphology (D. disticha and D. filix) Preliminary morphological

analysis of the specimens by Dr. Dennis Opresko (the world's leading expert on the taxonomy and systematics of black corals) suggests that one or more individuals may represent new species of Distichopathes. We are currently obtaining a genetic signature for these newly collected antipatharians using a combination of three mitochondrial gene regions (cox3-IGR-cox1, trnW-IGR-nad2, nad5-IGR-nad1; IGR = intergenic region) and 4 nuclear genes (ITS2, SRP54, 18S and 28S.) We will also explore the secondary structure of nuclear ITS2 to help refine inferred phylogenetic relationships based on mtDNA. Any new species will be described and named, and the results published in a peer-reviewed journal.
Support by NIH.

BIO - 4 STRUCTURAL ANALYSIS OF KNOTTIN-LIKE PEPTIDE IN VENOM OF PARASITOID WASP LEPTOPILINA HETEROTOMA

Joseph Arguelles (UG) and Shaneen Singh, Brooklyn College

Within Classes Insecta and Arachnida, many venom peptides take on a tertiary structure in which six cysteine residues, present in a conserved motif, create a series of entwined disulfide bonds. Called “knottins”, these peptides show promise as scaffolds for drug design, maintaining high stability while also being strongly sequence tolerant. A knottin-like peptide (LhKNOT) isolated from the venom of Leptopilina heterotoma (Lh), a wasp and generalist parasitoid of Drosophila, was analyzed through computational methods. Homologs were identified by ncbiBLAST and analyzed for sequence similarity. Homologs with known structures were identified, and secondary and tertiary structures of LhKNOT were predicted. Comparative analysis was performed, showing that while LhKNOT displays varied sequence similarity with structural homologs, the “knottin-like” secondary and tertiary structure is conserved. Understanding potential biological mechanisms of LhKNOT will require further analysis.

BIO - 5 TO EXAMINE THE EFFECT OF CALCIUM CHLORIDE AND GLUCOSE ON TETRAHYMENA THERMOPHILA

Laiba Choudhary (UG), **Sumaiyah Mahfooz** (UG) and Ralph Alcendor, New York City College of Technology

Tetrahymena is a unicellular eukaryotic cell that contains a macro- and micro- nucleus. Tetrahymena contains cilia around the cell membrane, which are hair-like structures that help with movement and allow the cell to absorb nutrients through their oral grooves. These cells eat bacteria, other cells and organic debris through the process of phagocytosis. Tetrahymena has been used extensively for research due to the fact that they have a rapid growth rate which increases the population in a short period of time. Oxidative stress is an imbalance between the production of free radicals and the ability to detoxify the harmful effects.The stressors used in this experiment are calcium chloride and glucose. Calcium is a mineral that helps the bones and teeth, also affects muscles, hormones, nerve functions, and the ability to form blood clots. Glucose is a simple sugar that is an important energy source in living organisms and is a component of many carbohydrates. The body needs insulin so that glucose in the blood can enter cells of the body where it can be used for energy. However, high or low levels of glucose and calcium can be invasive and can negatively affect the body from functioning properly. In this experiment we examined the effects of calcium chloride and glucose on tetrahymena by undergoing several procedures. The procedures included MTT assay, RNA extraction, Complementary DNA, Polymerase Chain Reaction, and Gel Electrophoresis. We plan to further study oxidative stressors and repeat the experiment.
Support by NIH Bridges to the Baccaulaureate.

BIO - 6 CULTURING OF NITROSOMONAS AND NITROBACTER FOR THE PREPARATION OF ARTIFICIAL SALTWATER AQUARIA FOR HIPPOCAMPUS ABDOMINALIS

Matthew Chung (UG), Matthew Moza, Jimiane L. Ashe and Tony B. Wilson, Brooklyn College

Several water parameters are of paramount importance when preparing for the introduction of Hippocampus abdominalis to artificial saltwater aquaria. The most important of which is the activation of bacterial genera Nitrosomonas and Nitrobacter in that they aid in nitrification to keep ammonia and nitrite levels at 0 units and nitrate levels under 40 ppm. If these bacterial genera that break down ammonia are properly cultured in an artificial marine aquarium, ideal conditions resembling the natural habitat of Hippocampus abdominalis can be achieved. Following an addition of 25% ammonia solution, the aquaria were seeded with Nitrosomonas and Nitrobacter species. A dissolved oxygen meter with a temperature gauge, refractometer, and API water chemistry kits were used to gather data. Saltwater changes were carried out when nitrate levels exceeded 40 ppm. After nearly ten weeks, ammonia levels had dropped from 8 un. to 0 un., nitrite levels rose to 5 un. then dropped back down to 0 un., and nitrate levels had risen from 0 ppm to 80 ppm. Though the desired levels of nitrogen had been achieved, it was not done so in a timely fashion, as the cultured bacteria failed to efficiently fixate nitrite. This was a result of the lower than normal temperatures in the AREAC facility due to recent snow storms, which killed much of the Nitrobacter species, thereby not only releasing high concentrations of nitrite upon lysing, but also lagging the oxidation of nitrite. The AREAC community, especially researchers starting new aquaria, will directly benefit from the methods optimized in this project.

BIO - 7 WHAT MAKES A BACTERIAL CLOCK TICK: IN SILICO ANALYSIS OF STRUCTURAL HOMOLOGY AND INTERACTIONS OF CYANOBACTERIAL KAIC PROTEIN

Muhammad S. Hasan (UG), Brooklyn College

In recent years, prokaryotes have been shown to exhibit diurnal rhythmicity in gene expression effecting metabolism and behavior. Yet unlike well characterized endogenous circadian clock responsible for eukaryotic diurnal rhythmicity, timekeeping mechanisms are less well understood among prokaryotes outside Cyanobacteria. Cyanobacteria circadian clock proteins were used as a template to guide the search for putative prokaryotic sequential and structural homologues. To this end sequential homology prediction tool BLASTP was searched for core protein oscillator KaiC and KaiB. Four Alphaproteobacterial sequential homologues were chosen for domain architecture analysis and homology based structural modeling. ATPase like domain repeats in Cyanobacteria was conserved among all four query sequences with substantial overlap in conserved catalytic and regulatory residues. Furthermore, Secondary structure was conserved as well among all sequences. Genomic search identified KaiC, KaiB and ubiquitous PAS domain Histidine Kinase protein coded at the same gene cluster in Sphingomonas: an alphaproteobacteria. Tertiary structure of these three proteins in Sphingomonas was modeled utilizing homologous templates in SWISS MODEL. KaiB in Sphingomonas exhibits a conserved Thioredoxin fold, without conserved Cysteine residues similar to other reports among Proteobacteria. Protein-Protein interaction using docking platform ClusPro has confirmed interaction among KaiC and KaiB in Sphingomonas, similar to Cyanobacteria. The analysis so far points to divergent pathway to time keeping among distantly related bacterial species.

BIO - 8 CONDITIONS THAT PROMOTE THE SUB-CELLULAR MIGRATION OF NUCLEOLIN TO THE CELL SURFACE ABSTRACT

Calvin Huynh (HS), Midwood High School and Anjana Saxena, Brooklyn College

Nucleolin (NCL) is an RNA-binding phosphoprotein that regulates a variety of cellular processes including chromatin remodeling, transcription, ribosomal biogenesis, cell proliferation, and death. NCL is predominantly localized in the nucleoli and has post-transcriptional and translational controls in the cytoplasm. However, in a myriad of carcinomas, overexpressed NCL resides on the cell surface. Studies have suggested that NCL exits the nucleoli to nucleoplasm under various stress conditions and that surface NCL binding to extracellular ligands is a calcium-dependent phenomenon. In this study, we further dissect to identify the conditions that trigger the mobilization and sub-cellular distribution of NCL.

BIO - 9 THE JOURNEY OF LEADERLESS GAPDH SECRETION FROM SACCHAROMYCES CEREVISIAE CELL INTERIOR TO CELL EXTERIOR

Sarah M. Jadoo (UG), **Brianne Philippe** (UG), Michael Cohen and Peter N. Lipke, Brooklyn College

Glyceraldehyde-3-Phosphate Dehydrogenase (GAPDH) is an enzyme located in the cell wall and cytosol of Saccharomyces cerevisiae. GAPDH is a key enzyme in glycolysis and converts glyceraldehyde-3-phosphate (G3P) into 1,3-bisphosphoglycerate acid while removing hydrogen from G3P. Yeast cell genes TDH1, TDH2, and TDH3 all encode GAPDH. This protein does not contain a signal peptide and does not follow the classical secretion pathway. Therefore, the goal of this project is to determine how GAPDH arrives to the cell wall from the cytosol without utilizing a signal peptide. Certain genes are involved in translocating GAPDH to the cell surface. The concentration of GAPDH located on the cell surface of a wild type yeast strain will be compared to knockout genes that may play a role in helping GAPDH travel from the cytoplasm to cell exterior. Specific genes were removed to observe the cell response which allows us to determine what would occur when the gene is normally present. Genes that don't play a role in translocation of GAPDH to the cell surface will keep the concentration of GAPDH constant. However, genes that are involved in its translocation to the cell surface will change the concentration of GAPDH present on the cell surface. We screened yeast strains missing vps8 and bro1 genes, and observed the amount of GAPDH activity in the mutants compared to wildtype at different timepoints over the course of 90 minutes. In the 30 minute, 60 minute, and 90 minute assays for GAPDH activity, we measured more GAPDH in the cell wall of a vps8 knockout and less GAPDH in the cell wall of bro1 and vp21 knockouts compared to the wildtype. Therefore, vps8 possibly plays a role in GAPDH translocation whereas bro1 and vp21 are not responsible for GAPDH accumulation in the cell wall.

Support by NIH MARC and NSF LSAMP.

BIO - 10 MECHANISMS REGULATING CENTRIOLE ENGAGEMENT DURING MALE MEIOSIS IN C. ELEGANS

Anthony James (UG), Eli Lessman and Mara Schvarzstein, Brooklyn College

Centrosomes contain two orthogonally connected microtubule-based centrioles that nucleate, organize microtubules and aid the formation of cilia and flagella. Defects in centriole structure or number are associated with poor prognosis in cancer patients and causing genetic and developmental disorders. Two centriole duplications occur during male meiosis in humans and C. elegans. Connected centrioles in sperm are crucial for the C. elegans embryo's first division. We identified a mechanism regulating centriole association in meiosis II. To assess the role of genes that may play a role in regulating centriole

engagement, we quantified abnormal centriole separation severity in the sperm of wild-type, single and double mutants. After visualizing the centriole defect with high/super-resolution microscopy of immunostained sperm, we found that SGO-1 and HTP-2 proteins prevent centriole disengagement. A sep-1 gain of function mutation causes abnormal centriole separation in sperm. Comparisons between single and double mutants suggest a genetic interaction between sep-1 and sgo-1, sep-1 and htp-2, and sgo-1 and htp-2. The sep-1;sgo-1 double mutant has somatic gonad and germ cell morphology defects, which don't affect the fertility of the mutant in fecundity assays. This suggests the independence of this phenotype from the observed germ-line phenotype. Our results support the hypothesis that SGO-1 and HTP-2 prevent SEP-1 from separating centriole pairs during and after the second meiotic division. We plan to test the function of HTP-2 and SGO-1 in temporally separated pathways. This will expand our knowledge of genetic interactions regulating centriole association during and after the second division, as well as the mechanisms regulating centriole duplication in meiosis.
Support by NIH MARC.

BIO - 11 DETERMINING THE STRUCTURE AND FUNCTION OF A LEPTOPILINA HETEROTOMA VLP KNOTTIN-LIKE PROTEIN

Shanjida Kamal (HS), Midwood High School and Shaneen Singh, Brooklyn College

Knottins are defined as small disulfide-rich proteins characterized by a specialized and unusually stable structure. Knottins have become important to drug design and therapeutic treatment because of their stability and ease of their chemical synthesis due to their small size. A knottin-like protein extracted from the venom gland of the wasp Leptopilina heterotoma (Lh) which infects the fruit fly was characterized by computationally modeling its three dimensional structure. The model was constructed using template based modeling using the known structure of ALO, a new knottin-type antifungal peptide from the insect Acrocinus longimanus (Harlequin beetle) as a template. Since the three dimensional structure of Lh knottin-like protein is unknown, this theoretical model provides new insight as to its function and allows for rationally designed experiments to test the predictions of functional annotations of this protein. Modeling the structure of the Lh knottin-like protein, and finding its mode of action can prove to be very useful in the future of drug design and therapeutic treatments and may extend to other fields such as pest control.

BIO - 12 DO SELECTIVE BLOCKERS OF BRAIN CELL CHANNELS INTERFERE WITH ION-SELECTIVE MICROELECTRODES ABILITY TO QUANTIFY IONIC CONCENTRATIONS?

Sierra L. Louis-Gene (UG), Brooklyn College and Robert Colbourn, SUNY Downstate College of Medicine

The extracellular space (ECS) is the external environment of brain cells that mediates intercellular communication through diffusion. The ECS volume plays a large role in determining the onset of seizure activity. Disturbances of the ECS cause excessive neuronal firing, generating epileptiform activity, which is similar to a seizure in a brain but instead occurs in a brain slice. Our lab is interested in dynamic volume changes (DVCs) synchronous with neuronal discharge during a seizure. The term DVCs represent our lab's discovery of volume changes occurring simultaneously with epileptiform activity. The ECS displays DVCs through the shrinkage and expansion occurring with epileptiform discharges in brain tissue. We believe that introducing blocking agents, which block ion channels in the brain, might inhibit the DVCs and synchronous neuronal discharge during epileptic seizures. The discovery of DVCs relied on fabrication of ion-selective microelectrodes (ISMs) which measure concentrations of the ECS marker

tetramethylammonium during epileptiform activity. After each fabrication, we perform a series of quantitative calibrations, which are necessary to insure that the ISM's functional integrity is maintained. To determine if the blocking agent is poisonous to the ISM, we compare ISM calibrations before and after its exposure to the blocker. So far, BaCl2 and bumetanide have not tampered with the ISM. Future directions include using these blockers in brain slice experiments. We hypothesize that blocking channels with these agents will result in changes in the pattern of DVCs in the brain's ECS. This will help us determine if those channels affect epileptiform activity and how necessary they are to DVCs.

BIO - 13 SHEAR FORCE-DEPENDENT CHANGES IN GENE EXPRESSION IN CANDIDA ALBICANS

Rabia Mehmood (UG), **Jensine Sajan** (UG) and Peter N. Lipke, Brooklyn College

The most common human fungal pathogen, Candida albicans, colonizes the human gastrointestinal tract and causes systemic infection. Adhesins, which are proteins found on the fungal cell surface, allow Candida albicans to adhere to host cells, thus beginning the first step of infection. These adhesins have amyloid-forming sequences. Amyloid formation can be induced by applying force to C. albicans cells, and application of force also increases biofilm formation. The purpose of this experiment is to identify a change in gene expression as a result of applied force. Shear force was applied to yeast cells for 2 minutes by vortex mixing, followed by an expression period of 40 minutes. Then, RNA was isolated and any contaminating DNA was digested before cDNA synthesis. Next, qRT-PCR was performed to compare the number of replication cycles of TEF1 to the experimental genes. Our prediction, based on our preliminary Nanostring results, that IHD1, CIT1, ENA21, and PHR1 would show upregulation of gene expression in response to applied force is supported by our PCR results. Furthermore, our prediction that GPD1, PFK1, RHR2, and DDR48 would show downregulation in response to applied force is also supported by our results. Therefore, application of shear force to C. albicans alters the transcriptional program.

BIO - 14 IDENTIFYING THE FUNCTION OF NOVEL SEQUENCES FROM LEPTOPILINA HETEROTOMA

Simran Patel (UG), **William Fong** (UG) and Saba Shokat Fadaii, Brooklyn College,

Leptopilina is a genus of parasitoid wasps whose natural host is Drosophila melanogaster. Spiked virus-like particles (VLPs) in wasp venom have been linked to their successful parasitism. However, these VLPs lack structural viral proteins associated with most VLPS but instead possess a pharmacopoeia of the eukaryotic vesicular transport system, immunity, and previously unknown proteins. Proteins specific to L. heterotoma VLPs possess sequence similarities with bacterial secretion proteins, specifically the needle tip invasin proteins SipD and IpaD of Gram-negative bacteria type-3 secretion systems that breach immune barriers and deliver virulence factors into mammalian cells. Because Lh VLPs are both eukaryotic and prokaryotic in nature, the term mixed-strategy extracellular vesicle (MSEV) has replaced VLP to give a more accurate representation of these sequences. In our study, we are identifying proteins similar to the novel sequences obtained from Lh to determine the functions, biological structures and role in biological pathways of these sequences. The primary structure was analyzed using BLAST and HMMER; the secondary structure was analyzed using the SYMPRED; the tertiary structure was analyzed using PHYRE2, Swisspro, LOMETS, and ITASSER; and the tertiary structure models were evaluated using VoroMQA, Verified 3D, ProSA-Web, ProQ3. Based on the results obtained from these programs, the tertiary structure prediction for seven novel sequences was found to be significant. Each model correlated with the secondary structure prediction. However, the evaluation programs scored some of the models in an insignificant range. Further research needs to be done to verify the validity of the structure of the models.

BIO - 15 SPATIAL SIMULATIONS PREDICT SPECIALIST-GENERALIST HOST CHOICES

Monica Saw-Aung (UG) and Jeremy Draghi, Brooklyn College

How parasites evolve to use different hosts presents an evolutionary puzzle. Although theory predicts that parasites benefit from accepting a wide range of hosts, reality shows that parasites often choose a narrow range instead. To better understand this “choice," our study simulates a spatial environment in which parasites encounter two types of hosts: specialists and generalists. In these simulations, specialist and generalist parasites compete under different conditions to test whether spatial correlations between hosts can select for choosy parasites. The results from our spatial model employ population dynamics to show that specialist parasites outcompete generalists, meaning that being a picky parasite confers a proliferative advantage over time. Our findings illuminate how the evolved behaviors of diverse pathogens came to be, including subtleties of evolved “choices” made by simple organisms like bacteriophage.

BIO - 16 THE CORRELATION BETWEEN THE SURVIVAL RATE AND THE POINT MUTATION IN NEISSERIA GONORRHOEAE

Olga Tsygelnytska (UG) and Nicolas Biais, Brooklyn College

The study focuses on identifying an amino acid in the pilin gene of Neisseria gonorrhoeae that, if affected, may impact the survival rate of the bacterial colonies. In order to do so, two strains with different survival rates are used - wild type, and a delta pilT, in which the pilin gene has been modified in a way that the bacterial cells cannot retract their pili (Type IV pili), but can still attach to the surfaces and to each other (to form colonies). Using Ethyl Methanesulfonate (EMS), both of the strains are further modified via mutagenesis, in which random mutations may occur throughout the genome. The modified strains (revertants) are tested via the survival assay and compared to the sequence of the pilin gene. Based on the current results, there is one particular mutation in the DNA sequence, which causes a point mutation in the amino acid pilin gene sequence that correlates with the change in the survival of the gonococcus. However, further studies are being done in order to check whether the point mutation in the DNA sequence is the only one in the genome that impacts survival of N. gonorrhoeae, or whether more mutations are accumulated in the other genes that jointly may affect the results.

BIO - 17 DETERMINING THE SPECIES AND SEX OF BIRD VISITORS TO THE CANARSIE PIER AND PROSPECT PARK IN NEW YORK CITY USING DNA EXTRACTED FROM MOLTED FEATHERS

Randy Valcourt (UG) and Terisha Persaud, New York City College of Technology

For our project we will be conducting DNA exams on feathers found in Canarsie Pier and Prospect Park. Using DNA extraction methods we seek to identify what bird species that are in these locations and we also seek to identify the sex of the birds. Additionally we will be conducting a sub experiment to find which part of the bird feathers we collected will have a high concentration of DNA. The parts will be looking at are the Rachis, Barbules, and the upper and lower calamus. We got the idea of doing this sub experiment when we read a few scholarly manuscripts on DNA test on birds. One of these manuscripts was Feather barbs as a good source of mtDNA for bird species identification in Forensic wildlife investigation.

BIO - 18 CHARACTERIZING THE MSHA PILUS IN VIBRIO CHOLERAE

Aneesa R. Valentine (UG)[1], Kyle Floyd[2], Jinhwan Park[2], Fitnat Yildiz[2] and Nicolas Biais[1]
[1]Brooklyn College
[2]University of California at Santa Cruz

Most bacteria and archaea possess hair-like appendages called pili with a high level of conservation across these two domains of life. These structures, analogous to prokaryotic “swiss army knives” in their functional versatility, aid in many processes including but not limited to; DNA uptake, electric conductance, motility, cell surface adhesion and by extension - infection. After adhering to a surface through extension, bacteria are able to retract their pili generating significant levels of force in their environment. The present study seeks to investigate the retraction force of the mshA pilus of Vibrio cholerae by combining biophysical micropillar assays with genetic engineering of Vibrio cholerae strains, ultimately resulting in the biophysical characterization the mshA pilus.

BIO - 19 FUNCTIONAL ANALYSIS OF DUNC-115 & MODELING PARKINSON'S DISEASE

Cyrano Yee (UG), Rabina Lakha, Natalie Ryabenkova, **Tahir Mumtaz** (UG), Jason Sajan, Roberto Gomez and Qi He, Brooklyn College

A critical step in the development of the central nervous system (CNS) is the navigation of growth cones during axonal pathfinding. While significant understanding has been achieved where major guidance mechanisms are elucidated, many important components essential for relaying the guidance cues to different interior destinations especially targets involving the cytoskeleton of the neuron remain elusive. Our previous work has shown that the Drosophila protein Dunc-115, a homolog of the worm Unc-115 and human abLIM, is involved in the axon projection in the CNS and the visual system. Upon further analyses, we have also demonstrated that Dunc-115 is capable of binding to actin filaments and thus an actin-binding protein. Coupled with its role in axon guidance, Dunc-115 is most likely functioning through regulating actin filaments during the CNS development. There are three Dunc-115 isoforms (Dunc-115S, M and L) in Drosophila from our previous data and only one of them, Dunc-115L contains the actin binding domain VHD. Our actin binding assays have shown that it is Dunc-115L that can actually binds to actin and the binding is mediated by the VHD domain. It had not been possible to assess individual isoforms’ functions due to the lack of technical means to generate isoform specific knockouts. This barrier has been lifted with the availability of the CRISPR-Cas9 based mutagenesis in Drosophila. We have recently utilized this approach to first generate the VHD domain deleted animals and used those mutated flies to conduct neuromuscular function analyses. Our data are consistent with Dunc-115’s actin binding capability and its potential role in neurodegenerative diseases such as the Parkinson’s.

CHEM - 1 SYNTHESIS OF ENOL ETHER LINKER SENSITIZER DRUG CONJUGATE

Callistus C. Chiemezie (GRAD), Goutam Ghosh and Alexander Greer, Brooklyn College

Synthesis of enol ether linker sensitizer drug conjugate Callistus C. Chiemezie, Goutam Ghosh, Alexander Greer Department of Chemistry, Brooklyn College, Brooklyn, New York 11210, United States and Graduate Center, City University of New York 365 5th Ave, New York, NY 10016 Abstract Herein we report the synthesis and development of an enol ether linker compound that can be used as a cleavable bridge between a sensitizer and drug. The synthesis of this linker compound is the initial goal of the project. Namely, a reaction of p-bromophenol and 1,2-dibromoethane leads to the formation of 1,2-bis(4-bromophenoxy)ethane. Subsequent bromination and olefination affords access to cis-1,2-bis(4-bromophenoxy)ethane which can be reacted with dimethylformamide to yield (Z)-4,4-(ethene-1,2-diylbis(oxy))dibenzaldehyde. We have reached the third step in this five step synthesis. We are planning to carry out a reduction of (Z)-4,4-(ethene-1,2-diylbis(oxy))dibenzaldehyde which affords the enol ether sensitizer drug conjugate. The enol ether drug conjugate can be used as a labile linker for drug delivery in the treatment of cancer. A prodrug can be cleaved upon irradiation to remove the enol ether protection and release the active drug. In our previous work we have shown that the enol ether linkage reacts with Singlet oxygen releasing sensitizer upon fragmentation of a dioxetane intermediate.

CHEM - 2 SUPERHYDROPHOBIC PHOTOSENSITIZERS: AIRBORNE 1O2 KILLING OF A IN-VITRO ORAL BIOFILM AT THE PLASTRON INTERFACE

Goutam Ghosh (POSTDOC)[1], Smruti Pushalkar[2], QianFeng Xu[3], Yang Liu, Ashwini A. Ghoghare[1], Cecilia Atem[4], Alexander Greer[1], Deepak Saxena[2] and Alan M. Lyons[5]
[1]Brooklyn College
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Singlet oxygen is a potent agent for the selective killing of a wide range of harmful cells; however current delivery methods pose significant obstacles to its widespread use as a treatment method. Limitations of current singlet oxygen delivery methods include: the need for direct contact of photosensitizer molecules with tissue; the short (3.5 μs) lifetime of the excited state in contact with water; the strong optical absorption of the photosensitizer, which limits penetration depth; and hypoxic environments, such as those found in deep periodontal pockets, that restrict the concentration of available oxygen. In this article, we describe a novel superhydrophobic singlet oxygen delivery device for the selective inactivation of bacterial biofilms. This treatment approach relies on transport of singlet oxygen from sensitizer particle surfaces, across the plastron, to the biofilm thereby preventing direct contact between sensitizer molecules and the organism. This approach precludes limitations due to oxygen diffusion, optical absorption, tissue sensitization and potential toxicity. The superhydrophobic surface was synthesized by partially embedding sensitizing particles on polydimethylsiloxane printed posts, capped with silica nanoparticles to prevent direct contact of sensitizer with the bacterial biofilm. Gaseous singlet oxygen is generated on sensitizer particle surfaces in the plastron of the superhydrophobic surface upon irradiation with visible light, and transported to inactivate Porphyromonas gingivalis biofilms on hydroxyapatite discs as monitored by colony counting and LIVE/DEAD staining. The biofilm killing efficiency correlated to the amount of singlet oxygen detected in a separate reaction with 9,10-anthracene dipropionate dianion.
Support by NIH National Institute of Dental and Craniofacial Research.

CHEM - 3 SOLUTION AND SURFACE PHOTOCHEMISTRY: NEW AVENUES FOR THE SENSITIZED Photooxidation of Peroxides

Sarah J. Belh[1], Niluksha Walalawela[1], **Stas Lekhtman**[2] (UG) and Alexander Greer[1]
[1]The Graduate Center of CUNY
[2]Brooklyn College

Photosensitized oxidation is highly complex. Many mechanisms take place forming a variety of reactive oxygen intermediates. As a means of simplifying this study we focused on a single component mechanism of photosensitized oxidation. Minimal direct absorption of irradiation by the peroxide is hypothesized to be necessary to examine homolysis exclusively due to energy transfer from a photosensitizer. The O-O bond dissociation energy (BDE) is also hypothesized to be low for it to be cleaved due to sensitization. In this poster we present our study of 4,4'-dimethylbenzil sensitized decomposition of di-tert-butyl peroxide, dicumyl peroxide, and dibenzoyl peroxide in solution phase as well as on a silica surface. After one hour of irradiation by $\lambda > 300$ nm light, the degree of sensitized decomposition for di-tert-butyl peroxide and dicumyl peroxide is about four to seven times that of dibenzoyl peroxide. In the case of di-tert-butyl peroxide and dicumyl peroxide, there is a correlation between the BDE and the degree of decomposition due to photosensitization. However, dibenzoyl peroxide does not exhibit the same correlation due to its liability to direct absorption of irradiation. The fraction of peroxide decomposition attributed to sensitization is high for both dicumyl peroxide (91%) and di-tert-butyl peroxide (90%), and slightly lower for dibenzoyl peroxide (74%). This highlights the difficulty in studying the sensitized decomposition of peroxides with fragile O-O bonds, such as dibenzoyl peroxide. The results of this study provide an insight into understanding photooxidative aging taking place in materials, such as plastics, and in biological materials.

Support by NSF.

CHEM - 4 POST-TRANSLATIONAL HISTONE MODIFICATIONS IN C9ORF72-ASSOCIATED ALS

Marcella Meykler (UG) and Mariana P. Torrente, Brooklyn College

Amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD) are progressive neurodegenerative diseases associated with protein misfolding and aggregation that lead to neuronal cell death. Chromosome 9 open reading frame 72 (c9orf72) is the most common genetic mutation observed both in familial and sporadic cases. C9orf72 contains nucleotide repeat GGGGCC. In c9orf72 ALS/FTD patients, the nucleotide repeat may be expanded to several hundred or thousands of repeats. By way of unconventional repeat-associated non-ATG translation, the nucleotide repeats are translated into dipeptide repeat proteins (DPRs). Arginine-rich DPR's, mainly Gly-Arg (GR100) and Pro-Arg (PR50) seem to be particularly toxic and aggregation prone. The exact mechanisms linking DPR toxicity to the development of ALS remain unknown. Eukaryotic DNA is wrapped around an octameric histone core formed by one H3-H4 tetramer and two H2A-H2B dimers. The N-terminal tails of histones are subject to many post-translational modifications (PTMs). PTMs modify the interaction between the histone and DNA, either activating or suppressing gene transcription. Saccharomyces Cerevisiae has been used as a model system for human neurodegenerative diseases. At the cellular level, key processes are conserved between yeast and humans, making yeast an efficient and accessible way of studying human neurodegenerative disease. Cytotoxic DPRs are overexpressed in yeast, and western blotting techniques with antibodies for specific PTMs are used to qualitatively detect changes between control yeast, and yeast overexpressing DPR. Elucidating the epigenetic mechanisms that associate with DPR toxicity will allow us to test compounds that can reverse these PTMs, reverse DPR toxicity and prevent neuronal cell death in ALS.

Support by NIH.

CHEM - 5 SYNTHESIS AND CHARACTERIAZATION OF FLUORINATED ALKYL CHAIN PTERIN

Derek C. Perry (UG) and Niluksha Walalawela, Brooklyn College

Pterin is a naturally-occurring compound that can function as a photosensitizer and generate reactive oxygen species, such as singlet oxygen. Here, we describe the synthesis of a new pterin derivative, namely a fluorinated alkyl chain [−CH2CH2C10F21] pterin conjugate. We have synthesize it and are currently spectroscopically characterizing it. The synthesis of the fluorinated pterin involved a nucleophilic substitution (SN2) reaction for the regioselective coupling of the fluorinated alkyl chain to the O4- or N3-sites in pterin. Interestingly, an additional adduct was obtained from an N-amine condensation of dimethyformamide (DMF) solvent molecule as a byproduct. This fluorinated alkyl chain pterin is hypothesized to be soluble in 2-phase aqueous fluorous media, where increased singlet oxygen in the fluorous phase may reach the water phase where no pterin sensitize resides. Work on a novel concept of fluorous biphasic photocatalysis is ongoing.

CHEM - 6 INTERACTION OF IONOPHORIC POLYPHENOLS WITH HUMAN SERUM ALBUMIN (HSA)

Alberto Martinez, Miguel Gomez and **Sinji Shibutani** (UG), Brooklyn College

The distribution, excretion, activity and toxicity of a drug are determined, at least in part, by its interactions with serum proteins. Human serum albumin (HSA), the most abundant blood plasma protein, reversibly binds pharmaceuticals, mainly at the hydrophobic cavities of subdomains IIA and IIIA. In previous work we have synthesized and studied important aspects of a series of ionophoric polyphenols as potential anti-Alzheimer's disease agents. As part of our ongoing investigations on the biological activity of these compounds, we are exploring now possible transport mechanisms. In line with this, the interaction of the ionophoric polyphenols with HSA has been studied by fluorescence and circular dichroism (CD) spectroscopies to obtain binding affinities, bimolecular quenching constants, theoretical number of binding sites, and HSA secondary structural changes. Using resveratrol, a polyphenolic reference which has demonstrated strong neuroprotective and anti-Alzheimer disease properties, as a control, preliminary results suggest the formation of adducts (static quenching), one theoretical binding site, and binding constants ranging within the 104 to 106 M-1 degree of magnitude between HSA and the ionophoric polyphenols. In addition, CD results show slight modifications on the secondary structure of the protein. Overall, our results seem to suggest that there is a compound-drug interaction which could have a potential impact on transporting capabilities between HSA and the ionophoric polyphenols.

CHEM - 7 CIRCULAR DICHROISM SPECTROSCOPY: PROFILES OF BOVINE AND HUMAN SERUM ALBUMIN

Malyka Valentine (UG), Dianna Samaroo and **Diana Landi** (UG), New York City College of Technology

circular dichroism (CD) spectroscopy was employed to determine the folding properties of proteins (bovine and human serum albumin, BSA and HSA, respectively and if possible calf-thymus DNA). This technique will determine the folding structure: secondary or tertiary structure (alpha or beta-sheets) of the proteins. We optimized the conditions of CD spectroscopy by looking at different buffers and concentration. We report in this presentation our findings in comparison to literature. BSA and HSA are predominantly alpha helices.

Support by NIH.

CIS - 1 POSSIBLE BIAS AGAINST ALGORITHMIC (AI) MUSIC

Alyssa C. Caputo (UG), Brooklyn College

Music is highly valued in society, recognized as a fine art and a creative talent. It is a part of "the humanities," placed in opposition to "the sciences;" but what happens when the sciences learn to create the arts? Does this diminish the creativity of the art? Or show how advanced the sciences have become? I have researched algorithmic composition using artificial intelligence and its affects on the perception of music. Algorithmic composition is a method of music composition in which music is created from a set of rules without human intervention. This method has been used for centuries, but in today's age, it is combined with AI to enable computers to do the decision-making in the composition process. The question that I have addressed is: is there a bias against algorithmic (AI) music? To answer this question, I conducted an experiment in which participants listened to one chorale composed by Johann Sebastian Bach and one chorale composed by EMI (Experiments in Musical Intelligence), an AI system created by David Cope. The participants answered 20 questions on a scale from 1 to 10, such as "how emotional did this song sound to you?" The control group did not know the composer of the pieces, which gave a baseline rating of the songs. The experimental group did know the composer identities. Overall results show a trend towards bias against EMI's music and a bias towards Bach's music; however, when analyzed using ANOVA, the differences for most of the attributes were not strong enough to be considered statistically significant. One significant result was that EMI's music was less likely to be seen as a work of art than Bach's music when the composer names were provided. This may be an indication that the line between science and art will be blurred in the future.

CIS - 2 ARTIFICIAL INTELLIGENCE AND THE GAME ANTI-SET

Philip W. Gringer (UG), Brooklyn College

ANTI-SET is a turn based variant of the popular card game SET. Both games have fascinating mathematical properties that span fields from abstract algebra, combinatorics, linear algebra and more. In my research I explored strategies for an Artificially Intelligent agent to play ANTI-SET. Methods based on the mathematical symmetries of the game were explored as well as cutting edge General Game Playing algorithms such as Monte Carlo Tree Search (MCTS). Inspired by research using MCTS for games such as Go I explored the use of many statistical heuristics and their advantages and disadvantages for the game of ANTI-SET.

CIS - 3 EXTRACTING DRUM SOUNDS FROM A SONG USING CONCATENATIVE RESYNTHESIS

Xiaowen Huang (UG), Brooklyn College

While human listeners can effortlessly attend to one instrument in a song, machines have difficulty with this task. An automatic system that can separate out a recorded song into recordings of individual instruments could be used in music production, music listening, and music education, among other applications. The current project focuses on estimating and separating the drum part from professionally produced songs. It is based on an existing project, "concatenative resynthesis", which separates clean speech from a noisy background. The speech system improves subjective speech quality evaluations by up to 50 percentage points compared to a baseline system. The current project utilizes the same approach to extract drum sounds from a song. It takes the original song as the noisy input and a music track that contains only drums as the clean reference. We have expanded upon the original system by utilizing traditional source separation techniques before applying our resynthesis system. We also determine a threshold point so that the existing project can work better with the repetitive nature of drum sounds. The current results are promising, the output picks up certain rhythm and beats of the original drums and the rest of the instruments are eliminated.

CIS - 4 CONCATENATIVE RESYNTHESIS FOR EXTRACTING BASS PARTS FROM SONGS

Dzmitry Y. Kasinets (UG), Brooklyn College

This project is based on an existing system that can remove noise from speech recordings. It uses a collection of clean speech signals and a deep neural network to resynthesize clean speech from noisy observations. This approach is called Concatenative Resynthesis and can produce extremely high-quality enhancements. The goal of the current study is to create a system to take a song as an input and return the song's bass part as output. To do so, we will use Concatenative Resynthesis, which requires creating new features and finding a configuration that can successfully resynthesize the bass part. Our experiments are performed on the MedleyDB dataset, a corpus of over 100 multitrack recordings. This means that each song is provided as the final product, along with all of the recordings of individual instruments that were combined to make it. This lets us choose a test song with good bass and train the network on more songs with bass to resynthesize the test song's bass part. To do this, we tried Gammatone Filterbank feature, and later created a custom one. We evaluate the results by comparing them to the actual bass recordings. We plan to evaluate the system by creating a survey that compares it to other approaches. Preliminary listening tests suggest that it is able to resynthesize bass with high audio quality, rhythm and pitch accuracy if it is trained on parts of itself in addition to different songs. It can resynthesize bass with good audio quality, rhythm and pitch accuracy if trained only on different songs. This project is valuable because it has the potential to create much higher quality separations than current approaches, which could enable new musical applications of this promising source separation technique that has so far been applied only to speech.

CIS - 5 CRISIS AND RELIEF ENGAGEMENT (CARE) APPLICATION

Antara Khan (UG) and **Nishat Anjum** (UG), Brooklyn College

The mission of our web app, Crisis And Relief Engagement (CARE), is to help the survivors of natural disasters by displaying aid and resources available in a given location. The aftermaths of natural disasters tend to be disorganized and difficult to manage. Often, there is an abundance of resources that survivors are unaware of due to the chaos. As a result, it takes longer for survivors to gain the help that they need. We want to utilize the real-time aspect of Twitter to help natural disaster survivors find immediate resources. This tool would be manifested in the form of a webapp and the main technologies would be the GoogleAPI, Twitter API and D3.js. Our application makes it easier for victims of a crisis to find resources to aid them by providing the latest information and visual display. As a result, our users will be able to be familiar with resources nearby due to the google api module. Also, the latest tweets from twitter about the current crisis would display according to twitter's hashtag. Lastly, the d3.js map would help inform the victims visually with a heat map.

CIS - 6 ERROR ANALYSIS AND CALIBRATION OF SERVO CONTROL IN A 6-LEGGED HEXAPOD ROBOT

Eric Li (UG) and Frank W. Grasso, Brooklyn College

Legged robots are capable of navigation in complex terrain. However, their control is non-linear in realistic (non-laboratory) environments. Artificial neural networks are a practical method for learning non-linear control mechanisms in an arbitrary body and to produce non-linear control in multi-joint limb coordination. We explored neural network control in a hexapod robot which had 3DOF each of its six limbs (A -horizontal control, B- vertical control and C- a second level of vertical control). We developed a control program in C++ to support walking behavior in the hexapod robot. In a positional control error analysis, the position of C depends on A and B, and the position of B depends on A. We undertook an error analysis to find a calibration for accurate limb placement. We found significant interactions between the three

joints that influenced the position control of the limb. To manage positional error, we found an empirical relationship in the limb that indicated quadratic control of the error on the first DOF would increase positional accuracy to an acceptable level. This simple error-correction scheme in a 3DOF limb will be used to ground truth the neural-network control for our Hexapod robot locomotion.

CIS - 7 BEAMFORMING WITH NEURAL NETWORKS

Oleksandr Loyko (UG) and Michael I. Mandel, Brooklyn College

Automatic speech recognition (ASR) works well in close conditions, but far-field ASR is still puzzling engineers. Because of the great amount of interference affecting the signal, researchers are constantly looking for ways to improve in this area. The goal of my research is to assess the efficiency of the latest techniques available for far-field signal processing when applied to CHiME-3 datasets, which contain multi-channel recordings featuring a variety of noisy environments and different speakers. Beamforming with neural networks will be implemented, which is an evolving trend in ASR that has already proved useful. Using neural networks for beamforming has shown to be better than the traditional approach to beamforming through localization. Beamforming will be implemented based on Xiong Xiao's approach described in his "Deep Beamforming Networks for Multi-Channel Speech Recognition". The author shows the applicability of using deep beamforming networks for the prediction of weight assignments to each of the channels, and thus making the signal that enters the speech recognition algorithm itself cleaner. Once implemented, the performance of the approach will be assessed and the results will be compared to that of the traditional beamforming.

CIS - 8 CREATING PRIVATE VOICE RECORDINGS USING ACOUSTIC ECHO CANCELLATION

Michael I. Mandel and **Christian Sarcona** (UG), Brooklyn College

The purpose of this project is to build a system to increase privacy when using voice-based technologies, specifically, a voice memo recorder. By playing a known noise signal from the recorder while recording the memo, nearby people cannot overhear the speech, but the noise can be removed from the recording after the fact using standard signal processing techniques. We have developed an iOS app to allow the recording of a voice memo while playing a known noise sample and made several test recordings with it, verifying the increase in privacy. We have developed software in MATLAB that applies adaptive filters such as the Least Mean Squares and Recursive Least Squares filters to these recordings to remove the noise, verifying that the original noise-free speech can be recovered from the recordings. While the current application is to voice memos, the same technique can also be applied to increase the privacy of phone calls, digital assistant interactions, and automatic speech recognition.

ENG -1 THE EFFECTS OF DIFFERENT SIMULATED ENVIRONMENTAL FACTORS ON THE VOLTAGE PERFORMANCE OF MICROBIAL FUEL CELLS WITH VARYING ANODE-EMBEDDING DEPTHS

Joyce Chow[1] (HS), **Ivy Li**[1] (HS) and Domenec Paterno[2]
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The microbial fuel cell (MFC) is a new technology that may have the ability to provide electricity for underdeveloped countries in an eco-friendly way. This research was conducted to study the effects of different microbes on the voltage of an MFC. Five MFCs, each with different anode-embedding depths, were created. For each tests, either a 1.25 g/L sodium acetate solution, a Volvox algae solution, or an Anabaena algae solution was added to the cells. Using a Vernier LabPro, the voltage of each MFC was recorded every hour for 7-30 days. The results of this study showed that MFCs produced a relatively low voltage; however, several relationships between environmental factors and voltage response can be seen. As temperature increased, the voltage of the MFCs increased. The addition of aeration stones, which oxygenated the solutions, also lead to an increased voltage. This study may not be aimed that producing a high voltage, but it is a step forward to understanding the effects that environmental factors have on MFCs.

MATH - 1 UNFOLDING POLYHEDRA

Eric S. Loucks (UG) and **Alisa Leshchenko** (UG), Brooklyn College

We construct covers of prisms and Archimedean solids using an ‘unfolding’ process, as well as minimal tessellating subsurfaces for these shapes. Additionally we present an algorithm for generating these minimal tessellating subsurfaces for prisms and Archimedean solids. We also explore ideas for extending the method to arbitrary polyhedra.

ENV - 1 A HEATED ATMOSPHERE: DRIVING FORCES IN AMERICAN ATTITUDES TOWARDS CLIMATE CHANGE

Audrey W. Bleier (UG), Brooklyn College

Anthropogenic climate change poses serious challenges to our present and future life on Earth, and yet many Americans are unaware that climate change even exists, or remain unconvinced of its urgency. A 2016 study by the Pew Research Center found that just half of Americans know climate change is driven by human activity, and only 36% are deeply concerned about the issue. Additionally, there is a significant partisan divide on this topic between Democrats and Republicans. As education level increases, Democrats become more concerned about climate change, while Republicans grow more skeptical. This project explores factors associated with these major differences in American perceptions of climate change. From a psychological perspective, people tend to accept the dominant viewpoint in their social sphere, leading to large regional differences in attitudes. Other variables found to be significant in shaping public attitudes include the influence of political orientation and worldview, lobbyist groups, climate scientists, the media, and variations in public school science standards. Research on this topic is of critical importance as opinions on climate change influence how people vote and decide American domestic and foreign environmental policy.

ENV - 2 COLD METHANE SEEPS AS POSSIBLE REFUGES FROM ASH FALLS: EVIDENCE FROM THE UPPER CRETACEOUS PIERRE SHALE, SOUTH DAKOTA

Shannon K. Brophy[1] (GRAD), Matthew P. Garb[1], Neil H. Landman[2], Jamie Brezina[3], Jone Naujokaityte[1] and Brianna P. Hafner[1]
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The Pierre Shale is well exposed in southwestern South Dakota, USA. A series of siltstones and mudstones represents offshore sedimentation in the Late Cretaceous Western Interior Seaway. Methane seep deposits, ranging from upper Campanian to lower Maastrichtian have been widely documented in the Pierre Shale. These seeps contain diverse faunal assemblages, representing highly productive, chemosynthetic ecosystems. Bentonite beds occur throughout the Pierre Shale, allowing for precise dating and correlation of strata. Bentonite layers are thick and laterally continuous indicating periodic yet intense volcanic events. Widespread ash deposition adversely affects marine ecosystems and can be catastrophic for benthic communities. At several localities, bentonite layers cut across methane seep carbonates and become irregular. At the seeps, bentonites are discontinuous and brecciated; beds become mottled, containing clasts of shale and seep associated concretions. This may be the result of continuous methane seepage during ash deposition, thus providing an uninterrupted source of methane and sulfide, necessary compounds for chemosynthetic based communities. Cold seeps may have provided refuges during environmental perturbations, protecting communities from local extinction events. This study compares the biotic response of a chemosynthetic and photosynthetic communities to a single volcanic event. By examining faunal assemblages below, within, and above the ash layer, this study elucidates pre- and post- event ecosystems, focusing on changes in macroinvertebrate diversity. Preliminary findings suggest seep associated deposits maintain similar faunal diversity and abundance following ash deposition as opposed to non-seep deposits.
Support by American Museum of Natural History and Geological Society of America.

ENV - 3 FAUNAL ANALYSIS AT THE CRETACEOUS - PALEOGENE (K-PG) MASS EXTINCTION BOUNDARY

Kayla M. Irizarry[1] (UG), Matthew P. Garb[1], James D. Witts[2], Anastasia Danilova[1] and Neil H. Landman[2]
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Approximately 66 mya, a bolide impact occurred near Chicxulub on the Yucatan Peninsula, Mexico. This event is thought to have caused widespread environmental perturbation, resulting in a mass extinction. Outcrops containing the Cretaceous-Paleogene (K-Pg) boundary on the U.S. Gulf Coastal Plain exhibit a distinct sequence of facies due to unique depositional processes that resulted from the impact. Such processes may have included mass wasting due to shelf collapse and/or earthquake activity, deposition of impact related ejecta (glassy spherules, lapilli, and tektites), tsunamis, and a succession of large storms. We studied sites near the Brazos River, Falls County, Texas. Here the Maastrichtian is represented by the fossiliferous Corsicana Formation. The presence of Discoscaphites iris indicates a latest Maastrichtian age. The Corsicana Formation is overlain by the Kincaid Formation of early Danian age. The base is an event deposit described by Yancey and Liu (2013) comprising three distinct facies. At the base, Facies A is composed primarily of shell fragments in a muddy matrix with mudstone rip-ups. Facies B, positioned above, comprises semi-laminated shell hash and ejecta in a clay matrix. Both facies are fossiliferous and contain well-preserved bivalves, gastropods, ammonites, and vertebrate material. The third event facies is represented by cross-bedded sandstone. A comparison of Facies A, Facies B and the underlying and overlying facies was made. It is assumed that Facies A and B are a direct result of the Chicxulub impact. These data can shed important light on the mechanisms related to the K-Pg mass extinction event and related depositional processes.

Support by NSF LSAMP.

ENV - 4 SOIL STRUCTURE AND HEAVY METAL IN ENGINEERED SOILS FOR STORMWATER MANAGEMENT

Kathy Mania[1] (HS), **Beien Lin**[1] (HS) and Zhongqi (Joshua) Cheng[2]
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In urban environments the green infrastructure (GI) sites, or areas that promote the natural flow of stormwater by collecting and managing runoff from grey infrastructure (streets, sidewalks, parking lots), are highly impacted by human intervention, which promotes heavy metal contamination build-up within the soil and engenders the soil to become compacted. The core objective of this research paper was to determine what characteristics are needed to construct GI sites to assure the soil's health. To achieve this purpose, soil samples were collected from six GI sites with varying designs (SSIS and ETP). Afterwards, within the laboratory the macro-aggregate size distribution (>5mm, 3-5mm, 2-3mm, and <2mm), pH, salt, and heavy metal contaminant in every macro-aggregate size were measured. Overall, although a high quantity of water, which is lauded with high levels of heavy metal contaminants, enters the GI sites, the engineered soils did not indicate a significant level of contamination. The pH and salt tests' results depicted that there were no significant differences among the varying locations (inlet, center, outlet) and designs. However, design, aggregation size, and location portrayed a significant difference among certain heavy metals. These outcomes suggest that the GI design should be taken into consideration for future management plans when improving soil structure.

ENV - 5 IMPLICATIONS OF UPPER MAASTRICHTIAN RHYTHMITE DEPOSITS IN THE GULF COASTAL PLAIN, USA: CHRONOSTRATIGRAPHY AND PALEOCLIMATE CHANGE LEADING UP TO THE K-PG MASS EXTINCTION EVENT

Jone Naujokaityte[1] (GRAD), Matthew P. Garb[1], Neil H. Landman[2], Shannon K. Brophy[1], Ekaterina Larina[3] and James D. Witts[2]
[1]Brooklyn College
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Upper Cretaceous shallow marine deposits and the K/Pg boundary are well exposed in the Gulf Coastal Plain (GCP) region of the United States. These successions represent mixed carbonate-siliciclastic marginal marine to shallow shelf depositional environments. In Mississippi and Alabama, the upper Maastrichtian Prairie Bluff Chalk records sequences of decimeter scale alternating chalk and marl horizons deposited during the last 500 ky of the Cretaceous. Three localities show distinct rhythmic bedding that may be associated with cyclical variations in Earth's climate leading up to the K/Pg mass extinction event. In this study, we utilize lithological and stable isotope data as well as the recently published ammonite biostratigraphy of the GCP to refine the timing and nature of climatic events, which may be associated with insolation changes that resulted from the Milankovitch cycles. Identification of astronomical cycles in the GCP can potentially refine the depositional timeframe and provide more precise durations of paleoenvironmental change, allowing us to analyze the mechanism of change leading up to the extinction event more accurately. Preliminary data from one locality (Starkville, Mississippi) suggests δ13C, δ18O and %CaCO3 values show patterns that closely match cyclical changes in lithology. A petrographic analysis and a low covariance (R2=0.04235) between δ13Ccarb and δ13Corg, suggest little, if any diagenesis, indicating it is safe to assume the original isotopic signature is preserved.

ENV - 6 RETRIEVAL OF SOCIO-ECONOMICS AND ENVIRONMENTAL INFORMATION THROUGH BLOOMBERG TERMINAL

Joy Paul (UG), Brooklyn College

Bloomberg Terminal provides users with a wealth of information, but it is mainly used in the financial industries. The purpose of this research is to highlight some of the ways a decision maker within a company, may use the Bloomberg Terminal in order to obtain insights that will influence their decisions. Using the Bloomberg Terminal, a handful of the functions has been gathered to discuss their usage in length. These functions may enable a decision maker within a company to make environmentally conscious decisions in the future.

ENV - 7 LATE CRETACEOUS METHANE SEEPS AS JUVENILE AMMONITE HABITATS (WESTERN INTERIOR SEAWAY)

Alison J. Rowe[1] (UG), Neil H. Landman[2], Matthew P. Garb[1] and James D. Witts[2]
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The Upper Cretaceous Pierre Shale of the U.S. Western Interior is peppered with cold methane seep deposits. We have studied these deposits from the Upper Campanian Baculites compressus and Didymoceras nebrascence zones and middle Campanian B. scotti zone in southwest South Dakota. These deposits contain an abundance of ammonites. The large concentrations suggest that they inhabited the seeps, rather than floated in after death. We present additional evidence to support this hypothesis by documenting the occurrence of juvenile ammonites belonging to Baculites and Hoploscaphites. The

smallest specimens include an individual of a newly hatched Baculites with its ammonitella. The presence of ammonitellas is common and indicates rapid burial. While adult and juvenile Baculites and Hoploscaphites are well represented, intermediate stages are less common in the sample. The relatively small amount of adolescents may indicate that many juveniles died soon after hatching (either following hatching at the seep or after arrival in the seep habitat), but those that did not, were able to survive into adulthood. The presence of both juvenile and adults suggests ammonites played a key role in these dynamic ecosystems.

Support by American Museum of Natural History.

ENV - 8 MITIGATION OF SEPTIC EFFLUENT NITROGEN USING HYBRID GREEN INFRASTRUCTURE FOR THE MANAGEMENT OF HARMFUL ALGAL BLOOM PRODUCTION IN LONG ISLAND COASTAL WATERS

Nia H. Rene[1] (GRAD), Jennifer Cherrier[1] and Steve Morton[2]

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Non-point source nutrient loading into our waterways is one of the leading causes of coastal eutrophication and subsequent harmful algae bloom (HAB) events. In Suffolk County, N.Y, septic systems treat 70% of the domestic waste and have been identified as a leading cause for degraded coastal water quality in Long Island and an important factor contributing to massive outbreaks of HABs in the Great South Bay, Peconic Bay and Long Island Sound. The HAB Cochlodinium polykrikoides (C. poly) has been implicated as causing toxic algal blooms in Suffolk County as well as coastal waters worldwide and has been found to be lethal to multiple species and life stages of fish. Green infrastructure (bioswales, raingardens) has been gaining recognition as an effective low-impact best management approach for mitigating stormwater related nutrient loading into waterways and may have the potential to address septic leaching as well. However, the design of these systems is passive and as a result their water interception and nutrient removal capacity has been shown to be highly variable and inconsistent. The overall goal of this research is to evaluate the potential of an activated hybrid green infrastructure system (ecoWEIR) for reducing nutrient loading from septic systems and thus offset HAB growth in coastal waters. The specific objectives of this work are to conduct controlled ecoWEIR mesocosm studies to evaluate nutrient removal efficiency from septic effluent and to carry out time-series incubations with C.poly with mesocosm inflows and outflows to determine how ecoWEIR treatment offsets growth of this HAB species. This study will inform residents and coastal ecosystem managers of a cost-effective solution to groundwater contamination from onsite wastewater treatment.

Support by NOAA CREST.

HNS - 1 EDUCATIONAL ATTAINMENT, PHYSICAL ACTIVITY, AND SEDENTARY TIME IN ADULTS WITH OBESITY

Sherie M. Alexis (UG), Ciarán P. Friel and Kristie Rupp, Brooklyn College

Excessive sedentary time and low levels of physical activity are both associated with cardiovascular disease and mortality. Educational attainment is associated with physical activity and sedentary time in young adults and it is unknown if adults with obesity have a similar outcome. PURPOSE: The purpose of this study is to examine the correlation between educational attainment and: (1) physical activity; and (2) sedentary time in adults with obesity. METHODS: This study is a preliminary analysis of an on-going study. Sixteen participants were 93.8% female, age (27.3± 11.1 years; mean ± sd), and had a BMI of 34.5 ±3.1 kg/m². At participants` baseline assessment they were asked to fill out a demographic questionnaire from which educational attainment was assessed. Moderate to vigorous physical activity (MVPA) and sedentary time were objectively assessed via accelerometry. Participants wore an accelerometer for one week following their baseline assessment. Data was considered valid with 4 consecutive days of wear time (>10 hours/ day). The average daily MVPA was calculated using Freedson's cut points for adults to determine minutes in MVPA. Sedentary time was computed as the average daily percent of time spent sedentary, using a pre-determined cut point of < 100 counts per minute to determine sedentary minutes. RESULTS: Educational attainment was not significantly associated with MVPA (r =.-.158; p = .558) or sedentary time (r =.117; p = .665). CONCLUSION: There is no association between educational attainment and MVPA or sedentary time in adults with obesity. However, these results should be interpreted with caution given the limited sample size; further analysis may be warranted.

Support by PSC-CUNY.

HNS - 2 MATERNAL CHOLINE AND BETAINE SUPPLEMENTATION MODULATES FETAL LIVER EXPRESSION OF GENES ASSOCIATED WITH FAT AND GLUCOSE METABOLISM

Rachel Bretter (GRAD), Khatia Nanobashvili, Yaelle Joslit, Chauntelle Jack-Roberts, Bhoomi Dave, Kathleen Axen and Xinyin Jiang, Brooklyn College

Gestational Diabetes Mellitus (GDM) is defined by maternal hyperglycemia during pregnancy. GDM-affected neonates are at risk for adverse outcomes such as fetal overgrowth. Choline is an essential nutrient and is important in maintaining lipid homeostasis and energy balance. In a previous study, we found that maternal choline supplementation can mitigate the effect of GDM, preventing fetal adiposity. In this study, we examined the effects of supplemental choline and its betaine derivative on the expression of genes associated with glucose and fat metabolism, in the livers of embryos from GDM dams. High fat (HF) or control (NF) diets were given to female C57BL/6J mice for 6 weeks before timed-mating and throughout gestation. These mice were supplemented with 25mM choline chloride, 1% betaine, or control drinking water until embryonic day (E)17.5. Fetal liver samples were collected for gene expression analysis. Results showed that the High Fat Control (HFCO) group had significantly higher ($P < 0.001$) Fatty Acid Binding Protein 1 (FABP1) expression compared to NFCO. Both the High-Fat Choline (HFCS) ($P < 0.001$) and High-Fat Betaine (HFBS) ($P = 0.014$) groups significantly downregulated the expression of FABP1 compared to HFCO. HFCS significantly upregulated ($P < 0.001$) lipogenic gene expression of CCAT/Enhancer-Binding Protein Alpha (CEBPA) in fetal liver compared to all other groups. Gene expression of Phosphoenolpyruvate Carboxykinase 2 (PCK-2), a rate limiting enzyme of gluconeogenesis in the liver, was downregulated ($P < 0.050$) in the Normal-Fat Betaine (NFBS) group compared to HFCO group. In sum, these results demonstrate that choline and betaine supplementation altered fetal liver expression of genes related to fat and glucose metabolism in this GDM mouse model.

Support by NIH, PSC-CUNY and National Academy of Science.

HNS - 3 CHOLINE AND PLACENTAL MACRONUTRIENT METABOLISM IN GESTATIONAL DIABETES-COMPLICATED PREGNANCIES

Chauntelle Jack-Roberts (GRAD), Madur Dalloul, John Kral, Michelle Haughton-Miller and Xinyin Jiang, Brooklyn College

Gestational diabetes mellitus (GDM) complicates 9.2% of pregnancies in the US. Obesity is a major risk factor of GDM. Macrosomia, a birth weight greater than 4kg, is a major neonatal complication of GDM with lasting influences, increasing the risk of cardio-metabolic diseases in adulthood. Increased placental transport was a proposed mechanism that fetuses amass excess macronutrients, developing macrosomia. In our prior study, choline participated in lipid metabolism and transport which normalized fetal growth and placental macronutrient transport in GDM mice. We seek to determine whether choline intake is associated with fetal growth outcomes in human pregnancies affected by GDM. We recruited GDM and non-GDM pregnant women 20 - 33 weeks gestation from SUNY Downstate Medical Center and collected their 3-day 24-hr dietary recalls to assess choline intake. We also collected birth outcome data from the medical charts and the placentas at delivery. Our preliminary results include 10 non-GDM and 10 GDM women. The GDM group had higher pre-pregnancy BMI (GDM: 33.8±8.5 vs non-GDM: 25.5±4.1 kg/m2). Choline intakes did not differ between groups (GDM: 448.2±113.2 vs non-GDM: 485.5±265.6 mg, $p > 0.05$). Birth weight and macrosomia incidence did not differ between groups and were not associated with maternal choline intake in this pilot dataset. Placental fatty acid transport protein was positively associated with choline metabolism. The preliminary data did not support a correlation between maternal choline intake and GDM-related macrosomia. However, placental choline metabolism may be related to nutrient transport. Further study with a larger sample size may provide insights into the correlation of maternal choline status with GDM birth outcomes and placental function.

HNS - 4 ASSOCIATION BETWEEN SEDENTARY TIME AND HEALTH RELATED QUALITY OF LIFE IN ADULTS WITH OBESITY

Cathleen Janeczko (GRAD), Ciarán P. Friel and Kristie Rupp, Brooklyn College

Sedentary leisure time is inversely associated with self-reported health related quality of life (HRQoL) among several populations. However, it is unknown whether there is an association between these measures in a population of adults with obesity. Purpose: The purpose of this study was to examine whether there is an association between objectively measured sedentary time and self-reported HRQoL, as well as physical function and emotional well-being in adults with obesity. Methods: Participants (n=16) were 93.8% female, age 27.3 ± 11.1 years (mean±sd), with a BMI of 34.3±3.1 kg/m2. Self-reported HRQoL was measured using the 36-Item Short-Form Survey. Sedentary time was objectively measured using accelerometry. Participants were fitted with an ActiGraph GT3X accelerometer that was worn for the week following their baseline assessment. Accelerometer data was considered valid if it was worn for at least 4 days with at least 10 or more hours of wear time each day. Minutes of sedentary time were calculated using a pre-established cut point of < 100 counts/min; sedentary time was measured as the average percentage of sedentary time to total wear time for all valid days of accelerometer wear. Statistical significance was set at $p<.05$. Results: There was no association between sedentary time and HRQoL [r=.308; p=.246]. There was a significant moderate positive association between sedentary time and the physical function subscale [r=.598; p=.014]. There was no association between sedentary time and the emotional well-being subscale [r=.171; p=.526]. Conclusions: There was a significant positive association between sedentary time and self-reported physical function, which indicates that those who spend a higher percentage of their day sedentary report better physical function.

HNS - 5 HEALTH NUDGES IN FOOD PANTRIES: A COMPARATIVE CASE STUDY IN NEW YORK CITY

Melisa Karabeyoglu (GRAD) and Melissa Fuster Rivera, Brooklyn College

There is a connection between food insecurity and obesity. Food pantries serve to address food insecurity, but they do not always promote healthy diets. This study examined the implementation of a health-nudge intervention to promote the uptake of healthy options in two NYC-based food pantries. Food pantries have steadily increased over the last decades. Food pantries and food banks are primarily interested in cost-effective strategies to encourage pantry visitors' amount taken of nudged foods. Therefore, the current study assessed the implementation of nudges used in two NYC urban pantries. The study used a case study approach. Primary data consisted of interviews with pantry managers. Secondary data sources included Site Information Form and Nudge Planning Tool, and Inventory tracking sheets, collected as part of the New York City-Department of Health and Mental Hygiene research study "Healthy Pantry Initiative." Student T-Test was used to assess differences in the uptake of nudged items between pantries. Qualitative analysis techniques were used to assess differences between the communities, the pantries and the implementation process. In both Sites A and B, the amount taken of the nudged items increased from pre-implementation to implementation phase, but the difference was only significant in Site B ($p<0.05$). The qualitative analysis revealed that results may be due to factors associated with the pantries' location, accessibility by public transport, hours open, nutrition education of pantry manager and population characteristics of population served. Nudge strategies are low cost and simple effective tools for food pantry organizers to use to promote healthy food selection, but their results are affected by contextual factors.

HNS - 6 HEALTH-RELATED QUALITY OF LIFE AND THE ASSOCIATION BETWEEN CARDIORESPIRATORY FITNESS AND PHYSICAL ACTIVITY IN ADULTS WITH OBESITY

Marina N. Mekhail (UG), Ciarán P. Friel and Kristie Rupp, Brooklyn College

Higher levels of physical activity and cardiorespiratory fitness are associated with greater health related quality of life (HRQoL), among several populations. However, it is unknown if this relationship exists in a population of adults with obesity. PURPOSE: The purpose of this study was to examine the association between self-reported HRQoL and: (1) cardiorespiratory fitness; and (2) physical activity in adults with obesity. METHODS: This study was a preliminary analysis of baseline data from a larger on-going clinical weight loss trial. Participants were (n=16) 93.8% female; age (27.3 ± 11.1 years; mean±sd); and BMI (34.3 ± 3.1 kg/m2). Fitness was assessed by a graded-exercise test to 85% of participants` age-predicted maximal heart rate. Time to 85% HRmax was used as the measure of fitness. Moderate to vigorous physical activity (MVPA) was objectively measured via accelerometry. Participants wore an ActiGraph GT3X accelerometer for one week; data was considered valid if it was worn for at least 4 days with at least 10 or more hours of wear time each day. Average daily MVPA was calculated using the average minutes in MVPA using the Freedson cutpoints for adults. The 36-Item Short-Form Survey was used to assess self-reported HRQoL, which has been demonstrated to be a valid and reliable measure of HRQoL. RESULTS: There were no significant associations between: (1) self-reported HRQoL and cardiorespiratory fitness (r=.385; p=.141); and (2) self-reported HRQoL and MVPA (r= -.151; p=.577). CONCLUSION: There does not appear to be a significant association between HRQoL and cardiorespiratory fitness or physical activity in adults with obesity, however, further exploration is warranted due to the small sample size of this analysis. *Support by PSC-CUNY.*

HNS - 7 THE ROLE OF FOOD BARRELS, REMITTANCES AND GOOD INTENTIONS IN ACCELERATING REMOTE DIETARY ACCULTURATION IN GHANAIAN AND JAMAICAN YOUTH LIVING IN NEW YORK CITY

Patricia J. Pauyo[1] (GRAD), **Shanaz Hosein**[1] (UG), Naudia Jones[1], Tashanne Distin[1] and Margrethe Horlyck-Romanovsky[2]
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Introduction: Black immigrants in New York City (NYC) represent approximately 33% of the Black population. The largest foreign born Black groups are Ghanaians and Jamaicans, where a majority of the youth grow up in the home countries. Little is known about how acculturation affects the diet and health of Black transnational immigrant families. We sought to understand how transnational acculturation influences dietary patterns of Ghanaian and Jamaican immigrant youth. Methods: We conducted interviews with Ghanaian youth, parents and grandparents (N=25) and Jamaican youth, parents and grandparents (N=24), lasting on average 60 minutes. Verbatim transcriptions were coded using a grounded theory approach.Results: Youth who grew up in transnational families had unique exposures to US food culture. Parents/grandparents living in NYC shipped barrels of shelf-stable foods to their children in the home country until the children were able to migrate to the US. Barrels and financial remittances were expressions of caring and extensions of the US experience to children living back home, representing the financial stability of adults living in the US. Foods were often chosen based on the youth's expressed taste preferences and brand recognition. Globalization of African and Caribbean markets paired with care packages and purchasing power from remittances increase access to and consumption of packaged foods, energy, sugar, fat and sodium. Implications: Transnational families actively facilitate dietary acculturation which may lead to poorer dietary quality before youth migrate to the US. Future public health initiatives should seek to affect social norms and preferences for healthier foods in transnational communities.
Support by CUNY Graduate School of Public Health and Health Policy Dean's Dissertation Award.

HNS - 8 DIETARY SHIFT IN BANGLADESHI-AMERICAN MUSLIMS

Prova Shukla (GRAD) and Melissa Fuster Rivera, Brooklyn College

Abstract: Background: New York City has experienced an increased influx of Bangladeshi and Bengali immigrants within the last few decades. There is limited research done on the migratory effects on the Bengali diet. Many research studies have been conducted on Asian populations including Chinese-Americans, but there is an association between dietary lifestyle factors and metabolic diseases and obesity prevalently seen in the Indian subcontinent. Dietary acculturation is studied to understand food practices between ethnic minorities and the many health disparities among these communities. The aim of this study is to describe and understand the dietary changes upon migration among Bangladeshi women in New York City. Methods: This is a cross-sectional qualitative, look-back design study, using semi-structured interviews. Participants were recruited via snowball sampling, resulting in 18 Bangladeshi born Muslims, immigrated within the last 15 years. Interviews were analyzed using Dedoose to organize and compare themes emerging from the interview. Results: The interviews describe dietary changes upon migration (such as celebrating U.S. Holidays, incorporating non- halal meat [exception of pork and pork derived foods], and using social media to learn recipes both Bengali cuisine and other ethnic cuisines) including the changes in view regarding the healthfulness of Bengali cuisine after migration. They also reported access to traditional ingredients in NYC. Conclusion: This study contributes to understanding of the dietary acculturation process in Bangladeshi-American population. In the foreign places, immigrants try their best to keep their ethnicities close to them as possible; food is one of the main ways to keep their memories of their homelands.

HNS - 9 AMONG RECENTLY BEREAVED YOUNG ADULTS, EXPOSURE TO TRAUMA IN CHILDHOOD IS AS PREDICTIVE OF THE IMPACT OF THE DEATH AS THE CIRCUMSTANCES AND MANNER OF THAT DEATH

Agnes Wong (GRAD) and Tracy Wong, Brooklyn College

BACKGROUND: Little is known about reactions to grief among diverse young adult populations in urban settings, including the role trauma history may play in these reactions. METHODS: In this study of Brooklyn College students, 713 undergraduates completed an online survey that included measures of childhood trauma exposure (Adverse Childhood Experiences) and reactions to grief among those who had experienced the death of a loved one. RESULTS: A total of 514 individuals (72% of the sample) reported having ever experienced the death of a loved one. Among those who had experienced a death, 60% reported the death of an immediate family member or close friend. Over two-fifths (41%) of deaths were within the past two years. Among those who had experienced a death, 85.5% reported that the manner of death was natural causes and 16% cited a sudden death (i.e., suicide, homicide or accident). Participants reported whether the death had a long-term impact (greater than 6 months) on the following aspects of their life: Psychological, physical, social, academic. Logistic regression analysis among the 208 individuals who had experienced a death in the past two years revealed that exposure to childhood trauma, recency of the death, a close relationship with the deceased, and a sudden death was predictive of long-term psychological impact. However, only childhood trauma and relationship were predictors of long-term social impact, and childhood trauma was the sole predictor of long-term physical and academic impact. CONCLUSION: These findings suggest that, while the impact of bereavement may vary by the certain characteristics of the death (e.g., relationship to the deceased), exposure to trauma in childhood is also highly predictive the impact of death in young adulthood.

PHYS - 1 COOLING THROUGH QUANTUM MECHANICS: MAGNON-BASED DESCRIPTION OF MAGNETOCALORIC EFFECTS IN LA-FE-SI, COMNSI, AND GADOLINIUM

Kemal Aziz (HS), Staten Island Technical High School and Karl G. Sandeman, Brooklyn College

The magnetocaloric effect (MCE) is the temperature change of a magnetic material induced by exposing the material to an external magnetic field. Potential applications of the MCE include the magnetically sensitive spin transistor eliminating complex electronic components (e.g., amplifiers) by using spin states to store binary information and MCE refrigeration with no Global Warming Potential. Based on derivation of the Heisenberg Spin Hamiltonian, Quantum Monte Carlo Methods (QMCs) which enable conversion of microstate energies into magnetization data are investigated. This work applies stochastic sampling to solve the Hamiltonian as a function of temperature and magnetic field. In VAMPIRE C++ simulations of Gd's magnetization with 16,182 atoms, we generate magnetization and peak magnetic entropy change values with 2.3% and 0.9% phenomenological errors, respectively, at 0-5 Tesla fields, compared to experimental values. Extending the atomistic model to amorphous GdCo and MATLAB SpinW-based imposition of magnetic interactions, we generate a simulated Curie Point possessing experimental error less than 1 Kelvin as per the point's inflection definition. Python software is built to automate magnetization data processing through Arrott plot and susceptibility methods. Applying the program to preexisting data obtained with a Vibrating Sample Magnetometer, we find La-Fe-Si possesses larger refrigerant capacities and entropy changes than CoMnSi at similar applied magnetic fields. If run in tandem, VAMPIRE and python software generates magnetization as a function of total spin energy defined by the Heisenberg Spin Hamiltonian and implements thermodynamic relations to analyze magnetization data, respectively.

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PHYS - 2 RESONANCE OPTICAL SPECTROSCOPY OF GALLIUM ARSENIDE / ALUMINIUM GALLIUM ARSENIDE MULTIPLE QUANTUM WELLS STRUCTURE AT SECOND QUANTUM STATE

Nikesh Maharjan (GRAD) and Mim Lal Nakarmi, Brooklyn College

We studied optical reflection (OR) and contactless electro-reflection (CER) at the second quantum state in Resonant Bragg Structure (RBS) based on GaAs/AlGaAs multiple quantum wells (MQWs) when the Bragg reflection coincides with the exciton energy of the second quantum state in the GaAs quantum well. The sample structure with 60 periods of GaAs/AlGaAs quantum wells/barriers grown on semi-conducting GaAs substrates by the molecular beam epitaxy (MBE). From the electro-optical experiments at ~20K, we observed an enhanced and broad electro-reflectance spectrum features related to the second quantum transitions of x(e2-hh2) and x(e2-hh1) excitons. The x(e2-hh1) transition, which is prohibited in the flat band model at zero electric field because of the symmetry of electron and hole wave functions. However, they are allowed by a DC bias due to the break of symmetry and increased overlap of the electron and hole wave functions. We also observed CER features even at room temperature at the second quantum state when exciton energy coincides with Bragg resonance, which shows a strong light matter interaction under the double resonance condition.

Support by PSC-CUNY.

PHYS - 3 PATENT AND APPLICATION REVIEW ON THERMOMAGNETIC POWER GENERATION

Anthony N. Tantillo (GRAD) and Karl G. Sandeman, Brooklyn College

Thermomagnetic power generation (TMG) is the process by which heat is converted into magnetic energy, which is then converted into usable electrical energy. This is possible through the reverse magnetocaloric effect, in which a magnetocaloric material (MCM) experiences a change in magnetization as it is heated through its Curie temperature. Attempts to implement TMG date back to the late nineteenth century with patents submitted by both Thomas Edison and Nikola Tesla. Progress and development in the field has continued through the present day, as technological and scientific advances allow for more complexity and efficiency in device designs. This poster presentation will focus on US patents in TMG from the end of the nineteenth century through the late twentieth century and up to present day. Of particular interest are the changes in operating principles and functional materials that distinguish these designs from one another. Using this compilation of inventions, a demonstration device will be constructed. As a conclusion, various possible avenues of future research into TMG device construction will be discussed.

PHYS - 4 CAN WE DEVELOP AN ACCURATE SAMPLE SIZE OF THE MILKY WAY GALAXY TO LEARN WHAT MASS FUNCTION CAN TEACH US ABOUT STELLAR DISTANCE FUNCTION?

Chapin L. Zerner[1] (HS), Jordan M. Walsh[1], **Rohan Surana**[1] (HS) and Micha Tomkiewicz[2]
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We provide an analysis of data which after close consideration, has proved small clusters of stars to be unrepresentative of the entire Milky Way Galaxy. We collected the mass and distance values of 476 stars and 46 black holes. We then created histograms and scatter plots to determine if the mass distribution of large stars and parent stars of black holes provided a strong representation of the Milky Way Galaxy as a whole. We found a strong linear representation of the relationship between distance from the solar system and stellar black hole mass. This inconsistency of strong mass and distance correlations demonstrated the limitations of current celestial observations. It provides a general understanding that the functionality of the Milky Way Galaxy cannot rely on the analysis of a small cluster of data consisting of present day stars and parent stars of the past, derived from mass conversions of stellar black holes. There is a need for advancement in the technology used for astronomical observation for us to broaden our understanding of how galaxies such as the Milky Way Galaxy have evolved. Due to the currently obtained clusters revealing strong linear relationships for subsets of our collected data, there is a chance that future collection of information could help us better define the growth and function of our galaxy. Overall, our results show that to represent a cosmological area as large as the 100,000-light-year galaxy, large portions of data must be obtained.

PSY - 1 THE NEURAL BASES OF RELATIVE PREDICTIVE VALIDITY USING A NOVEL BEHAVIORAL PROCEDURE

Gabrielle N. Akcelik (UG), **Alison Shur** (UG), Ingrid Reverte-Soler and William Esber, Brooklyn College

The aim of this study is to understand how predictive relationships are formed between a conditioned stimulus and a corresponding cue. The theory of absolute predictive validity states that a cue in the environment is in of itself sufficient to predict an outcome, while the theory of relative predictive validity states that a cue's predictive strength is dependent upon other cues in the environment. The study hypothesizes that relative predictive validity is the driving force of learning, whereby a cue with a high probability of reinforcement may be deprived of associative strength by other concurrently trained cues whose likelihood of reinforcement is greater. Using a novel behavioral procedure called the self-initiated conditioned magazine-approach (SICMA), the first stage of the experiment ensured that subjects learned to discriminate between two stimuli who were either mostly reinforced or non-reinforced. The second stage of the experiment pairs said stimuli with cues that alter the known outcome, such that the resulting compounded elements change the probability of reinforcement for stage one stimuli. This study is currently ongoing; however, we predict that responding to cues with high probability of reinforcement will change if paired in compound with cues that are better predictors of reward, and vice versa. Preliminary behavioral results show virtue of the SICMA procedure by allowing for 100 trials in a single hour session with no detriment to learning as well as optimizing data collection during neural recording. Future directions include the neural recording of animals during the SICMA procedure using in-vivo single unit recording.

PSY - 2 THE EFFECTS OF HD-TDCS ON MEMORY AND METAMEMORY PERFORMANCE FOR VARYING RECOGNITION TASK DIFFICULTY

Rebecca B. Baron (UG), Timur Belinsky and Elizabeth F. Chua, Brooklyn College

Memory performance is one's ability to retrieve information, whereas metamemory is the ability to monitor one's own memory. "Feeling-of-knowing" (FOK) judgments are a measure of metamemory in which participants predict future memory performance. In the recall-judgment-recognition (RJR) paradigm, participants recall the correct answer to a general knowledge question, provide a FOK rating, and select the correct answer from a series of choices. "Metamemory accuracy" evaluates how well FOK judgments correlate with recognition performance. Previous work using high definition transcranial direct current stimulation (HD-tDCS) has shown that dorsolateral prefrontal cortex (DLPFC) stimulation leads to improved metamemory accuracy, whereas anterior temporal lobe (ATL) stimulation increases recall. Our study tests whether these dissociable effects of stimulation are influenced by recognition task difficulty. We induce 'decision conflict' in the "Hard" versus "Easy" recognition task by increasing the similarity among alternate choices. In our within-subjects study, participants (n=24) complete the RJR paradigm during either an active or sham session to test for "online" effects, followed by a session without stimulation to measure "offline" effects. The results reveal better recognition performance and metamemory accuracy in the "Easy" vs "Hard" task. Contrary to previous findings, recognition was better during ATL (vs DLPFC and Sham) stimulation across task difficulty. While we didn't see increased overall metamemory accuracy with DLPFC stimulation, we did find improved metamemory accuracy during "online" DLPFC (vs Sham) stimulation for the "Easy" recognition task. Taken together, these results indicate that the effects of HD-tDCS are sensitive to recognition task difficulty.
Support by PSC-CUNY.

PSY - 3 REMEDIATION PROTOCOL TO IMPROVE THE USE OF VISUAL CONTEXT

Iqra Bibi (UG), Brooklyn College

Among cognitive impairments associated with schizophrenia are limitations in the use of contextual information to interpret visual images. The goal of the research described here is to develop a remediation therapy to improve the use of context by encouraging a holistic approach to comparisons of visual images (i.e., global processing). Subjects undergo three days of exercises designed to help develop their microskills in global processing. Subjects view two sets of abstract visual shapes that may vary in size, color, shape or orientation. Subjects compare shape pairs and indicate which pair is more similar. Across trials, stimulus pairs become progressively more similar, thereby increasing task difficulty. Performance reflects identification of the critical stimulus feature upon which comparisons are made. It is hypothesized that subjects will display an upward trend in ability to make comparisons across the images. Prior to and following training subjects are assessed on their use of context using a neuropsychological test. The assessment test consists of graphical visual representations of information and data that requires context processing. Change in performance across the training period may represent neuroplastic changes in either stimulus processing or more high-order cognitive processes.

Support by NSF REU.

PSY - 4 THE EFFECT OF MOTIVE FOR A TRANSGRESSION ON ANGER AND DISGUST

David A. Brocker (GRAD) and Hanah A. Chapman, Brooklyn College

Act judgments are made based on the permissibility of an action and character judgments are made based on the moral character of the individual performing the action. Past research has shown that act judgments lead to a stronger anger response whereas character judgments lead to stronger disgust responses. The present study aims to replicate these findings in a novel context. In order to manipulate character, we varied the motivation of a man who speeds home and hits another car. The man had either a neutral motive (to have dinner), a positive motive (to hide a gift) or a negative motive (to hide cocaine). After reading the scenarios, participants completed character and act judgments. Additionally, participants reported how much disgust and anger they felt towards the actor. We expected that the motive manipulation would have a stronger effect on character judgments than on act judgments, and a stronger effect on disgust than anger. Although we found the predicted motive x judgment type interaction, there was no interaction between motive and emotion type. These results suggest that character is only related to disgust in certain instances.

PSY - 5 EFFECTS OF MINDFULNESS TRAINING ON SELF-REPORTED STRESS AND SKIN CONDUCTANCE IN COLLEGE FRESHMEN

Stephon Broome (UG), Liat Zitron, Shawn E. Fagan and Yu Gao, Brooklyn College

The first year of college is a difficult period of adjustment for many students, as evidenced by the prevalence of mental health deficits like chronic stress, anxiety, and depression. Mindfulness is a practice that alleviates stress; it encourages practitioners to develop a greater awareness of their environmental stressors and produces both behavioral and physiological changes, specifically in autonomic nervous system activity. Prior research found that a short-term mindfulness training intervention significantly reduced physiological and self-reported stress in adolescents and first-year undergraduates. To our knowledge, past studies have not looked at the impact of mindfulness training on the skin conductance response (SCR) in particular, which is a highly sensitive sympathetic marker of stress. This is important as stressful triggers in the environment specifically trigger a cascade of activity in the sympathetic nervous system. We recruited 25 first-year undergraduates to undergo either a mindfulness training intervention

(45min of deep-breathing techniques) or a control/relaxation condition, each of which met for 6-sessions over the semester. Participants visited the lab pre- and post-intervention where they completed behavioral assessments, including a fear-conditioning task during continuous physiological recording. We hypothesized that the mindfulness intervention would reduce post-intervention SCR amplitudes at baseline and during the fear-conditioning task due to decreased stress levels and stress reactivity. Results showed no significant decreases in physiological stress between or within mindfulness and control groups. However, participants in both groups reported significantly lowered feelings of stress at the end of the study.

PSY - 6 HOW PERSONAL ACHIEVEMENT GOAL BIASES AFFECT ACHIEVEMENT GOALS WITHIN A MASTERY OR PERFORMANCE GOAL-ORIENTED ENVIRONMENT

Stephen P. Bryson[1] (UG), Yuliya Ochakovskaya[2] and Elizabeth F. Chua[1]
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Students often approach education with a bias towards learning and developing their knowledge (mastery goals), or trying to do better than others (performance goals). Researchers have also examined how an instructor's classroom environment is associated with adoption of these goals. We examined how incoming personal goal biases affect the adoption of an environmentally set goal. First, to measure Personal Achievement Goal Bias, students (n=118) completed a questionnaire about their mastery and performance goal pre-dispositions towards their college classes. Bias was defined by subtracting Performance Goal ratings from Mastery Goal ratings (i.e., mastery goal bias). Participants were then randomly assigned to a mastery goal or performance goal environment and given a challenging learning task. To measure environmental goal adoption, participants answered questions about the effort/motivation and importance of the achievement goals towards the task. Within a mastery goal environment, the more biased an individual was towards mastery goals prior to the task, the less important they rated performance goals during the task (Spearman's $r = -.264$, $p < .05$), and there was marginal evidence for decreasing effort for performance goals during the task (Spearman's $r = -.218$, $p < .10$). Within a performance goal environment, the more biased an individual was towards mastery goals prior to the task, they were marginally more likely to rate mastery goals as more important during the task (Spearman's $r = .254$, $p < .06$), and were marginally less likely to rate performance goals during the task as more important (Spearman's $r = -.222$, $p < .1$). These findings suggest that personally held achievement goals have some impact on the success of environmentally set goal adoption.
Support by The Graduate Center of CUNY Doctoral Student Research Grant (DSRG).

PSY - 7 GOAL-DIRECTED AND HABITUAL BEHAVIORS IN FIXED-INTERVAL (FI) AND RANDOM-INTERVAL (RI) SCHEDULES

Badrunnesa Bushra (UG), Eric Garr and Andrew R. Delamater, Brooklyn College

Behavioral neuroscientists have explored under what conditions animals behave in goal-directed or habitual ways. Goal-directed behaviors are actions guided by the representation of an outcome, whereas habits are not. Previous studies suggested that rats trained to lever press for food rewards on interval schedules of reinforcement respond habitually. However, a recent study showed that mice trained with a fixed-interval (FI) schedule were goal-directed, whereas mice trained with a random-interval (RI) schedule were habitual (DeRusso et al., 2010). Experiment 1 aimed to replicate these findings with rats and to examine the role of extensive training in habitual and goal-directed responding. Rats were given 20 days of training under FI-45 or RI-45 schedules with assessments of goal-directed or habitual responding occurring after limited, moderate, and extensive amounts of training. It was found that both groups

responded habitually after limited training, whereas after moderate training, FI-45 rats became goal-directed. However, with extensive training, both groups were goal-directed, though FI-45 rats showed stronger goal-directed responding. To see if the results were an artifact of multiple tests, a follow-up experiment was conducted using a between-subjects design. Rats were trained on an RI-45 schedule for 2 or 20 days before tests occurred for goal-directed and habitual responding. The results from Experiment 2 confirmed those from Experiment 1. Overall, these results question whether training on interval schedules inevitably lead to the formation of habits. Instead, the temporal predictability of reward and the amount of training could play a role in determining goal-directed or habitual responding.

PSY - 8 EFFECTS OF MINDFULNESS TRAINING ON PHYSIOLOGICAL ACTIVITY AND EMOTION REGULATION DURING THE ULTIMATUM GAME

Catherine Chan[1] (UG), Shawn E. Fagan[2], Liat Zitron[2] and Yu Gao[1]
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Emotion regulation (ER) is the ability to manage one's response to a salient emotional experience and can encourage rational decision-making. One physiological marker of ER is heart rate variability (HRV), an index of parasympathetic nervous system activity. Previous research has shown that high baseline HRV and greater HRV reactivity are both related to ER during decision-making. ER and high baseline HRV are also associated with trait mindfulness, an important aspect of successful ER. Mindfulness is a mental state where one is observant of their own thoughts and feelings. This study examined whether mindfulness training over a 6-week period increases behavioral and physiological correlates of ER. Twenty-five undergraduates participated in either a mindfulness intervention or a control/relaxation condition consisting of six training sessions each. Following the intervention, students returned to the laboratory. We recorded their physiological activity while they played the Ultimatum Game (UG), an economic task that gauges rational decision-making. We predicted that individuals with high baseline HRV and/or increased HRV reactivity would make decisions that were more rational during the UG. We also predicted participants who received the mindfulness training would make decisions that are more rational during the game compared to the control group. Results were partially consistent with our hypotheses. Mindfulness training did not affect UG performance, though baseline HRV and HRV reactivity were positively correlated with rational decision-making. Our results add to growing evidence that HRV is an appropriate biomarker for ER.

PSY - 9 AGGRESSION ON THE BEACH: CROWDING INCREASES AGGRESSION LEVELS IN FIDDLER CRAB (UCA PUGILATOR) COLONIES

Kevin Chen (HS), Midwood HighSchool and Frank W. Grasso, Brooklyn College

Fiddler crabs live in large social groups in the beach intertidal zone of the ocean and estuaries. Colonies of fiddler crabs are located in areas where there is good foraging for food when the tide is out and good burrowing locations for shelter when the tide is in. They are also locations for mating and rearing offspring because egg-bearing females shelter in male-defended burrows. These crabs defend individual burrow-territories with ritualized claw waving displays that limit the risk of physical damage that would result from actual fights. We hypothesized that the number of claw-waves (CW) would increase with the population density inside colonies composed of burrow territories. We collected 30 3-minute videos of crabs during low tide at two colonies in Jamaica Bay Brooklyn. Of these 5 showed a large number of crab-to-crab interactions that could be easily visualized. We randomly sampled regions within each of these videos and scored the density of crabs and the frequency of claw waves in each video region. We found a significant positive correlation between crab density (group size, GS) and claw waves ($r(64) = 0.36$ $p <$

0.01) and a linear regression of CW = 0.71 GS + 0.48 p($p < 0.01$). We conclude that the social lives of these crabs include increased levels of aggression as population density increases.

PSY - 10 PSYCHOPHYSIOLOGICAL AND EYE-TRACKING CORRELATES OF EMOTION RECOGNITION AND AUTISTIC TRAITS IN NEUROTYPICALS

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Emotion Recognition Deficits (ERD) have been extensively studied in Autism Spectrum Conditions, but the underlying mechanisms remain poorly understood. Neurophysiological and eye-tracking abnormalities have been proposed as a potential explanation. Interestingly, large sample-based estimations show that 'autistic traits (AT)' are somewhat normally distributed in the general population, raising the question whether AT might predict ERD, psychophysiological and gaze patterns in neurotypicals. To test these hypotheses, one hundred and one undergraduates (71% female Mage = 20.12, SD=1.95) judged emotions displayed on a computer screen while their eye movements and skin conductance responses [SCRs] were being recorded. The task had free gaze and cued gaze (eyes vs. mouth) conditions. High vs. low AT group were obtained using a top-bottom 20% AQ score criteria, matched for gender. Partially repeated between subject factor and linear analysis were performed. We found significant main effects of group on SCRs for sad, neutral and fearful faces, with high AT displaying consistently lower SCRs across conditions [$F(1,35) = 28.9$, MSe= .4 $p < .001$; np2 = .453];. This effect remained significant when controlling for a linear prediction ($r = -.236$; $N = 101$). A condition*group interaction was found for accuracy, with higher AT group being less accurate, an effect driven by fear and mouth cues. No significant effect of AT on eye-tracking patterns was found. This is the first study to link hypoarousal reactivity to emotional expressions and high AT in neurotypicals, replicating current findings on clinical samples. Alexithymia effects and directions are discussed. Keywords: autistic traits, hypoarousal; eye-tracking; neurotypicals.

PSY - 11 EVIDENCE THAT URBAN ANTHROPOGENIC NOISE MAY IMPACTS VOCAL COMMUNICATION IN MONK PARAKEETS (MYIOPSITTA MONACHUS).

Tatyana Desire-Brisard (UG) and Frank W. Grasso, Brooklyn College

Anthropogenic noise has a strong impact on the health and breeding success of many species. This is particularly evident and urban environments. We speculate that Monk Parakeets, because they learn their calls during behavioral and neural development would be sensitive to urban noise. We hypothesized that Monk parakeets alter their calls in the presence of urban noise by modifying their call structure in order to communicate with one another under noisy conditions. We collected 23 audio-video recordings of the Monk Parakeets at their nests in urban settings (Brooklyn New York, Barcelona Spain). From these we extracted 140 instances of chatter calls and contact calls. We extracted the audio portions of these videos as .wav files and analyzed these recordings in the Raven Interactive Software Analysis Program for the average amplitude, Peak Frequency Contour (PFC) max frequency, and PFC max slope of the calls. We had also scored the period immediately before the call from various different sounds such as car noises, human noises, and other birds. We found significant increases in audio signal strength in all measures during the period just before the calls indicating good capture of parrot vocalizations. We found no differences between the chatter and contact call types in these measures. We did find increases in peak call frequency [$t(73) = 17.40$ $p < 0.01$] and slope [$t(73) = 9.41$ $p < 0.01$] with increased noise levels in both chatter and contact calls but no significant changes in call amplitude. We conclude that monk parakeets possess the ability to adjust their call structure as a reaction to ambient noise level. These findings may

be applied to understanding the development of vocal neural processes and social communication structures of Monk Parakeets.

PSY - 12 MEASURING DYADIC PUPIL DILATION SYNCHRONY AS A PREDICTOR OF AUTISTIC TRAITS

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Dynamics of the human eye are a well-established method of studying human cognition. Studies have linked gaze and pupil dilation with cognitive processes such as attention, language, and emotional state. However, researchers have only recently examined how these eye dynamics are processed between people. A recent study by Kang and Wheatley found that when two individuals shared attention, their pupil dilations spontaneously synchronized. Our lab aims to replicate this study while examining these dynamics in individuals with differing social attention skills, such as common traits of Autism Spectrum Disorder. We hypothesize that self-reported good conversations have higher levels of pupillary synchrony between dyads, and that individuals with more autistic traits will show less pupillary synchrony with their conversation partners, regardless of conversation quality. Eight participants (4 dyads, 6 female) were placed in pairs and asked to hold a conversation for fifteen minutes. During this time participants had their eye movements, pupillary responses, and conversation recorded via a pair of eye-tracking glasses, a lapel mic, and an external webcam. Participants' autistic traits are measured using the Autism Quotient (AQ). Synchrony values from the conversations were correlated with the standard deviations of each dyad's AQ scores. Preliminary results illustrate that less synchrony during conversation positively correlates with differences in autistic traits within dyads ($r = 0.82$, $p = 0.18$). Though the results from our correlation are insignificant due to the low n-value, the Pearson's r value suggest a positive linear trend between the variation in a dyad's autistic traits and their pupillary synchrony scores.

PSY - 13 THE EFFECTS OF DRAWING ON CHILDREN'S MOOD

Olivia Exama (UG), Brooklyn College

Drawing has been shown to be a coping mechanism in children and adults during stressful times. Previous research has shown that drawing can be used to improve mood in children when used as a way to distract rather than express negative thoughts and feelings (Drake & Winner, 2013). In this study, we examined the drawings of children to determine if they use drawing as a form of distraction. Participants were 46 children, (23 boys and 23 girls) between the ages of 6 and 8 ($M = 92.1$ months; $SD = 9.3$ months). First, we took a baseline rating of the children's mood. We then asked them to think about something that was bothering them and afterwards took another mood rating. Then children were given a sheet of paper and were told to draw whatever they liked. After drawing, children were again asked to rate how they were feeling. They were also asked what they drew and why. Two-independent raters were used to code the children's drawings. A paired sample t test showed that mood decreased after the mood induction, $t(45) = -12.379$, $p < 0.001$, and mood increased after drawing $t(45) = 13.345$, $p < 0.001$. The majority of children drew what they liked/enjoyed (43.5%), while others drew what made them happy (19.6%), what they were good at (10.9%), and whatever came to mind or other (8.7%). This study shows us how children use drawing as a form of distraction as a way to deal with difficult events.

PSY - 14 THE EFFECT OF TEMPERATURE ON THE FREQUENCY OF VOCALIZATION OF MYIOPSITTA MONACHUS

Frank W. Grasso and **Hafsa Fatima** (HS), Brooklyn College

Monk parakeets (Myiopsitta monachus) build complex and intricate nests in close proximity to human habitation. Understanding parrot-generated noise pollution is a quality of life issue for residents living near nest locations. It was hypothesized that there would be a direct relationship between temperature and frequency of vocalization. 196 video and audio recordings of monk parakeet nests were collected in 2017. The ambient temperature at the time of each recording was also noted. For each recording, the number of chatter, contact, alarm, and threat calls were scored. A correlation analysis of temperature on vocalization was then performed. A strong correlation between temperature and chatter calls was found ($r(358) = 0.19$, $t(193) = 2.74$ $p = 0.001$) but no evidence of a relationship to the other calls. A regression analysis showed that for every 1 °F of increased temperature, there is a 0.007 increase in the frequency of chatter calls. An ancillary result indicated a significant difference in the frequency of chatter calls between nests. Anti-sound pollution efforts that target monk parakeet calls therefore should be increased in warmer months.

PSY - 15 INHIBITION OF THE DIRECT PATHWAY VIA DORSOMEDIAL STRIATUM IMPAIRS ACTION SEQUENCE LEARNING BUT NOT PERFORMANCE

Eric Garr (GRAD), The Graduate Center of CUNY and Andrew R. Delamater, Brooklyn College

Our goal was to examine the role of the direct pathway in action sequence learning and performance in rats. To transiently inhibit the direct pathway during action sequence learning, we virally expressed Gi-DREADDs in the dorsomedial striatum of D1-Cre rats and then injected CNO during and/or after training. Rats expressing DREADDs and injected with CNO during training performed fewer sequences early in training and were also slower to initiate and complete sequences compared to three control groups. However, the relative proportion of correct sequences did not differ between groups. When DREADD-expressing rats were then tested on and off CNO after training, there was no change in behavioral performance—indicating that the role of these neurons in sequence performance is confined to the early stage of acquisition. Finally, in tests of selective satiation, we found that sequence initiation is sensitive to reward devaluation but not during post-training D1 inhibition. Sequence completion was insensitive to reward devaluation except in those rats for which D1 neurons were inhibited during training and test.
Support by The Graduate Center of CUNY Doctoral Student Research Grant (DSRG) and NIH NIDA.

PSY - 16 DRAWING TO DISTRACT VS. EXPRESS: THE BENEFITS OF DRAWING TO REGULATE SADNESS AND ANGER

Andrew Genuth (UG) and Jennifer E. Drake, Brooklyn College

Previous research has demonstrated the mood improvement benefits of using drawing to distract as a means of regulating sadness compared to drawing to express and other activities. However, much less is known about how drawing may be used to regulate anger. This study aimed to compare the effects of using drawing to regulate anger and sadness. Participants were 83 undergraduates who experienced a sadness or anger mood induction. After the mood induction, which included a 3-min. guided visual imagery task, we randomly assigned participants to draw to distract or draw to express. Positive affect, negative affect, and arousal were measured before and after the mood induction, and after drawing. A series of mixed design ANOVA's revealed that those in the draw to distract condition reported greater mood improvement after drawing than those in the draw to express condition, regardless of emotion induced (sadness or anger). Those who regulated anger reported higher arousal after drawing than those

who regulated sadness, regardless of emotion regulation strategy (distract or express). A MANOVA revealed that those in draw to distract condition reported greater flow and enjoyment than those in the draw to express condition. A follow-up MANOVA on the flow questionnaire subscales showed that those in the distract condition reported greater challenge-skill balance and autotelic experience than those in the express condition. This study replicates previous findings on how drawing is used to regulate sadness, and to a large degree, extends these findings onto how drawing may be used to regulate anger. Although we may experience emotions differently, this study suggests that similar benefits translate to regulation across different emotions.

PSY - 17 EXAMINING THE INVARIANCE OF WORD PROCESSING: DO MANIPULATIONS OF SIZE AFFECT SIZE JUDGMENTS?

Kimberly Gonzalez (UG), Maryam Choudhary, Marissa Scotto and Natalie A. Kacinik, Brooklyn College

Embodied cognition is a theory proposing that our mental representations and processes are grounded or "embodied" in our perceptual and motor experiences and interactions with the world. Although this general notion has received considerable support by prior research, recent experiments in our lab that involved manipulating size have generally failed to support the theory. The current study continued this work by presenting participants with the same stimulus items and asking then to make explicit judgements regarding 1) the world's appearance according to text size, 2) the size of the item the word represents, or 3) whether the item is something that can be grasped and held in one's hand. Like our previous findings, the size manipulations, specifically font size to be congruent or incongruent with an object's actual size, generally failed to result significant effects, even in tasks that required participants to explicitly process and make decisions about size. These results suggest that word processing is indeed invariant of perceptual appearance and potentially challenge the embodiment of semantics, although some issues and potential explanations will be discussed.
Support by NSF.

PSY - 18 STUDENTS' QUALITATIVE RESPONSES TO AN EXAM WRAPPER INTERVENTION IN ORGANIC CHEMISTRY I

Evan Grandoit (GRAD), **Shoshana Mayer** (GRAD) and Gail Horowitz, Brooklyn College

Reasons as to why students struggle in college level STEM courses have been repeatedly investigated, with poor teaching practices frequently identified as the culprits (Gasiewski et al., 2012; Hunter, 2016). Educators have been slow to implement pedagogical changes, citing financial and time burdens as obstacles. In light of this, we implemented a low cost, minimally intrusive pedagogical tool known as an exam wrapper (Lovett, 2013) into a traditional STEM classroom to examine if it could be utilized to improve students' self-regulated learning (SRL) and/or course performance. We examined the use of exam wrappers in an Organic Chemistry I course at an urban, public university that is highly diverse. For analysis, students were separated into groups based on their course performance and risk of failing (determined from prerequisite performance). We then compared students' reported SRL behaviors to determine if trends emerged in association with the use of exam wrappers. We found a Kruger-Dunning effect (1999) and that satisfactorily performing students did not necessarily put in more time towards the course than unsatisfactorily performing ones. Somewhat surprisingly, unsatisfactorily performing students more frequently reported strategic studying behaviors. Additionally, unknown risk (non-matriculated and transfer students) were approximately 4 times more likely to fail by not showing up and 5 times more likely to withdraw. The majority of students did not indicate plans to check answers, utilize answer keys, or correct their mistakes as planned study behaviors. Overall, results showed that these

exam wrappers can be used to identify students who are at risk, but they may not have triggered behavior changes for some students.

PSY - 19 STUDENT PERFORMANCE IN RESPONSE TO AN EXAM WRAPPER INTERVENTION IN ORGANIC CHEMISTRY I

Natasha Hackman (UG), Baruch College and Gail Horowitz, Brooklyn College

Often UREM's and women are at a disadvantage when STEM courses are taught in large, impersonal style lectures, where pedagogies known to be effective are absent and poor quality teaching dominates (Hunter, 2016). Often ideological resistance, inertia and a lack of resources prevent research proven reforms from being implemented (Wieman, 2016). Exam wrappers are interventions designed to help students improve their performance through the promotion of self-regulated learning. The use of exam wrappers could be an easily implemented tool for professors to not only help already successful students, but also UREMs and women. In this quasi-experimental study, exam wrappers were implemented in an Organic Chemistry I course, at a public, diverse institution. Students were prompted to respond to a series of questions intended to trigger them to implement or change their study behaviors in response to course performance. Results indicated that students who filled out the exam wrappers performed better on the final exam. Additionally, control students were 5x's more likely to fail rather than withdraw as compared to treatment students. Control students were significantly more likely to report watching online videos as a study behavior, whereas treatment students were significantly more likely to report help seeking strategies.

PSY - 20 EXPLAINING THE COUNTER-INTUITIVE EFFECT OF REPETITION ON RECOGNITION MEMORY: IT'S NOT WHAT WE EXPECTED.

Rochelle R. Hall (UG), Matthew J.C. Crump and Nick Brosowsky, Brooklyn College

Abstract Explaining the counterintuitive effect of repetition on recognition memory: It's not what we expected. The present study examines whether the semantic similarity between a prime word and a probe word at encoding influences later recognition memory for the probe word. Rosner, Lopez-Benitez, D'Angelo, Thomson, and Milliken (2018) recently found that participants had worse recognition memory for probe words preceded by repetition primes (same word, eg., truck-TRUCK) during encoding, compared to probe words preceded by unrepeated words (different word, eg., tiger-TRUCK). Our experiment involved the same design as Rosner et al., except that we parametrically manipulated the semantic similarity between prime and probe words in the unrepeated conditions across 5 levels (most-to-least on a rank-based log scale). Our results can then test an account of this phenomena in terms of discrepancy encoding (MINERVA-AL, Jamieson, Hannah, Crump, 2012) which suggests that encoding strength depends on semantic similarity between prime and probe words.
Support by The National Research Foundation.

PSY - 21 THE EFFECT OF POSITIVE CHARACTER INFORMATION ON DISGUST AND ANGER

Jeffrey P. Kravitz (GRAD) and Hanah A. Chapman, Brooklyn College

Recent research has drawn a distinction between moral judgments directly focused on a transgressor's act and judgments focused on a transgressor's character. Functional-evolutionary theories of emotion posit that bad character should elicit disgust (a withdrawal emotion) because stable, negative traits are unlikely to change, so the best course of action may be to avoid those with bad character. By contrast, the transgressions themselves should elicit anger (an approach emotion), which may serve to change the transgressor's future behavior. The current study aimed to provide further evidence for these hypotheses

by manipulating a transgressor's character and testing how this affects feelings of disgust and anger. To manipulate character, we provided information about the transgressor' prior good deeds, compared to a control condition in which no positive information was provided. Participants rated the transgressor's character and the wrongness of their act, and also reported on disgust and anger. The character manipulation was successful: the control condition had worse character than the different-domain (positive character) condition, and, as predicted, condition had a stronger effect on character than on act judgments. However, contrary to expectations, condition did not have a stronger effect on disgust than on anger; rather, the opposite pattern was found. Also unexpectedly, disgust was not chosen more often in the different-domain condition in a forced-choice facial endorsement task (disgust vs. anger). These findings suggest that there are circumstances in which character is not related to disgust; it is possible that only extremely poor character affects feelings of disgust.

PSY - 22 LEFT HANDED WARRIOR

Ana Lakshin (UG), Alla Chavarga, Zoren Degtyarev and Israel Abramov, Brooklyn College

An unusual but prevalent phenomenon in illustration is that characters are depicted holding weapons in their left hands. For a viewer, the weapon placement appears to be on the right side in space, however the actual placement is in the sinistral hand. This occurs so frequently that it extends beyond the expected rate of left-handers in the population. Possible explanations for this phenomenon are handedness of the artist, aesthetic preference, rightward bias due to written language, or mental rotation difficulties. The goal of this study is to begin the systematic investigation of the left-handed bias phenomenon in illustration. Participants were asked to draw a character holding a spoon and another character holding a weapon. Half of the participants took a mental rotation task between drawing sessions, while the other half took a break between drawing sessions and the rotation task at the end. Participants also filled out surveys about handedness, language fluency, and drawing frequency at the end of the experimental session. Mental rotation served as a manipulation to "prime" them to spatially rotate their drawn figures, and all other subject variables derived from the questionnaire were used as factors in a chi-square test of independence.

PSY - 23 ASSESSING DIETARY INTAKE OF OMEGA-3 FATTY ACIDS: BIOMARKERS VERSES SELF-REPORT

Alexander Legg[1] (UG), Ashley R. Polokowski[2] and Laura C. Reigada[2]
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Researchers frequently utilize self-report dietary questionnaires to assess participant food and nutritional intake. One of the most widely used self-report dietary measures in health and nutritional research is the National Cancer Institute's Diet Health Questionnaire (DHQ). The version of the DHQ utilized in this study assessed the intake of 134 food items and 8 dietary supplement questions over the past month. While self-report dietary questionnaires like the DHQ are economically beneficial, this method is limited by the potential for under- or misreporting. Due to these problems, researchers have begun to collect objective measures of physiological states called biomarkers. The current study aimed at examining the consistency of the DHQ to measure omega-3 fatty acid (ω-3 FA) levels. Healthy adults (n=63) completed the DHQ and provided a dried blood spot sample collected via finger prick. Diet*Calc Analysis generated nutrient values of Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA), expressed as nutrient per 100 grams, based on self-report food frequency data from the DHQ. Dried blood spot samples were analyzed for percent fatty acid composition by OmegaQuant Analytics. Pearson's correlation analysis will be conducted to examine the relationship between the self- reported values of EPA and DHA from the DHQ and the obtained values from dried blood spot. To further understand patterns of reporting we will examine

demographic variables including age, sex, and ethnicity. The current study fills a gap in the literature by gaining a better understanding of the dietary assessment of ω-3 FAs among a diverse population of urban college students.

PSY - 24 A COMPUTATIONAL MODEL OF THE PARTIAL-REINFORCEMENT EXTINCTION EFFECT

Brittany L. Lozada (UG), Yoni Zomick and Stefano Ghirlanda, Brooklyn College

In comparison to continuous reinforcement schedules, partial reinforcement schedules produce delayed acquisition and extinction in instrumental and Pavlovian conditioning. While delayed acquisition is well understood in terms of associative learning models, the mechanism behind delayed extinction remains unclear. In instrumental conditioning, Eisenberger has suggested that conditioned reinforcement value may accrue to the sensation of "effort" experienced in partial reinforcement schedules. "Effort" is conceptualized as an additional stimulus, in the form of memory or other internal state. The conditioned value of effort is then assumed to provide a source of reinforcement in extinction. We tested this hypothesis in the simplest case, comparing continuous reinforcement with a fixed-ratio (FR2) schedule in a computational model of instrumental conditioning that includes a mechanism for conditioned reinforcement. Our simulation includes a fictitious stimulus called "effort" that is experienced only under the FR2 schedule. We verified that this stimulus acquires conditioned value and, as postulated by Eisenberger, leads to delayed extinction. Future research will try to extend this result to other partial reinforcement schedules (variable ratio, variable interval, and fixed interval) and will compare simulation results to the empirical literature.

PSY - 25 LEND A HAND TO SUPPORT OUR HEROES: A CLOSER LOOK AT ANXIETY AND LONELINESS IN ISRAELI LONE SOLDIERS ON ACTIVE DUTY

Faigy Mandelbaum[1] (GRAD), **Rochel Ozur**[1] (GRAD), Shoshana Mayer[2] and Laura Rabin[1]
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Anxiety and loneliness are common posttraumatic stress disorder (PTSD) and stress-related symptoms prevalent among veterans. Assessing the trauma history and emotional health of active soldiers can help us understand why some soldiers develop PTSD while others do not. The current study investigated the developmental trajectory of trauma in Israeli lone soldiers (soldiers who are from abroad and/or do not have the support of their family) through identifying endorsed trauma differences between Israeli soldiers and lone soldiers serving in the Israeli army using a convenience sample of n=44. The survey included the following measures: Childhood Trauma Questionnaire, Trauma Symptoms Checklist, Difficulties in Emotion Regulation Scale, and Perceived Stress Scale. Results between the two groups demonstrated strong endorsed differences in childhood trauma, current trauma, and emotion regulation difficulties. Specifically, lone soldiers endorsed severe symptoms across all scales, whereas the Israeli soldiers did not. Examples of items in the loneliness/anxiety domains include: anxiety attacks, $p<.05$; nightmares, $p<.05$; sadness, $p<.01$, loneliness, $p<.001$; feeling isolated, $p<.001$; waking up in middle of the night, $p<.001$, and feeling nervous and stressed, $p<.01$. These results highlight the distress levels of Israeli lone soldiers, which according to the literature, puts them at great risk of developing PTSD in the near future. Ultimately, endorsed child abuse experiences found only in the lone soldiers group, acts as a risk factor for PTSD in soldiers, highlighting the pressing need for new interventions.

Support by Tow Foundation International Research Fellowship.

PSY - 26 HOW DO THE CHANGING SEASONS EFFECT THE GROUP SIZE OF MONK PARAKEETS

Naila Mirza (HS), Midwood High School and Frank W. Grasso, Brooklyn College

The monk parakeet, Myiopsitta monachus, has successfully adapted to life in North America despite its Argentine origins. Census studies indicate that the populations have declined in recent years. Accurate estimates of the populations depend on accurate estimates of the seasonal variation of group size. We hypothesized that monk parakeet group size would be smaller in the spring and larger in the summer because of their annual reproductive cycle. 623 visits to seven monk parakeet nests in Brooklyn, New York were made from the fall through the summer of 2016-2017. During these observations I recorded the number of parrot groups present and the size of each group. We used linear regression and correlation statistics to test for possible relationships between season and group size. We found that there is a positive correlation between group size and temperature. Studies of monk parakeet population size should take into account this seasonal variation in group size.

PSY - 27 MONK TO MONK COMMUNICATION IN BROOKLYN: DO MONK PARAKEET'S (MYIOPSITTA MONACHUS) CALLS INFLUENCE CONSPECIFIC BEHAVIORS?

Fizza Nayab[1] (HS), **Larissa Brijmohan**[1] (HS) and Frank W. Grasso[2]
[1]Midwood High School
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Understanding social behavior of Monk Parakeets (Myiopsitta monachus) is important for the conservation and management of their urban populations. To explore the ways Monk Parakeets social activity related to noise levels, we tested the hypothesis that the frequency the specific behaviors would vary depending on the types of vocalizations the Monk Parakeets emitted. We collected 88, 30-second video samples of wild monk parakeet behaviors from 7 nests in Brooklyn NY. They were scored for the types of vocalizations emitted (chatter call, contact call, alarm call, and threat call) and the behaviors the parrots emitted while vocalizing (nest in, nest out, on the nest, nest in on arrival, in vicinity, response, flight, direction, interaction, carry, and nest construction) during that clip. We performed a chi squared analyses on this data which showed Monk Parakeets make more chatter calls and fewer contact calls when they are near the nest than expected by chance $\chi2(1)=7.67$ $p < 0.05$. That this is due to communication between Monk parakeets is supported by the result that Monk Parakeets in our sample engaged in different behaviors depending on which types of vocalizations were emitted. $\chi2(6)= 58.20$ $p < 0.01$. Based on these results, we speculate that the higher frequency of chatter calls occurs because the Monk Parakeets are more likely to challenge unfamiliar parrots (visitors from other nests) comparted to Monk Parakeets with which they are familiar. This possibility raises important implications for conservation and management of Monk Parakeet noise levels in residential areas.

PSY - 28 THE EFFECTS OF EMOTION REGULATION STYLES ON NARRATIVE CONTENT IN AN EXPRESSIVE WRITING PARADIGM

Jean Hillstrom[1], Shalamar Raimie[2], Bryan Chan[2], **Jordan Jean Pierre**[1] (UG), Pa Her[1] and **Christopher Persaud** (UG) [1]
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Research shows that writing about traumatic, stressful or emotional events is associated with improved health and well-being. We assessed the effects of a standard vs. meaning-making expressive writing format on written emotional expression over time and whether the content would be moderated by emotional regulation strategies. The results of this study show that writing instructions (standard versus meaning-

making) affect the writing content differently for men and women over time. Further, the emotion coping strategy of emotional suppression moderated some of these results. Implications are discussed.
Support by NIH Bridges to the Baccaulaureate.

PSY - 29 MICROAGGRESSIVE EXPERIENCE OF WOMEN IN PSYCHOLOGY: FOSTERING RESILIENCE THROUGH QUALITATIVE RESEARCH NARRATIVES

Amanda Almond, **Audrey Powell** and **Daisy Salas** (UG), New York City College of Technology

Microaggressions are a common experience, particularly for women and members of underrepresented cultural groups. As psychologists, it is our ethical responsibility to be aware of and to minimize the likelihood of committing microaggressive acts, particularly with respect to students, supervisees, and others where there is a power differential or evaluative relationship. For this project, we will summarize qualitative findings of microaggressive experiences from 290 women who identify as doctoral students and early career psychologists throughout the United States. Research will describe the cultural identities that were most frequently targeted during acts of microaggressions, as well as the type of microaggression (microinsult, microassault, microinvalidation), the most common responses to such microaggressions, and the feelings identified by the participants. We will then discuss implications for students, faculty, and supervisors for recognizing and responding to microaggressive experiences, particularly when navigating power differentials in academic and work environments.
Support by NIH Bridges to the Baccaulaureate.

PSY - 30 NEST COMPOSITION OF THE MYIOPSITTA MONACHUS

Soanne Saint Victor (HS), Midwood High School and Frank W. Grasso, Brooklyn College

Myiopsitta monachus, also known as monk parakeets, are native to Argentina, but have managed to thrive in the United States for many years. These unique birds have sparked interest in scientists and members of the community. This study was conducted on how variation of nest composition affects the construction of the monk parakeet's large, communal nests. This study was done measuring the diameter (mm), spanned and total length (mm) of sticks and determining the tree species of these sticks. The data was analyzed to determine how each measurement varies with the species of tree. This will lead to the discovery of monk parakeets having variation in the sticks used in each nest. One conclusion made is that monk parakeets use multiple sticks from the same species to build their nests, but with different lengths. Using this conclusion, one can determine that the sticks used are based on the monk parakeets' preference. It has been determined that monk parakeets do choose the length of the sticks they use, therefore the choice is based on the species of tree. Of all the nests studied, one nest was found to be different from the others because the sticks were thinner.

PSY - 31 THE EFFECTS OF MONK PARAKEET AGE ON SOCIALITY

Aushna Saleem (HS), Midwood High School and Frank W. Grasso, Brooklyn College

Monk parakeets are multi-decade inhabitants of Brooklyn that contribute to noise pollution; they make loud social calls in their communal nests atop trees, telephone poles, and utility structures. Understanding their social behavior is important for the quality of life of urban residence living in proximity to monk parakeets. We hypothesized that young and old parakeets would differ in their agonistic displays. We observed 339 social interactions around Brooklyn between October 4th, 2016 and March 24th, 2017 for phase 1 of the project and recorded their ages and frequency of six agonistic behaviors (biting, feather-pulling, perch-displacement, chasing, vocalization and aggressive vocalization). Analysis of our aggression data did not support our hypothesis. However, analysis of each of these variables showed that vocalizations

varied significantly with age, X2(1)=10.36,p<0.01. Old monk parakeets vocalized two times more than young. Also, all the parakeets in our sample vocalized significantly more in the spring than in the fall or winter (H(2)=9.94,p<0.01. We therefore conducted a second study designed to address these relationships directly. The same variables were observed, but on videos of monk parakeets from May 23th, 2017 to July 28th, 2017. Analysis of these data showed that there was no significance difference in aggression between young and old birds, X2(1)=0,p<0.01. However, age of parrots varied with group size; old monk parakeets were more likely to be alone, while young were more likely to be in a group, X2(1)=5.397,p <0.01. Overall, these two studies allow us to conclude that monk parakeets are relatively non aggressive animals, and noise control efforts are best based on old monk parakeets in the spring.

PSY - 32 CHANGING PERCEPTION OF ETHICS: A STUDY ON THE EFFECTS OF ETHICS TRAINING IN RESERACH EXPERIENCE FOR UNDERGRADUATES (REU) COHORTS

Sharon M. Santhosh[1] (UG), Faigy Mandelbaum[1], Rose Bergdoll[1], Julie Schell[2], Deborah Walder[1] and Laura Rabin[1]
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The field of neuroethics encompasses the ethics of neuroscience and the neuroscience of ethics. Components include grey areas such as free will, agency, moral judgement, self, and personality. There is an increasing need to help students address ethical grey areas, especially because university courses in neuroethics are scarce and a single ethics course may not be sufficient to develop a reflective understanding of ethics. Research Experience for Undergraduates (REU) programs such as the one housed in the Psychology Department at Brooklyn College, can help address these concerns by providing group focused discussions of ethical areas in various STEM disciplines. Ethics training enhances REU programming by enabling students to navigate personal and societal issues at the interface of research ethics. In this study, REU students engaged in intensive neuroethics training modules (CITI training certifications, 3-hour workshop with a research ethics specialist, and neuroethics-focused discussions). Students from four consecutive REU cohorts (n=44) completed pre-and post-assessments regarding their understanding of ethical issues in research. Results indicated that the REU ethics training increased students' understanding of research ethics and ethical dilemmas. For example: "Please rate your confidence in your knowledge of research ethics at this moment" changed pre to post, p<.001. Additionally, student views on the importance of research protocols, ability to identify ethical problems in research, and confidence in providing ethical advice to peers also changed significantly. These findings highlight the potential of REU ethics intervention training to redefine perceptions of ethics, suggesting that similar programs should be implemented across college campuses.

PSY - 33 DIFFERENTIAL SPACE-USE BETWEEN WILD-CAUGHT AND LABORATORY-REARED OCTOPUS BIMACULOIDES

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Octopus is well known for its highly derived neural and sensory systems, rapid learning capabilities, and remarkable behavioral flexibility. Most, if not all, previous research into the behavioral and cognitive characteristics of octopuses has been conducted using wild caught animals of uncertain age and unknown life histories. The present study is one of few explorations of behavior in O. bimaculoides which were raised from the egg under laboratory conditions, and thus have known life histories. Animal locations within identical individual housing units were recorded daily (for 20-74 days). A measure of information entropy was calculated for each animal (lower values reflecting greater fidelity to particular locations) on the observed proportions of time spent per location. A statistically significant difference was identified (t(14)=-2.56, p=0.02; Cohen's d=1.3; 95% CI[-0.21, -0.02]) between the two life history conditions, with the

laboratory-raised animals (N=12) displaying greater entropy than wild (N=4). A potential trend in entropy across time was assessed with a repeated-measures ANOVA, and significant differences were identified across both time ($F(4, 56) = 6.595$, $p < .001$) and life history condition ($F(1, 14) = 7.127$, $p = .018$). Although potential confounds were present in this dataset, we believe these results underscore the previously underappreciated importance of early experience for studies of spatial learning and cognition in Octopus.

PSY - 34 EXPLORING INDIVIDUAL VARIABILITY IN ESCALATION OF OPIATE INTAKE IN SIGN-TRACKERS AND GOAL-TRACKERS

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Prescription and nonprescription opioid abuse has steadily increased over the past two decades and has had a detrimental impact on the quality of life for affected individuals, their families, and on society. Studying individual differences in addiction vulnerability is a critical step towards understanding the neurobiological underpinnings of motivation for drugs and their impact on the brain and behavior. Prior studies have indicated that variability in striatal dopaminergic signaling is related both to escalation of drug intake and to individual differences in natural reward approach known as sign- and goal-tracking phenotypes. Sign-tracking rats show heightened motivation for food-predictive cues and subsequently show greater cue-induced drug relapse than goal-tracking rats. Here we sought to determine whether individual differences in tracking phenotype predict escalation of opiate intake. To begin to explore this possibility, we tested the hypothesis that within individual variability in sign- and goal- tracking would predict escalation of heroin and food intake. Using Pavlovian lever AutoShaping procedure to determine the sign- and goal-tracking phenotype. We trained sign- and goal-tracking rats to self-administer heroin (0.05 mg/kg/infusion) or food reward on a fixed ratio (FR1),20sec. time-out schedule. In the intermittent access phase of self-administration training, rats learn that heroin or food reward were only available for 5 minutes every half hour for three-hour sessions. Currently, we are examining individual variability in the acquisition and escalation of heroin and natural reward intake in sign- and goal-tracking rats.

PSY - 35 MONK PARAKEETS (MYIOPSITTA MONACHUS) PREFER TO NEST IN RESIDENTIAL AREAS OF BROOKLYN RATHER THAN GREENSPACE

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Monk parakeets (Myiopsitta monachus) are viewed by many people in urban settings as a noise nuisance - an important source of noise pollution and quality of life. Monk parakeets are originally from Argentina, but they have been imported to the United States and now are inhabiting urbans areas of New York City including , Brooklyn. If monk parakeets have a preference to where they choose to nest, it could help inform people who dislike loud environments on where they should live. We hypothesize that the monk parakeets do have a preference of where they choose to build their nests based on the quality of the sites in Brooklyn. We recorded the GPS coordinates of 187 monk parakeet nests in Brooklyn and mapped them into an Arc GIS database. We used the NYC database of land quality as additional layers in the Arc GIS map. We scored the quality of each nest location (within 50 meters of each nest) as a proportion of water, residential, or greenspace. We examined the proportions of greenspace to residential space for each nest. We found that the monk parakeets in our sample significantly preferred to nest in residential areas compared to greenspace. [$\chi 2=7.06$ $p<0.01$]. This result might be interpreted as the existence of more food sources for the omnivorous monk parakeets near human habitation. This possibility suggests that management of parrot-generated noise pollution in urban settings might be improved by tight control of human food waste such as sanitation, backyard birdfeeders, and littering.

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