PSY-1 DRAWING AN IMAGINARY WORLD: THE EFFECTS ON SHORT-TERM MOOD IMPROVEMENT IN CHILDREN

Irfa Kafayat (UG) and Jennifer Drake, Department of Psychology, Brooklyn College, Brooklyn, NY.

Previous research has shown that drawing improves short-term mood in both adults and children when used as a form of distraction rather expression (Drake & Winner, 2012; 2013). This study examined the advantages of a distraction drawing task that calls for creation of an imaginary world vs. a non-imaginary world. When children use their imagination to create an imaginary world, their emotions are directed at the events in that imaginary world rather than ongoing, actual events (Harris, 2000). This study included 60 children between the ages of 6 and 8 (M = 7;6; SD = 0;10; 32 females). In order to induce a sad mood, I asked participants to think of a disappointing event. After the negative mood induction, I randomly assigned children: to draw a picture of a real event (a dog chasing a robber) or a picture of an imaginary event (dragon chasing a witch). With the premise that imagination and fictional events can help improve mood, I predicted that those in the imagine condition, children who drew a "dragon chasing a witch" would have a greater mood improvement than those in the real condition. Mood was measured before and after the mood induction and after drawing. Mood improvement did not differ between the two conditions, (1, 59) = 0.366, p = 0.548. However, the imaginary condition was marginally more absorbed in the activity than the real condition, F (1, 59) = 3.109, p = .083. This study suggests that regardless of type of drawing task, imagine or real, drawing serves as a form of distraction, which improves children's mood in the short-term.

PSY-2 EMOTION IN ART: DIFFERENTIATING EXPERIENCED AND REPRESENTED EMOTION IN REPRESENTATIONAL AND ABSTRACT ART

Isabella Poloes (UG) and Jennifer Drake, Department of Psychology, Brooklyn College, Brooklyn, NY.

Research has shown that sad music induces pleasant emotion (Kawakami et al., 2013). While it has been suggested that sad art can be recognized as sad but not necessarily make us feel sad (Goodman, 1968), this question has been understudied in the visual arts. In two studies, we examined whether we can differentiate between experienced and represented emotion for representational and abstract art and whether it is possible that we experience more negative emotions when viewing art filled with suffering and tragedy but we find this art more powerful. Results demonstrated that we are able to differentiate between the emotions we experience when viewing a painting and the emotion represented in a painting. This effect is not as strong for abstract art where we experience and represent less emotion than representational art (portraits and landscapes). Finally, we found that negative paintings were rated more powerful than positive paintings and representational works were rated more powerful than abstract art. Our results are consistent with the work on music showing that our experience of art differs from the emotion expressed in the work.

PSY-3 DIFFERENTIATION OF ABSTRACT ART BY FAMOUS ARTISTS AS COMPARED TO ART BY CHILD PRODIGIES

Ann M. Jose (UG) and Jennifer Drake, Department of Psychology, Brooklyn College, Brooklyn, NY.

In a series of three studies, I asked whether children identified as abstract art prodigies make abstract paintings indistinguishable from typical children or whether their works are actually more like those of adult abstract masters? I identified abstract child prodigies who had been written up in the popular press and had professional websites. I matched the prodigies' images to images by famous artists and

typical children on color, line, and composition (Hawley-Dolan & Winner, 2011). The final images consisted of three sets of 10 pairs: 1) artist-child; 2) prodigy-child; and 3) artist-prodigy. In Study 1, participants were randomly assigned to view one image set and were asked to identify the artist (in the artist-child and artist-prodigy pairs) and the prodigy (in the prodigy-child pairs). Participants were able to distinguish typical child from artist paintings and typical child from prodigy at a rate above chance. They proved unable to distinguish artist from prodigy paintings. In Study 2, participants were randomly assigned to view one image set but this time the images were presented as a single image. In the artist-child condition, participants correctly identified the artist and in the prodigy-child condition correctly identified the prodigy. But in the artist-prodigy condition, participants incorrectly identified the works by the prodigy as by the artist. In Study 3, I examined the role of intention and structure. Participants perceived more structure and intention in the works made by famous artists and prodigies. Taken together, these findings show that children identified as prodigies in abstract art may genuinely be gifted.

PSY-4 TRASACTIVE MEMORY SYSTEMS OF THREE TYPES OF WORK GROUPS

Bethany Longer (GRAD), Baruch College, New York, NY.

When people come together to complete a task, they bring knowledge that other people in the group may not have. When a person has a specialized piece of knowledge that they must share with the group in order to complete that task, they use transactive knowledge systems in order to relay that information. Different types of groups may be more or less reliant on these shared knowledge systems. Some group tasks require more of a member focused approach (teams), while others may be more task focused (task forces) or tool focused (crews). Each type of work group differs in structure and approach. We hypothesize that they will also differ in the types of transactive memory systems they utilize in order to complete their task. In order understand the differences in transactive knowledge systems used in different types of groups, we intend to assemble three different types of work groups (teams, task forces, and crews), each with a unique task that is reflective of that type of group. Through observation and analysis of these tasks, we are hoping to be able to assess the types of transactive knowledge systems that were used and how often they were used. We will also administer a survey in order to gather individual group member's perceptions on the work group they were in as well as their use of transactive knowledge systems. This information will hopefully enable us to determine what types of transactive knowledge systems are commonly utilized in the different types of work groups and we will be able to compare and contrast them across groups. These outcomes would ideally be used in the workplace by helping create customized work group interventions that are suited to task type and improve the transactive knowledge systems that are utilized by that type of group.

PSY-5 CEREBRAL ASYMMETRIES IN METAPHOR COMPREHENSION: EXAMINING THE INFLUENCE OF TASK

Kole A. Norberg (UG) and Natalie A. Kacinik, Department of Psychology, Brooklyn College, Brooklyn, NY.

Right hemisphere (RH) involvement in comprehending metaphors remains unclear. Most neuroimaging (Rapp et al., 2012; Yang, 2014) and a prior divided visual field (DVF) study (Kacinik & Chiarello, 2007) find that the RH is not more important than the LH. However, investigations using brain-lesioned participants (Brownell et al., 1990; Lundgren et al., 2011) or TMS (Pobric et al., 2008; Kacinik et al., 2014, CNS poster) support the RH as preferentially involved in metaphor comprehension, indicating RH importance for understanding metaphors may not be evident until RH processes have been impaired. Although the studies by Kacinik and colleagues used the same stimuli, the DVF and TMS experiments involved

different tasks (lexical decision vs. relatedness judgments, respectively), which may have contributed to the discrepant results. The current study presented the same stimuli in a DVF paradigm with lateralized target words and asked participants to decide if the word was related to the meaning of the preceding sentence. The reaction time data did not show any interactions, only main effects of relatedness, stimulus type, and visual field, with significantly faster responses to related items and literal compared to metaphoric stimuli in the RVF/LH vs. LVF/RH, respectively. Accuracy results were similar, except relatedness interacted with stimulus type and visual field, such that responses to metaphorically related target words in the LVF/RH were the least accurate. These findings further demonstrate that both hemispheres are normally equivalently involved in metaphor comprehension. However, the importance of RH processes becomes more evident when they are disrupted since it seems our previous TMS results were not simply due to the use of an explicit relatedness judgment task.

PSY-6 TRANSACTIVE MEMORY IN TEAMS, TASK-FORCES, AND CREWS

Patricia Ansah[1] (UG), Bethany Longer,[2] Elisabeth Brauner.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Baruch College, New York, NY

A computer is a tool that helps process and store information. Transactive memory systems (TMS) operate in a similar way. 'Transactive' means information is conveyed, and transfer of knowledge occurs through communication. The TMS dimensions meta-knowledge, transactivity, integration, differentiation, and cognitive interdependence play a vital role in the functionality and success of groups. Meta-knowledge is knowledge about knowledge; transactivity involves knowledge transfer processes that occur among team members; integration of shared knowledge makes TMS functional; higher differentiated knowledge equates to greater specialization of expertise; and cognitive interdependence indicates how reliant we are on the knowledge of our team members. An experimental study was designed to analyze how TMS are used in small groups (dyads) and how they differ based upon the group type and group purpose. Participants will be Brooklyn College students ages 18 and older. One hundred and fifty participants will sign up via SONA system (25 teams per group task). Using a random numbers generator, we will randomly assign the participants to one of three conditions: teams (higher interpersonal communication), task forces (coordinated expertise for goal acquisition), or crews (rigid roles associated with tools, machines, and equipment). Verbal data will be captured through audio recording and the TM dimensions will be analyzed with the Transactive Knowledge Interaction Schema (TRAWIS). We predict that meta-knowledge will be highest in teams; cognitive interdependence will be lowest in teams and crews; transitivity will be highest in teams; differentiation will be highest in crews; and finally integration will be highest in teams and lowest in crews.

Supported by LSAMP (Louis Stokes Alliance for Minority Participation)

PSY-7 THE INTERSECTION OF LIFE SATISFACTION, MENTAL HEALTH, AND NATIONAL POLITICS

Frank B. Watkins (UG) and Elisabeth Brauner, Brooklyn College, Brooklyn, NY.

Using General Social Survey (GSS) data, we were interested in how peoples' demographics affect their attitudes. The GSS is a study conducted every two years in the United States. Participants from different backgrounds respond to questions measuring 5,867 variables. Our three main research questions were: how does experiencing discrimination affect one's attitudes towards life and mental health; how do political views affect one's attitudes towards expectations of life satisfaction; and how does place of origin/family's place of origin affect one's attitudes towards life. We downloaded the data from the GSS website and extracted 29 variables that will allow analysis of our research questions. We selected data

only from the years of 2004, 2006, 2008, 2010, 2012, and 2014. The participants in this sample of 15,902 respondents were 44.8% men and 55.2% women. They were 75.4% white, 14.4% black, and 10.2% other. The median age was 46. Using an ANOVA, we will test whether race and experience of discrimination will affect attitudes towards life such as how many days of poor mental health the respondent had in the last 30 days, the respondent's general happiness, and whether or not the respondent thinks that their life is exciting or dull. We also plan to use regression analysis to predict participants' attitudes towards life based on their political views.

PSY-8 EFFECT OF STIMULUS SIMILARITY ON EXTERNAL INHIBITION IN HUMANS

Jonathan Zomick[1,2] (UG), Mazal Salame,[1] Dr. Stefano Ghirlanda.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Touro College, New York, NY

External inhibition is a phenomenon of associative learning that is little understood and until now has not been studied successfully with human subjects. Importantly, different theoretical models of associative learning have made varying predictions regarding the degrees in which external inhibition will be observed. Our study utilizes an original approach for examining external inhibition in humans. Using randomized checkerboard patterns as stimuli, subjects were first conditioned to respond to one set of patterns with one keystroke, and to a second set with a different keystroke. Then subjects were presented with the original stimuli along with a novel stimulus which was either similar or dissimilar to the conditioning stimuli. Our findings indicate that humans are more likely to respond to a conditioned stimulus when that stimulus is presented with a similar stimulus than when paired with a dissimilar stimulus. These findings are in line with predictions made by Pearce's (1987,1994) configural model of associative learning and present a challenge to the "replaced elements" model proposed by Brandon et al. (2001).

Supported by NSF

PSY-9 INTEGRATION OF AUDIOVISUAL INFORMATION IN PRETERM VS FULL-TERM INFANTS

Gabrielle N. Akcelik[1] (UG), Lauren Emberson,[2] Ph.D.
[1] Brooklyn College, Brooklyn, NY
[2] Princeton University, Princeton, NJ

Audiovisual integration is a key component to speech perception development in infants. The audiovisual integration ability of full-term infants has been widely studied, but there have been few audiovisual integration studies with their preterm counterparts. We hypothesize that preterm infants will have a lesser audiovisual integration ability than full-term children, as a step to understanding the link of some neurodevelopmental disorders to preterm status. Participants [N=68; 31 preterm, 37 full-term, all at 18 months of age] saw two adjacent videos of a person mouthing either vowel /i/ or vowel /u/. Simultaneously, an audio clip of the person speaking only one of the vowels played, synchronized with the corresponding mouth movement while the gaze of the infants was measured by a Tobii eye tracker. Both preterm and full-term infants performed equally on the task; both groups looked at the distractor video more than the target video, showing no signs of audiovisual integration. When the eye tracking data from both groups were analyzed by vowel, the data showed that both groups would only look longer at the correct video when the vowel /u/ was presented, showing a bias towards the vowel /u/. The eye tracking data from both groups were also analyzed by target video side. Both groups showed a rightward bias. These results suggest that the preterm and full-term infants have similar abilities of integrating audiovisual information with this task.

Supported by NIH NIGMS GM62981 (RISE) and GM08078 (MARC)

PSY-10 UNDERSTANDING THE ROLE OF THE PREFRONTAL CORTEX IN THE JUDGMENTS OF LEARNING (JOL)

Sandry M. Garcia[1] (UG), Alexandra Gaynor,[2] Elizabeth F. Chua.[1,2]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY

Awareness of our own memory, or metamemory, is important for effective behavioral control. The Judgment of Learning (JOL) is a metamemory task in which participants study new information and then rate their confidence that they will remember that information at a later test. Studies have shown that individuals often base JOLs on cues such as ease of processing, even when such cues are not predictive of later memory accuracy. Brain research has implicated the anterior prefrontal cortex (aPFC) and dorsolateral prefrontal cortex (DLPFC) in metamemory, but no studies have tested the roles of these regions when JOLs are based on different types of cues. We applied high definition transcranial direct current stimulation (HD-tDCS) during a JOL task to test the roles of the aPFC and DLPFC in JOLs based on different cues. 22 subjects studied 100 words, which were high or low frequency, and presented upright or inverted, and made a JOL rating for each, while receiving aPFC, DLPFC, or sham stimulation. 24 hours later, they were given a recognition test. Our preliminary data replicated past behavioral studies: subjects gave higher JOLs for high frequency words ($p<0.05$) despite better memory for low frequency words ($p<0.001$). They also gave marginally higher JOL ratings for upright words ($p = 0.08$), despite better memory for inverted words ($p<0.001$). There was a stimulation x frequency x orientation interaction on mean reaction times for JOL ratings ($p < 0.05$). For low frequency words, both DLPFC and aPFC stimulation led to faster JOLs for upright than inverted words. Thus, there is some evidence that the PFC is broadly involved in making JOLs, and that stimulation caused subjects to rely more on ease of processing, even though this is non-diagnostic of future memory accuracy.

Supported by NIH/NIGMS MARC GM008078.

PSY-11 DEFICITS IN EMOTION RECOGNITION IN INDIVIDUALS WITH PSYCHOPATHIC TRAITS

Zoren Degtyarev[1] (UG), Yu Gao.[1,2]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY

Previous research has shown that psychopathic individuals show deficits in emotion recognition, specifically the emotion of fear, and that deficits in fear recognition in those with psychopathic traits were associated with a reduced attention to the eyes. Meanwhile, it was also shown that females are more accurate at recognizing emotions compared to males. I hypothesize that in undergraduate student population, people with high psychopathic traits will show deficits in recognition of facial expressions, fear in particular. I also hypothesize that there is a main effect of gender: females will have a higher accuracy compared to males at recognizing fear. One hundred and one Brooklyn College students (71% female) between 18-25 years old (m=20.35) participated in the study. Participants had to categorize five different emotions (happy, sad, angry, fearful, and neutral faces). Accuracy and reaction time during the task, as well as their self-reported psychopathic traits were assessed. Results showed that individuals who were higher on psychopathic traits had larger reaction time (i.e., took longer time) to categorize emotion of fear. No main effect of gender or psychopathy was found in relation to accuracy of fear recognition. Findings indicated that psychopathic traits are associated with certain emotion recognition

deficits, in particular the emotion of fear. Being able to categorize fear is extremely important for empathy development and aggression control.

Supported by NSF REU Research - Experiences for Undergraduates Students Program in Neuroscience.

PSY-12 THE ROLE OF HYSTERYSIS AND FEED-FORWARD CONNECTIVITY IN SOFT ROBOTIC AND ANIMAL LIMB CONTROL

Avery J. Sternglass (UG), Frank W. Grasso, Brooklyn College, Brooklyn, NY.

Soft robotics is an emerging field that promises new manipulator technologies with greater flexibility than fixed-linkage robots. That such robots can be physically realized is evidenced by hyper-redundant motor systems observed in cephalopods; (e.g., or example octopus arms that manipulate objects and are constituted without rigid structures like bones or exoskeletons). Squid tentacles are a 1-dimensional system with no rigid parts, muscle and connective tissue with nearly infinite degrees of freedom. They constitute a simplified system to study soft actuator control in animals and robots. We simulated squid tentacle strike control with a biomimetic neural network to control a simple model tentacle. We explored plausible alternative neural architectures that are structurally isomorphic to the connectivity of the squid nervous system. We hypothesized that altering the hysteresis and feed-forward connectivity would affect the trajectory of the tentacle club. To test our hypothesis we ran simulations under conditions of a) direct feed-forward connectivity b) indirect feed-forward connectivity c) mixed feedforward and recurrent connectivity. The model produced biologically realistic ~50.% strains under the control of our networks. We found that the hysteresis intrinsic to networks with recurrent connectivity more closely reproduced the trajectory of squid tentacles than either direct or indirect feedforward networks. Our research suggests that hysteresis is something that is integral in the control neural networks of squid tentacle strike and that this principle might find useful application in the control of soft robots.

Supported by NSF REU.

PSY-13 LISTEN TO ME! OLDER MONK PARAKEETS VOCALIZE SIGNIFICANTLY MORE THAN YOUNG IN SOCIAL SITUATIONS

Aushna Saleem[2] (HS), Andrew G. Fulmer,[1] Frank W. Grasso.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

Monk Parakeets are multi-decade inhabitants of Brooklyn that contribute to noise pollution. They are noted for their loud social calls in their communal nests atop trees, telephone poles, and utility structures. Control and reduction of their loud vocal behavior might improve the quality of life of people living nearby. We hypothesized that young and old parakeets would differ in their agonistic displays. We observed 339 social interactions among them, between October 4th, 2016 to March 24th, 2017 and recorded their ages and frequency of six agonistic behaviors (biting, feather-pulling, perch-displacement, chasing, vocalization and aggressive vocalizations). Analysis of each of these variables showed only that vocalizations varied significantly with age, $\chi 2(1) = 10.36$, $p < 0.01$. Older monk parakeets vocalized two times more than young ones. Also, all the parakeets in our sample vocalized significantly more in the spring than in the fall or winter ($H(2) = 9.94$, $p < 0.01$). Our original hypothesis was not supported; however our results suggest that noise control for human quality of life in proximity to monk parakeets would be enhanced by excluding adult Monk Parakeets. We conclude that focusing noise control efforts on older birds in the spring would most efficiently contribute to noise reduction.

PSY-14 CLEAN UP IN AISLE 7! ASSESSING THE ROLE OF COGNITIVE CONTROL FOR ACTION SEQUENCING IN TYPING

Marissa Scotto[2] (UG), Matthew J. Crump,[1] Lawrence P. Behmer.[1]
[1] Brooklyn College, Brooklyn, NY
[2] The City College of New York, New York, NY

Humans have the remarkable ability to perform tasks fluidly and flexibly. To do so, we must be able to control the order of our actions and involved motor behaviors. While the execution of these tasks happens automatically, how do we determine when we need to control our motor movements? Past research has shown that the anterior cingulate cortex (ACC) has a specialized role in signaling for control. The ACC decides when conflict is present and recruits the prefrontal cortex (PFC) to implement control during response co-activation. Response co-activation in typing occurs when all letters of a word become activated while planning. Implementing a typing task is a unique approach for testing the activation of the ACC since it is a continuous and everyday task compared to past studies which used the Stroop or Flanker tasks. Neither of these tasks simulates real-world situations and can be difficult to generalize to everyday situations. However, if the ACC is involved in detecting conflict during a typing task we can generalize the real-world application of the ACC. In our study, subjects participated in a typing task of normal and random letter strings varying in length from 1, 3, 5, or 7 letters while ACC activity was recorded using Biostem EEG technology. We are interested in if ACC activation will change as a function of word-length. We should expect that as the response co-activation increases, the subsequent ACC activation will also increase. We successfully measured the ACC and its neural correlates with control and the PFC involvement. Our results have contributed to understanding the role of the ACC as a function of word length and subsequently how humans are incredibly proficient at performing tasks with great speed and accuracy.

Supported by REU NSF.

PSY-15 GENERATIONAL DIFFERENCES IN NEST CONSTRUCTION BEHAVIOR IN MONK PARAKEETS (MYOPSITTA MONACHUS)

Noor Asif[2] (HS) and Frank W. Grasso.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

The monk parakeet is native to Argentina and has established thriving populations in urban communities worldwide. Their nest construction behavior is of commercial and scientific interest because of its intensity and duration. We hypothesized that young parakeets (<1 year), being inexperienced would contribute less to nest construction than older parakeets. We observed 1387 nest construction events (sticks carried, added, removed and/or relocated) in the Brooklyn Population of Monk parakeets between January 26th 2016 and April 8th 2017. We estimated the age of the birds from their head color. We had insufficient observations of stick relocation for analysis but found significantly lower carrying $\chi 2$ (1) = 7.90 $p < 0.01$, addition $\chi 2$ (1) = 5.45 $p < 0.05$ and removal $\chi 2(1) = 14.92$ $p < 0.01$ by young parakeets than older ones. This is consistent with the hypothesis that nest construction is to some extent learned in these species and with the suggestion that they are cooperative breeders that benefit in their own reproductive success from helping behavior in their first year.

PSY-16 EMOTION RECOGNITION AND AUTISTIC TRAITS IN NORMAL YOUNG ADULTS: AN EXPLORATORY STUDY OF EYE GAZE AND PSYCHOPHYSIOLOGICAL RESPONSES.

Helio C. Cuve[1] (GRAD), Yu Gao[1], Shawn Fagan.[2]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY

The present study aimed to explore the relationship between emotion recognition abilities and autistic traits using a sample of undergraduate college students. We hypothesized that performance on emotion recognition task would be differentially associated with fixations patterns and psychophysiological responses and that autistic traits might moderate those relationships. One hundred and one undergraduate students participated in this study and their eye-tracking patterns and psychophysiological responses were recorded during an emotion recognition task. We found that higher accuracy was associated with shorter reaction time, $r = -.273$, $n = 101$ $p < .01$, and longer eye fixation to the mouth region in the free gaze condition, $r = .295$, $n = 97$ $p < .01$, and also to the eye region in the cued-mouth condition, $r = .430$; $n = 101$, $p < .05$. In addition, higher accuracy for sad expression was associated with longer fixation to the mouth region in the free gaze condition, $r = .254$, $n = 90$, $p < .01$ and to the eye region in the cued-mouth condition, $r = .305$, $n = 97$ $p < .01$, but not in the cued-eye condition. The effects of autistic traits were not found significant. These results suggest that the holistic processing of facial expressions is important for emotions with co-joint diagnostic features that include the eyes and mouth regions, such as sadness, and that autistic traits do not affect emotion processing in non-clinical samples. Aspects related to sample size and stimuli type need to be addressed in future studies. Keywords: emotion, facial expressions, eye tracking, cued, psychophysiology.

PSY-17 DIVERSITY OF AXOLOTL (AMBYSTOMA MEXICANUM) SNAPPING BEHAVIOR IN RESPONSE TO HYDRODYNAMIC PERTURBATION

Pornin Tauthong (UG), Alice Chan, Frank W. Grasso, Brooklyn College, Brooklyn, NY.

Axolotls express an obligate aquatic lifecycle that does not include the terrestrial phase observed in other salamanders. This developmental characteristic offers a window on the evolution of behavior because axolotl snapping behavior is informed by the lateral line; therefore, axolotls use neural circuits shared with older, aquatic ancestors but not their immediate terrestrial ancestors. It was hypothesized that, as a reflection of this evolutionary history, axolotls would show multiple kinematic modes of snapping. Food-pellets were used as target stimuli for 10 axolotls, and videos of their responses were recorded at three locations: ~2 cm either to the left, right, or in front of the head. Pellets were presented 9 times to each animal three times in each location. From the videos (30 fps), 19 body points over a two-second period were computer-tracked. From these digitized points, a set of "poses" for each video frame was computed. ~4,000 poses were originally found, which was later reduced to 112 poses using a principle component analysis. From these poses, GSEQ lag-sequential analysis was used to find consistent trajectories through series of poses. 19 trajectories associated with the left-, 20 with the right-, and 10 with the center-presented stimuli were found. Some modes were common between the different stimulus locations and some were unique. The diversity of kinematic snapping behavior modes (sensory-motor programs) supports the idea that the snapping behavior of axolotls might arise from multiple neural circuits. The ultimate cause of this diversity could be either that there are learned components to snapping in axolotls or that the special phylogenetic history of these animals resulted in a diversity of genetically determined neural circuits or both.

PSY-18 PERFORMANCE ON FEELING-OF-KNOWING AND RECOGNITION TASKS THAT VARY BY CHOICE DIFFICULTY

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

Memory accuracy is measured by one's ability to retrieve information, whereas metamemory is defined as the ability to monitor one's own memory. One measure of metamemory uses "feeling of knowing" (FOK) judgments where participants make prospective confidence ratings about their ability to select the correct answer from a series of choices. Brain stimulation studies have shown that high definition transcranial stimulation (HD-tDCS) over the dorsolateral prefrontal cortex (DLPFC) leads to improved metamemory accuracy, but not memory recall. In contrast, HD-tDCS over the anterior temporal lobe (ATL) led to improve recall, but only for appropriately difficult questions. In our experiments, participants were asked to recall the correct answer to a general knowledge question, provide a FOK rating, and complete a forced-choice recognition task. We manipulated the difficulty of the recognition task. In the "hard" task, the distractors were the most frequently given wrong answers from a previously normed sample. In the "easy" recognition task, distractors were the least frequently given answers. We expected recognition and metamemory accuracy to decrease in the hard task when compared to the easy task. Results from 2 experiments show decreased recognition accuracy in the hard recognition task when compared to the easy one. The FOK ratings for correct responses were higher than those for incorrect responses, and this difference was bigger for the easy task than the hard task. Finally, metamemory accuracy was lower in the hard recognition tasks than the easy one. The next stage of our project is to apply HD-tDCS over selected regions of interest in order to test whether the effects of the HD-tDCS over the DLPFC and ATL are consistent across different levels of choice difficulty.

PSY-19 JAR OPENING BY OCTOPUS BIMACULOIDES: MEMORY OF VISUAL INPUT INFORMS GUIDED TACTILE OUTPUT

Jesse Farruggella[1,2] (GRAD) and Frank W. Grasso.[1,2]

[1] BioMimetic and Cognitive Robotics Laboratory, Department of Psychology, Brooklyn College CUNY, Brooklyn, NY

[2] Ecology Evolutionary Biology and Behavior, Department of Biology, The Graduate Center CUNY, New York, NY

Octopuses are invertebrates with complex behavioral repertoires. Their capacity for object manipulation is supported by sophisticated sensory-motor and memory systems. The ability of the Mediterranean octopus *O. vulgaris* and Pacific Giant octopus *Enteroctopus dofleini* to uncork jars has been documented (Fiorito *et al.* 1998, Anderson 2006). We sought to ascertain whether *Octopus bimaculoides* open jars and the time it takes them to learn to open them. We found that the American octopus *O. bimaculoides* is able to uncork stoppered bottles and open jars with screw-on lids. Octopuses (n=15) were presented with a live crab contained in a transparent bottle or jar and were filmed in bottle- and jar-handling activities. Within 4 days, octopuses presented with un-stoppered bottles (n=11) consistently removed all food items in up to 8, consecutive, hourly presentations per day. The octopuses presented with stoppered bottles (n=2) immediately uncorked the bottles and acquired the crabs. The octopuses presented with jars (n=2) rapidly retrieved the crabs from uncovered and Parafilm-covered jars. When the screw-on lids were loosely placed on the jars, the octopuses took 10-12 trials to learn to immediately remove the crab and retained this ability. When the same animals were subsequently presented with lids screwed on, they opened the jars in 3-4 presentations. Although jar opening is not a natural behavior for octopuses in the sense that human these artifacts were not available during most of their evolutionary history, this behavior has a natural precursor in the bivalve opening by these animals.

This study demonstrates the ability of *O. bimaculoides* to open jars reliably in the experimental setting and indicates that this ability is phylogenetically widespread.

PSY-20 THE POLITICAL SKILLS OF PHYSICIANS AND PATIENT SUPPORT PERSONNEL

Tuba Habib[1] (UG), Jennifer Feitosa,[1] Marissa L. Shuffler,[2] Tod N. Tappert,[3] Sharon L. Wilson.[3]
[1] Brooklyn College, Brooklyn, NY
[2] Clemson University, Clemson, SC
[3] Greenville Health System

Errors often occur in the healthcare field at all levels of operations, and unfortunately they are neither rare nor intractable (Bates, 2000). Consequently, it is important to understand any dissimilarities across healthcare professionals that can be sources of conflict and misunderstanding (e.g., lack of closed-loop communication). To start addressing this gap, this study examines whether physicians and patient support personnel differ in how they view the construct of political skill and their levels across political skills dimensions: social astuteness, interpersonal influence, networking ability and apparent sincerity. Participants in this study were healthcare professionals gathered from a southeastern hospital (N= 982). Utilizing Ferris et al.'s (2005) 18-item Political Skill Scale (α=.90), we identified measurement equivalence across physicians and patient support personnel. Our results indicate both subgroups view the construct of political skill similarly. However, differences emerged at the dimension-level. Specifically, physicians showed a higher level of apparent sincerity, whereas patient support personnel; showed a higher level of networking ability. There were no mean differences regarding their social astuteness and interpersonal influence. Nonetheless, it is important to point out that this has implications for both theory and practice of evidence based medicine. Future research and limitations will also be discussed.

PSY-21 EMOTIONSHIPS AND ROMANTIC RELATIONSHIPS

Michael Franco (UG), Matthew Goldberg, and Cheryl Carmichael, Brooklyn College, Brooklyn, NY.

People require emotional support in various situations. Research by Cheung, Gardner, & Anderson (2015) showed that people rely on specific peers in specific emotion regulation situations, termed emotionships (or emotion-based relationships). They found that people with more diverse emotionship portfolios had greater well-being. We set out to replicate their findings, and investigate a novel question: whether emotionship diversity had an effect on romantic relationship quality, and how emotion regulation by a romantic partner moderated the effect of emotionship portfolio diversity on well-being. We tested whether the effect of emotionship breadth on well-being and relationship quality would be stronger when a romantic partner is less effective at regulating an emotion, or if one is less likely to turn to their partner for regulating emotion in a particular domain. We did not replicate Cheung et al. (2015). Emotionships did not predict subject well-being. Additionally, we found that being likely to turn to a romantic partner for emotion regulation, and having a partner who was more effective at regulating emotions was associated with increased relationship quality and subjective well-being over and above the benefit associated with emotionship networks. However, the moderating effect of romantic partner emotion regulation on the association between emotionship breadth and well-being/relationship quality was significant only for savoring happiness, but not other (especially negative) emotion regulation domains. When a romantic partner was not particularly effective or likely to be sought out for savoring happiness, having a broader emotionship network for this purpose was beneficial to well-being.

PSY-22 PERCEPTUAL GROUPING BY OBJECT SIMILARITY IN RATS

Helen Lu[1] (UG) and Daniel Kurylo.[2]
[1] City College of New York, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

Rodents serve as a valuable model to study visual processing in primates. However, their visual system differs from that of primates in relative brain size and diverse cortical areas. Despite the differences, they share commonalities in similar cone sensitives and receptive fields. Although physiological characteristics of rodent visual systems have been extensively investigated, less is known at a perceptual level. Though visual acuity is poor, rats can perceptually group stimulus components using proximity and similarity, and use invariant object recognition, the ability to distinguish objects regardless of extraneous image variations. To further explore these abilities, perceptual grouping using more complex stimuli will be examined. It is hypothesized that rats can use similarity in component objects to discriminate stimulus patterns. Eight Long Evan rats, under water restriction, were conditioned to discriminate stimulus patterns constructed of unclosed (X) and closed objects (◇) with identical components along with the aid of proximity cues. Correct responses resulted in a water reward, while errors resulted in no consequences. Results showed that the percentage of correct responses decreased as proximity cues were gradually removed. Rats were unable to rely on object similarity alone as a grouping cue, reflecting limits in acuity. For analysis, it is critical to control stimulus parameters relative to the direction of gaze. Careful measurement and calibration methods will be applied to control this aspect. Further adjustments will be made to line length, thickness, object size, and spacing to determine if these factors account for performance limitations. These results contribute to the analysis of the differences between human and rodent visual cortical network.

Supported by Brooklyn College Neuroscience REU Program.

PSY-23 STUCK IN THE MIDDLE OF WORDS: EXAMINING COGNITIVE CONTROL AND INFORMATION THEORY ACCOUNTS FOR MID-WORD SLOWING DURING TYPING

Chin Yen Tan (UG), Matthew J. C. Crump, Lawrence Behmer, Brooklyn College, Brooklyn, NY.

Our ability to type reflects complex cognitive control and motor movement working in unison. Although typists vary in expertise, they produce a common typing pattern. Previous studies of interkey times in typing have revealed a reoccurring pattern referred as the non-monotonic inverted U-shape (Ostry, 1981). The inverted U-shape measures the typist's tendency to type with increase interkey time approaching the middle of the word (peaked at character 4 for all word length 5 and above) followed by a decrease in interkey time to the end of the word, regardless of expertise (Ostry, 1981). The mid-word slowing indicates an important cognitive aspect in typing and can be explained using the loading effect described above (Ostry, 1981). Regardless of the importance of mid-word slowing, no further study was conducted in pursuit of the question: why do we implement more control during mid-word while typing. We proposed two hypotheses to approach the problem: 1) The loading effect must be consistent with the increase activation of the anterior cingulate cortex and pre-frontal cortex as a function of word length during a typing task, 2) The mid-word slowing phenomenon is a consequence of discrete sensitivity to letter frequency in the English language which resulted in the delayed response. Using the EEG data from a sister project, we performed a response lock analysis to examine the first hypothesis. To obtain letter frequency, we used google's n-gram corpus and information theory to calculate uncertainty at each letter position of words of different lengths. Our finding show some support for both ideas: typing speed is slower for letter positions where uncertainty is high, and resolving uncertainty could demand a greater role for cognitive control during sequence production.

PSY-24 THE EXPRESSION OF UNDERSTANDING, VALIDATION, AND CARING THROUGH TEXT MESSAGING WITH AND WITHOUT THE USE OF EMOJI

Jonathan Winfield[3] (UG), Maureen Coyle,[2] Cheryl Carmichael.[1]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY
[3] Stony Brook University, Stony Brook, NY

Perceived responsiveness (PR) is a hallmark of high-quality relationships. In the age of text messaging, conveying responsiveness—understanding, validation, and care (the elements of PR) through mediated channels such as text—is of foundational importance. The purpose of the original research was to discover whether the presence of emoji affected the perceived responsiveness of a confederate's support in response to participants' positive and negative event disclosures over text message. The current coding project was undertaken to determine the extent to which confederates' language was responsive, notwithstanding their use of emoji. We adapted Maisel's (2008) microanalytic responsive behaviors coding scheme to evaluate the degree of perceived responsiveness in confederates' text responses when they did and did not use emoji. Emoji were removed from the exchanges to keep the three coders blind to condition while reading complete text exchanges between participants and confederates. We rated the extent to which the confederates' language throughout the exchange displayed perceived responsiveness to participant's disclosures. We hypothesize results will reveal no difference in perceived responsiveness as a function of confederate or emoji use condition. If there is an effect of emoji use on responsive language, this will provide new insights about the communication of perceived responsiveness through electronic means, and can help improve our understanding of how relationship partners use these modes of communication to maintain relationships.

PSY-25 EXAMINING THE EFFECTS OF HD-TDCS ON LEARNING IN THE CONTEXT OF GOAL MANIPULATION

Maya Baldwin[1] (UG), Yuliya Ochakovskaya,[2] Jennifer Mangels,[2] Elizabeth Chua.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Baruch College, New York, NY

Task goals can be categorized as "mastery" when one focuses on learning or "performance" when one aims to do better than others. Mastery goals have been related to better learning and a recent study used functional magnetic resonance imaging to identify more activity in the dorsolateral prefrontal cortex (DLPFC) when a mastery goal was endorsed. This experiment used high definition transcranial direct current stimulation (HD-tDCS), a form of non-invasive brain stimulation, to test the role of the DLPFC in successful learning under mastery versus performance goals using a general knowledge task. The effects of HD-tDCS over the DLPFC were compared to HD-tDCS over the left inferior temporal cortex, and sham HD-tDCS. During the first session, participants answered four blocks of difficult general knowledge questions. The first two blocks were without stimulation to establish a baseline measure and encourage either mastery or performance goal adoption. HD-tDCS was applied for 20 minutes during the third block, and aftereffects of the stimulation were expected to continue throughout the fourth block. One week later, participants answered the same questions to examine differences in error correction (i.e., new learning). Data collection is ongoing, but preliminary analyses with 9-12 participants per group have shown effects of block during the first session, with worse performance on block four, and better error correction for errors made during block one. There have been no effects of stimulation or goals thus far. The lack of effects of goal and stimulation at this time may be driven my variability within our limited pool of subjects.

Supported by Research Experience for Undergraduates (REU), NSF.

PSY-26 LONGITUDINAL RELATIONSHIP BETWEEN PRENATAL MATERNAL STRESS, HEART RATE, AND ANTISOCIAL TENDENCIES IN YOUTH

Yonglin Huang[1] (GRAD), **Shawn Fagan**[1,2] (GRAD), Yu Gao.[1,2]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY

Recent literature has reported that both psychosocial risk factors and neurobiological deficits are associated with antisocial tendencies. This research is part of a longitudinal study looking at psychological and physiological influences on antisocial behavior. Our prior work has shown that prenatal maternal stress and autonomic arousal interacted to predict conduct problems and psychopathic traits in youth. The present study examines the longitudinal relationship between prenatal maternal stress, autonomic arousal, and antisocial behavior from the same cohort. At Time 1 prenatal maternal stress was assessed in 253 8-to-10 year old children through caregiver's retrospective report, and children's heart rate (HR) and respiratory sinus arrhythmia (RSA) were acquired during rest periods. Both caregiver and child-reported measures of antisocial behavior and psychopathic traits were collected at Time 1 and again one year later at Time 2. Our results indicated that low levels of resting HR during Time 1 predicted higher levels of delinquency at Time 2. Prenatal maternal stress was positively correlated with impulsivity at Time 2. A significant interaction effect was found; children with lower resting HR and higher prenatal maternal stress had higher impulsivity scores during Time 2. We saw no such relationship with RSA. Our findings suggest that resting HR may be more robust than RSA in predicting antisocial behavior and psychopathic traits, and that psychopathic traits (i.e., impulsivity) but not antisocial behaviors are more stable and likely to be influenced by epigenetic factors.

Supported by NIH.

PSY-27 EVIDENCE FOR ALLOCENTRIC CUE USE IN NAVIGATING FIDDLER CRABS (UCA PUGILATOR)

Stephen G. Volz (GRAD) and Frank W. Grasso, BioMimetic and Cognitive Robotics Laboratory, Department of Psychology, Brooklyn College, Brooklyn, NY.

Fiddler crabs are capable of egocentricity-guided homing to burrows that they dig and maintain. Previous studies of fiddler crab spatial memory abilities have exclusively focused on navigation in the context of homing to burrows after foraging and mating excursions. The memory mechanism thought to underlie this behavior is path integration. To date these have animals been studied exclusively in their natural habitat. In an effort to examine the generality of fiddler crab spatial learning abilities this study attempts to determine whether fiddler crabs are capable of spatial learning outside of the context of homing, using both egocentric and allocentric cues. We exposed fiddler crabs, under controlled laboratory conditions to a Y-maze paradigm, using access to water and darkness as an unconditioned stimulus. We provided the subjects with and manipulated both egocentric and allocentric visual cues, to determine if these animals were capable of learning to escape the y-maze with increased efficiency over repeated training sessions. We found that fiddler crabs traveled less distance ($F(4,212)=2.975$ $p= .020$), spent less time ($F(4,212)=5.623$ $p= <.001$), and explored the y-maze less ($F(4,212)=3.725$ $p= .006$) over repeated trials, providing the first evidence of fiddler crab spatial learning within a laboratory setting. We found that the stimulus-specific characteristics of the visual stimuli used had effects on fiddler crab performance but surprisingly, that devaluing the available egocentric information did not. Taken together these results suggest that fiddler crabs are capable of using and remembering visual cues in a

navigational task, and indicate that these animals are capable of some degree of generalized spatial memory.

PSY-28 THE EFFECTS OF EMOJI USE ON PERCEIVED RESPONSIVENESS AFTER POSITIVE AND NEGATIVE EVENT DISCLOSURES

Dana Goldberg (UG), **Odette Kasavi** (UG), Gloria Safdieh, Brooklyn College, Brooklyn, NY.

In relationships, partners who respond to each other in ways that makes the other feel understood, validated, and cared for promote perceived responsiveness, a hallmark of good relationships (Reis, Clark, & Holmes, 2004). People typically convey responsiveness through positive verbal and nonverbal behaviors. Yet in media, which can facilitate communication in relationships, empathy is expressed differently. This research examined the effect of a respondent's emoji use on the discloser's perceived responsiveness to positive and negative event disclosures. Participants disclosed a positive and negative event to a confederate over text message and received supportive responses with or without emoji. Results indicate that emoji use did not have a significant effect on participants' feelings about the disclosed events, or feelings towards the responder. Participants felt more responded to, and closer to the confederate when the confederate's emoji use matched the participant's emoji use. An order effect revealed that participants felt more responded to by the confederate when the negative event was disclosed before the positive event. These findings suggest that emoji use is beneficial when it functions to enhance social mimicry. Social mimicry was prevalent in computer-mediated communication in our research as participants mimicked emoji use or lack thereof to match the confederates. Social mimicry is an accommodation that allows people to better relate to each other and adapt to each other's emotional levels. It can promote a sense of belonging and connectedness, as we see that participants that matched their emoji use to the confederates felt closer to the confederates than those that were mismatched.

PSY-29 UNDERSTANDING ARTISTIC EXPERTISE THROUGH EVALUATION OF OBSERVATIONAL STILL-LIFE DRAWINGS BY ARTISTS AND NON-ARTISTS

Ian Gallagher (UG) and Aaron Kozbelt, Brooklyn College, Brooklyn, NY.

Empirical studies on artistic expertise involve many methodological challenges, but in the past twenty years researchers have made significant progress in understanding perceptual, drawing, and evaluative aspects on this topic. The current research is based on a battery of perceptual and drawing tasks, including an observational still-life drawing task, which has been given to first-year college art students and non-art students throughout the academic year. In this part of the study, we focus on how participants' drawings were rated, as a basis for assessing skilled drawing performance as well as the nature of artistic evaluation. Specifically, all still-life drawings were evaluated on artistic realism by artist and non-artist raters using an 8-point Likert scale. Artist raters consisted of Pratt University faculty and BFA/MFA graduates from other institutions; non-artist raters were Brooklyn College undergraduates. We expect artist raters to distinguish between drawings made by artists versus non-artists to a greater degree than non-artist raters; in addition, we expect the artist-raters to distinguish between drawings made over the course of the foundation year to a greater degree than non-artist-raters. We will test inter-rater reliability within each rater group using Cronbach's alpha and between the two groups using a Pearson correlation. To analyze group and longitudinal differences in performance, we will use between-groups and repeated-measures ANOVA. In sum, we hypothesize that artist raters evaluate drawings with certain expert criteria, which yield more nuanced and appropriate ratings, which can reveal between-groups and longitudinal differences to a greater extent than novices' ratings.

Supported by NSF.

PSY-30 THE UPS AND DOWNS OF TEAM DYNAMICS

Rebecca K. Harmata (UG), **Moira Rousseau** (UG), Jennifer Feitosa, Brooklyn College, Brooklyn, NY.

With the workplace diversity becoming inevitable within the United States, understanding the effects diversity has on team dynamics is a necessity. It is crucial for organizations to know how to maximize the benefits of such diversity, as it is still common for more homogeneous teams to outperform heterogeneous ones. However, not all diversity types matter at all times. Thus, the purpose of this study is to understand the extent surface-level and deep-level diversity affect team cohesion and subgroup formation within a professional work setting. More specifically, this study aims to examine how team emergent states mediate the effects of racial and educational diversity onto perceived team performance. Employees nationwide will complete a survey, including a vignette that will be manipulated into four possible racial and/or educational diversity conditions. We hypothesize that surface-level variables will generally induce subgroup formation, but deep-level characteristics will be the diversity typology that will mostly hinder team cohesion over time. Furthermore, we hypothesize that surface-level diversity -earlier on- and deep-level diversity -later on- will impact team performance, through the subgroup formation and cohesion. Expected results and implications will be discussed.

PSY-31 PAPER VS IPAD: HOW OUR EMOTIONAL RESPONSES DIFFER BETWEEN COLORING TRADITIONALLY AND USING DIGITAL TECHNOLOGY

Macy L. Drake (UG) and Jennifer E. Drake, Brooklyn College, Brooklyn, NY.

With the vast popularity of portable digital technology, activities that we once did by hand, we are now doing on our phones and tablets; this also applies to art. Research has shown that drawing and coloring can greatly reduce anxiety and improve mood. My study compares the benefits of coloring by hand versus digitally. Participants were 60 college students. They were randomly assigned to one of three conditions: coloring with pencil and paper, coloring via “tap-to-fill,” or coloring with a stylus. Both tap-to-fill and stylus coloring conditions utilized the app Pigment, available on the iPad. Participants filled out the PANAS before and after the coloring activity. They were then asked to complete a questionnaire on their enjoyment and absorption in the activity as well as additional questions about their use of technology and familiarity with coloring apps. I hypothesized that participants would experience more flow and have a more improved mood when coloring on paper than on the coloring apps. Additionally, I hypothesized that tap-to-fill, the most popular form of coloring on tablets and phones, would show the least amount of flow and mood change. I found that while positive affect increased across all three conditions, there was no significant difference in enjoyment, affect, value or flow-state between the conditions.

SCAS-1 NAMING ERRORS ACROSS THE SPECTRUM OF VASCULAR COGNITIVE IMPAIRMENT

Jason L. Dunlap[1] (UG), Stephanie Gutierez,[2] Ashana Torani,[2] Hannah Hinkle,[3] Bomi Kim,[2] Angela Roberts Ph.D.[2]

[1] Brooklyn College, Brooklyn, NY

[2] Northwestern University, Evanston, IL

[3] Butler University, Indianapolis, IN

Introduction: Word retrieval errors can precede the development of cognitive impairments in dementia, making them valuable diagnostic predictors of dementia. However, little is known about the naming

errors in vascular cognitive impairment (VCI). Purpose/Hypothesis: We sought to determine the characteristic profile of naming errors in individuals with VCI with high vs. low cognitive impairment. Method: Fifty two participants (M age = 66.57; Women = 18) were categorized as having high (VCI-High) or low (VCI-Low) cognition based on their Montreal Cognitive Assessment score (> 25 = VCI-High). Audio recordings of the 15-item Boston Naming Test were transcribed phonetically and coded by error subtypes. Results: Controlling for group differences in verbal IQ, there was a significant difference in Boston Naming Test scores between VCI-High (M = 14.64, SD = 0.49) and VCI-Low (M = 14.21, SD = 0.83), F = 6.70, p = .012, ηp2 = .12 suggesting a medium effect of cognitive status on noun naming. A discriminant function analysis showed that an optimally weighted profile of naming error subtypes discriminated VCI-High from VCI- Low with 75.0% sensitivity and 64.3% specificity with 69.2% of cases classified correctly. Conclusion: These findings indicate that naming difficulty progresses with worsening cognition in VCI. Moreover, errors distinguish mild cognitive impairment from dementia in VCI. This suggests that naming errors may be useful markers for predicting dementia development in VCI.

Supported by NIH NIGMS GM62981 (RISE) and GM08078 (MARC).

SCAS-2 IMPROVING COMMUNICATION AND TRUST BETWEEN CHILDREN AND ADULTS

Aneisa Ahmad (UG) and Marina Dimitrova, Brooklyn College, Brooklyn, NY.

Communication is an effortless process for most. However, some individuals are incapable of communicating and rely on Augmentative and Alternative Communication (AAC) systems. Humans satisfy their need for interaction by expressing their needs, wants and thoughts and addressing the needs, wants and thoughts of others while communicating. Additionally, communication is a tool used to build long lasting bonds and relationships with others. AAC methods provide speech and language impaired individuals the ability to communicate and interact with their family, friends, caregivers, teachers and healthcare professionals. The goals of this study were to identify if (1) communication quality affects trust building, (2) AAC helps build trust between children and adults, and (3) utilizing AAC helps build trust more than child-adult relationships without AAC. It was hypothesized that (1) communication quality affects trust building, (2) AAC helps build trust between children and adults, and (3) utilizing AAC helps build trust between children and adults more than relationships without AAC. The study was limited to adults over the age of 18, interacting with children ages 4 - 18. A brief survey was distributed to schools for children with special needs (e.g., ASD and Hearing Loss) and shared to various Facebook pages for individuals interacting with children utilizing AAC and children that do not use AAC. Participants included healthcare professionals, classroom instructors, family members, and caregivers of children with and without special needs. Questions included background information on the adult and child they interact with, as well as quantifiable measures of trust within their relationship.

SCAS-3 THE FORMULATION AND DEVELOPMENT OF RELATIONSHIPS THROUGH ONLINE FORUMS VS. FACE-TO-FACE

Kaitlin N. Balsam (UG), Arielle Boord, **Victoria R. Mozatto** (UG), Brooklyn College, Brooklyn, NY.

The goal of this study is to analyze the formulation and development of relationships made from online forums and face-to-face interactions. The purpose of this research study is to provide insight to relationship development. Since technology is rapidly evolving and impacting the way individuals communicate daily it is important to explore this revelation. Participants were asked to complete a survey using SurveyMonkey through Facebook, Twitter, cellular messaging, and e-mail. This survey helped gather data regarding the types of associations individuals form, the level of accountability individuals feel to maintain connections, and the level of depth bonds hold. The results indicate that

26% of participants, who represents the majority, are seeking casual companionship when meeting through online forums, whereas 36% of participants interacting in person seek long-term relationships. Furthermore, 68% stated that no meaningful relationships were formed online. The survey shows 23% of participants believe they are not accountable to maintain online relationships while 37% state they are very accountable when maintaining in-person relationships. The data also concluded that participants choose their online forum based on their personal preferences. Survey results show that 25% were recommended by a friend or to pass free time. Additionally, 36% of participants somewhat believe that online dating impacts one's ability to form meaningful relationships. This study offers a new perspective, in regards to the new era of communication with the use of online forums.

BIO-1 UNCOVERING THE MEMBRANE TARGETING MECHANISM OF HUMAN UNCONVENTIONAL CLASS I MYOSINS: A COMPUTATIONAL STUDY

Daniel Gruffat (GRAD) and Shaneen Singh, Brooklyn College, Brooklyn, NY.

The class 1 myosins (Myo1) are a widely expressed family of single-headed, non-filament-forming, membrane-binding myosins that comprise several sub-classes and are characterized by their ability to cross-link the plasma membrane to the underlying actin cytoskeleton by the presence of a lipid-binding region in the tail domain and an actin-binding region in the motor domain. Consequently, these motor proteins are drivers of numerous cellular processes that link the membranes to the actin cytoskeleton. Their importance in regulating these processes is underscored by studies that link pathogenesis and cancer with this class of motor proteins. Our focus in this study is the little studied aspect of membrane targeting in the different sub-classes for Myo1. Although conventional sequence analysis doesn't identify any membrane binding domains in the tails of Myo1 proteins, recent studies of Myo1c and Myo1g implicate the presence of a pleckstrin homology (PH) domain and attribute this domain to their membrane targeting function. A preliminary analysis based on a combination of sequence analysis and secondary structure prediction tools, suggested that Myo1b and several other sub-classes also contain a PH domain. We hypothesize that the membrane targeting function of all Myo1 sub-classes is driven by the presence of a PH domain within their tails. To address this hypothesis, we have carried out a comprehensive investigation of the Myo1 tails from all human unconventional class I myosin isoforms sub-classes to identify, model, and analyze the membrane binding mechanism of their PH domains. This study details the membrane binding mechanisms of unconventional class I myosins and lays the foundation for the role of membrane targeting of Myo1 proteins in cancer and disease.

BIO-2 INTRA-MICROCOLONY SPATIAL POSITIONING AFFECTS ANTIBIOTIC SUSCEPTIBILITY IN NEISSERIA GONORRHOEAE

Mahmoud Abouelkheir[1] (HS), Brian Ford[2], Kelly Eckenrode[2], and Nicolas Biais[2]
[1] Midwood High School at Brooklyn College, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

Neisseria gonorrhoeae (GC) is gram negative obligate human pathogen. During colonization, an extracellular adhesive organelle, the type IV pilus (tfp), attaches to other surrounding pilli, allowing bacteria to colonize environmental surfaces or cells. It is imperative to understand the role of force and diffusion of small molecules (e.g. antibiotics) due to GC's pathogenic nature and the increasing difficulty required to treat those infected. Therefore, it is crucial to understand the role of spatial positioning in the formation of microcolonies as well as the resultant spatial patterns associated with rates of survival. When tfp retract from the extracellular space into periplasmic space a mechanical force is produced. Retraction forces are fueled by the intracellular ATPase pilT. When the pilT gene is deleted (ΔpilT), pili are still produced and present in the extracellular space but cannot retract and thereby cannot apply force. A ΔpilT mutant will produce microcolonies, despite the loss of retraction force, due to the lateral sticky binding of the tfp. This experiment focuses on the the mixing of both wild type GC (WT) and its derivative ΔpilT mutants, and measuring their survival rates post antibiotic selection exposure. We aim to determine if there is a difference in survival rates for bacteria at the outer edges of the microcolony (ΔpilT) vs. those at the center (WT). Understanding whether one consistently survives at greater rates could reveal the nature of spatial positioning within biofilms, antibiotic susceptibility profiles, and the diffusion of small molecules throughout microcolonies. Our results heavily suggest that spatial positioning does in fact affect antibiotic susceptibility within mixed microcolony formation.

BIO-3 EFFECT OF NACL ON TETRAHYMENA THERMOPHILA

Kingsley Okolo (UG) and Ralph Alcendor, New York City College of Technology, New York.

Oxidative stress is an imbalance between the levels of free radicals and the ability of the body to counteract their harmful effects. Antioxidants are molecules present in cells that prevent these reactions from causing damage to molecules and important cellular processes. Tetrahymena thermophila is a single-celled model organism for unicellular eukaryotic biology. Studies of T. thermophila have contributed to many discoveries such telomeric repeats, telomerase, and the function of histone acetylation. T. thermophila is a great model eukaryotic system because it divides rapidly, and expensive facilities are not required. In addition, these cell types possess many important processes found in eukaryotes. NaCl is an important ingredient in our diet. Excess dietary salt is a major cause of hypertension and heart related illness. Salt increases arterial constriction and peripheral vascular resistance, and thereby raises blood pressure. To better understand the impact of NaCl on eukaryotic cells, we examined the effects of NaCl in Tetrahymena thermophila. We hypothesized that NaCl will increase OS in these cells and affect antioxidant genes. High concentrations of NaCl reduced T. thermophila ability to survive. At 150 mM of NaCl most cells were dead within 4 h. The expression levels of most antioxidant genes tested increased at 20 mM. However, at 100 mM and above the expression levels of these genes decreased dose dependently. These results indicate that NaCl can be toxic to these cells. In addition, NaCl is capable of inducing OS and altering the expression levels of antioxidant gene.

BIO-4 HIGHER NUCLEOLAR INDEX OF NUCLEOLIN AS AN INDICATOR OF ABERRANT CELLULAR DNA DAMAGE RESPONSE (DDR)

Iqra Nadeem[1] (UG), **Amna Aslam**[2] (HS), Jingyuan Wang,[1] Anna Kozlova,[1] Danielle Gordon,[1] Rachele Dolce Rameau,[1] and Anjana Saxena.[1]

[1] Brooklyn College, Brooklyn, NY

[2] Midwood High School, Brooklyn, NY

Nucleoli provide a survival advantage for various tumor types, exemplified in prostate neoplasia, leukemia, lung, and breast carcinomas. Unregulated expression and increased nucleolar localization of many stress-responsive factors often correlate with hyper-proliferative status. Therefore, nucleolar changes in cancer cells are the first cytological indicators that can serve as an index for diagnostic and prognostic purposes. In this study, we examine an abundant nucleolar stress factor, nucleolin (NCL) for its sub-nuclear localization under normal and DNA damage conditions. This study corroborates the previous research that suggests NCL translocation requires wt-p53 and provides new insights into the role of p53-mutations. Further, we also assessed the role of NCL and p53 (wt vs. mut) in regulating stress signaling (ATM/ATR and p38-kinase) pathways and gene expression in apoptosis.

BIO-5 COMPARATIVE STARCH METABOLISM FOR TWO GREEN ALGAE

Katherine Chiu (UG), Macaulay Honors College at Brooklyn College, Brooklyn, NY and Juergen E.W. Polle, Brooklyn College, Brooklyn, NY.

Algae are eukaryotes that perform plastidial oxygenic photosynthesis. Green algae evolved to use starch as their main storage compound. The two species of green algae used in this study were Chlamydomonas reinhardtii and Scenedesmus obliquus. The unicellular C. reinhardtii is a green algal model with a well-annotated genome. The coccoid S. obliquus is an emerging platform for biofuels applications. As S. obliquus uses starch, certain enzymes should be present in the alga. The purpose of the study was to elucidate the starch metabolism of S. obliquus for comparative analysis with C.

reinhardtii, to better understand green algal metabolism. The Kyoto Encyclopedia of Genes and Genomes (KEGG) database for C. reinhardtii was used as a starting point for the study. KEGG's metabolic map for the plant Arabidopsis thaliana was used to construct an updated starch reference map for C. reinhardtii. The reference map was used to search for starch metabolism genes in S. obliquus based on homology. Functional annotation of the gene models was used to create two and three-dimensional starch maps for S. obliquus. Some starch metabolism genes present in C. reinhardtii were missing from the S. obliquus's predicted pathway. However, results were consistent with enzyme localization predictions for the alga. The S. obliquus genome has starch metabolism enzymes predicted to be mostly localized to the chloroplast. Studying green algal starch metabolism allows for a more comprehensive understanding of organic molecule processing. This opens the door for genetic and metabolic engineering and optimization projects, which have applications in fields such as biotechnology, biofuels, and biofeeds.

BIO-6 EFFECTS OF ACTIVIN B, BMP4 ON DIFFERENTIATION OF MOUSE NEUROSPHERES

Juanita Marin (UG) and Andleeb Zameer, New York City College of Technology, Brooklyn, NY.

Multiple sclerosis (MS) is considered the prototype immune mediated demyelinating disease of the human central nervous system (CNS). Oligodendrocyte loss in MS is accompanied by demyelination and axonal transection. Therapies for MS have focused primarily on the immune system with little focus at CNS protection and regeneration. We have recently shown that in developing mouse spinal cord, activin B (ActB) and TGFβ ligands can promote oligodendrocyte development and myelination. Here we propose to establish an in vitro model using mouse ventral mesencephalon E14 neurospheres to mimic our findings in mouse embryos.

Supported by Bridges program.

BIO-7 DIURNAL AND NOCTURNAL PATTERNS IN ACTIVITY AND SOCIAL BEHAVIOR OF CHAMBERED NAUTILUS

Mahwish Ashfaq[1] (GRAD), Naomi Lewandowski,[2,3] Rebecca Cohen,[2] Divya Roy,[2] Ned Ellis,[2] Yasmely Luna,[2] Wajed Syed,[2] Jensine Sajan,[2] Sheela Moaleman,[2] Lucila De Jesus,[2] Daria Postavania,[2] Jennifer Basil. [2, 3]

[1] LIBE, Brooklyn College, Brooklyn, NY

[2] Brooklyn College, Brooklyn, NY

[3] The Graduate Center of the City University of New York, NY

Although Cephalopod mollusks (Octopuses, etc) are well known for their vertebrate like intelligence and unique behavioral repertoires, little is known about the capabilities of the Chambered Nautilus, often called a living fossil. A deep-water, solitary animal, Chambered Nautilus makes repeated daily migrations from deep waters generally to shallower areas to forage along coral reefs. However, these field observations are rare, and show substantial variation. It is unknown what modulates these daily rhythms – it could be the detection of light driving the dives to deeper depths, or these daily rhythms could be an expression of an endogenous circadian clock. We continuously videotaped a captive group of nautiluses (N=5) under three L:D conditions, of 4 days each. We measured their activity levels, movement patterns, and inter-animal associations for one minute every 10 minutes. Nautiluses show clear entrainment to 12:12 light: Dark, with peak activity in darkness, beginning around subjective dusk. In constant darkness, subjective dusk/night activity rhythms persisted, although the free-running period was less than 23h. We also documented their inter-individual affiliations under all treatment conditions and found social

affiliations amongst sets of animals, and we describe how those patterns vary across day and night conditions.

BIO-8 THE INDUCTION OF GAMETES IN SCENEDESMUS OBLIQUUS: A STRATEGY FOR STRAIN DOMESTICATION IN BIOFUEL PRODUCTION

Melinda Suarez (UG), Arwa Gabr, Zaid McKie-Krisberg, Juergen E.W. Polle, Brooklyn College, Brooklyn, NY.

Scenedesmus obliquus, a green alga, has a high concentration of oil, which can be extracted to renewable biofuel. Studying the sexual cycle of S. obliquus can help us perform strain improvement through classical genetics. Control of the sexual cell cycle and mating will allow us to breed strains with favorable phenotypes that improve biofuel production. In general, gametogenesis in the alga is controlled by factors such as nutrients, temperature, and light. In the related model alga Chlamydomonas reinhardtii, nitrogen stress induces gametogenesis. Similarly, a previous study has shown that generation of S. obliquus gametes is also controlled by nitrogen depletion. This study also highlighted the importance of temperature and light during the induction process. The goal of this study is to induce gametes and mating in two of our laboratory strains. Cultures were inoculated in nitrogen free media under constant light and a temperature of 15 degrees Celsius. Cultures were then viewed under a microscope over the course of the experiment for detection of gamete phenotype. Preliminary data shows that gamete induction is possible. However, the rate of gamete production and subsequent mating was extremely low and has to be increased through protocol improvement.

Supported by Department of Energy DE-SC0012556

BIO-9 COMPUTATIONAL ANALYSIS OF NEK FAMILY OF PROTEINS

Carline A. Durmus (UG), Dr. Shaneen Singh, Brooklyn College, Brooklyn, NY.

The overall goal of this research is to perform a comprehensive computational analysis of the members of the human Never In Mitosis A-like kinase (NEK) protein family. To provide detailed annotations of the NEK family members, three dimensional modeling using various approaches including homology modeling, threading, and ab inito techniques were performed. The information gathered from the models was integrated with sequence and structure analysis to establish structure-function correlations and come up with experimentally testable biological predictions. Using these methods, in this study we present a detailed analysis of the catalytic domains of the NEK proteins. Future studies will analyze additional domains in the individual members of this family of proteins. The role of NEKs in the cell cycle, numerous medical disorders, and as potential chemotherapeutic targets underscores the importance of understanding the structure-function relationship of this family of proteins and establishing the foundation of their mechanism of action, including delineating the differences amongst the different members of the family.

BIO-10 KARYOTYPIC ANALYSIS OF ALGAL SPECIES SCENEDESMUS OBLIQUUS

Michael Sher (UG), Arwa Gabr, Zaid McKie-Krisberg, Mara Schvarzstein, Juergen E.W. Polle, Brooklyn College, Brooklyn, NY.

Scenedesmus (Acutodesmus, Tetradesmus) obliquus is a green algal species from the Scenedesmaceae family within the green algae. Similar to other Scenedesmus strains, researchers are not entirely certain about the chromosome number of S. obliquus. Previous studies show that the haploid number of S. obliquus was either n=4 and n=6. Genome sequencing data from our isolate DOE0152-Z showed that S.

obliquus appears to be a diploid or partially diploid organism. Therefore, we can anticipate the number of chromosomes to potentially be twice the number that had been reported earlier. However, first genomic analysis of a second strain EN0004 indicated a haploid genome. The goal of this experiment is identify and characterize the number of chromosomes in the laboratory strains of Scenedesmus obliquus. Cells were treated with metaphase cell cycle inhibitor for 24hr followed by DNA stain. Fluorescence microscopy was then used to visualize the cells. Preliminary results were inconclusive in regards to the number of chromosomes present. However, they provided us with valuable information for experimental improvement. Experiments in progress include synchronization of the cells using Light/ dark periods, nutrient limitation and multiple treatment of the culture with a cell arrest agent.

Supported by Department of Energy DE-SC0012556.

BIO-11 LOCALIZATION OF ENOLASE ENZYME FROM THE MICROALGAE SCENEDESMUS OBLIQUUS IN CHLAMYDOMONAS REINHARDTII

Laura Gonzalez (UG), Arwa Gabr, Zaid McKie-Krisberg, Juergen E.W. Polle, Brooklyn College, Brooklyn, NY.

The green microalga, Scenedesmus obliquus, produces a high amount of biomass making it the favorable microalga for lipid production. To study the linkage between growth metabolism and oil production, it is crucial to understand carbon allocation into the different cellular macromolecules including oil. In this regard, the carbon core metabolic network of S. obliquus is being investigated. Enolase, an essential component in the metabolic pathway of glycolysis, catalyzes the reaction between 3-phosphoglycerate (3PGA) to phosphoenolpyruvate (PEP), which is a precursor to pyruvate and further carbon allocation into lipids (oil production). It has been reported that Chlamydomonas reinhardtii, a related alga, contains only one enolase gene that localizes to the cytosol. However, genomic and transcriptomics analysis of S. obliquus showed that this alga contains two enolase genes with one gene product containing an N-terminal extension. Based on prediction programs (PredAlgo), we believe that this extension is a chloroplastic signal peptide (Chlo-Enolase). To test this hypothesis, using Gibson and Gateway cloning methods, we have designed a vector delivery system in which different fragments of Chlo-Enolase is tagged with the Green-Fluorescent-Protein (GFP) and expressed in C. reinhardtii for localization analysis. Thus far, all fragments have been fused to GFP, and cloned into Chlamydmonas specific vectors. Currently, transformation is being performed and localization will be determined by microscopy through detection of the GFP fluorescence.

BIO-12 ARTIFICIAL INTELLIGENCE

Almas Qamar (UG) and Laureen Park, New York City College of Technology, Brooklyn, NY.

This research aims to defend the Strong AI which is the idea that artificial intelligence (AI) can completely mimic human intelligence. Our research includes the analysis of arguments formulated by other scholars against John Searle's argument. Scholars such as Seidel and Jacquette have demonstrated that it is possible to accept Searle's criteria for human consciousness in terms of biological naturalism and intentionality, and yet reject Searle's conclusion that AI could not meet these conditions. They show that AI can meet these conditions in a strong way given sufficient advancements in technology, which the author thinks is why Searle rejected strong AI – because there was a lack of such technology during the time of his writing. Examples taken from recent developments in AI are used to corroborate the strong AI thesis and Searle's compatibility with that thesis.

BIO-13 EXAMINING A NOVEL IONOPHOPRIC COMPOUND

Jitendra Singh (UG), New York City College of Technology, Brooklyn, NY.

Oxidative stress contributes to many of your bodies underlying problems and diseases as we age. However, the compound resveratrol is thought to acts as an antioxidant which donates an electron without any repercussions thus neutralizing the free radicals. Using this compound as a template, Professor Alberto Martinez has synthesized two new compounds which may hold beneficial effects against oxidative stress. We hypothesized that the synthesized compounds AM17 and AM20 would add anti-oxidative properties the cells. Depending on the concentration of the synthesized compound we were able to see cell death using MTT Assay, and where there was no significant cell death we preformed gene analysis, using gel electrophoresis. We recorded the multiple genes which were expressed more in the different concentrations and sought out whether they were involved in preventing oxidative stress or not. This has great potential in treating Alzheimer's as it is thought that the formation of reactive oxygen species is a major cause for the disease. Being able to prevent or even control this would lead to a significant decline in Alzheimer's.

Supported by NIH.

BIO-14 BARCODING AND SEQUENCING OF DNA EXTRACTED FROM THE SCALES OF PHATAGINUS TRICUSPIS FOR USE IN FORENSICS OF WILDLIFE TRAFFICKED IN INTERNATIONAL TRADE AND BIODIVERSITY STUDIES

Shenika S. Burke (UG) and **Brittania B. Brown** (UG), New York City College of Technology, Brooklyn, NY.

Pangolins are unique mammals covered with hard scales made of keratin. These scaly insectivores can be found across Asia and sub-Sahara Africa. There are eight species of pangolins. Our study is on one of the pangolin species found in Nigeria, Phataginus tricuspis. Pangolins are the most trafficked mammals; and the scales that we analyzed, is the body part with the heaviest use across continents where pangolins are found. For forensic analysis, it is imperative that we know the partial or complete DNA sequence of each extant pangolin species so it is possible to ascertain which species is being traded in when confiscated. We extracted DNA from the scales of the Nigerian pangolins using two different protocols. The aim is to identify which section of the scale and which protocol can provide the best quality DNA; as good DNA quality is important for downstream use in genomic analysis. For each pangolin, we used three samples, whole scale, exposed part of scale and embedded part; and two protocols using Promega and Qiagen kits for extraction. DNA yield and A260/280 ratio measured using the Nano spectrophotometer were best for the part of the scale attached to the skin and DNA extracted using the Qiagen kit and protocol. We plan to eventually sequence the DNA following PCR amplification.

Supported by NIH.

BIO-15 STRUCTURAL AND FUNCTIONAL ANALYSIS OF CENTROSOMAL PROTEIN SPD-2

Mikaela Murph (GRAD), Mara Schvarzstein, Shaneen Singh, Brooklyn College, Brooklyn, NY.

Centrosomes are organelles that nucleate and organize the bipolar spindle during meiosis/mitosis in many animal systems. They are responsible for asymmetric cell divisions and formation of primary cilia. At the G2/prophase checkpoint of the cell cycle, a process known as centrosome maturation begins and the centrosomes increase in size and their ability to nucleate microtubules. γ-tubulin and other proteins that form the pericentriolar material at the centrosomes are activated and accumulate to form the microtubule-organizing center (MTOC). Aberrant centrosome structure and/or function is associated

with cancer, developmental defects, and ciliopathies such as polycystic kidney disease, nephronophthisis, Senior-Loken syndrome, orofaciodigital syndrome and Bardet-Biedl syndrome. Spindle-defective protein 2 (SPD-2) is a highly conserved protein found in C. elegans that has been shown to be crucial to proper centrosome maturation, MTOC formation, and cell division. We have identified a functional Aspm-SPD2-Hydin (ASH) domain, which is predicted to be necessary for localization using sequence analysis tools. In this study, we present the modelled three-dimensional structure of the ASH domain of SPD-2 using template-based modelling and its biophysical characterization using a combination of computational and molecular techniques.

BIO-16 IDENTIFYING CADHERIN 9 BINDING PARTNERS AND THEIR ROLE IN SYNAPSE FORMATION

Adriana Cushnie[1] (UG), Mathew Taylor,[2] Ranauk Basu,[2] Dr. Megan Williams.[2]
[1] Brooklyn College, Brooklyn, NY
[2] University of Utah, Salt Lake City, UT

Background: Brain function depends on very specific patterns of synapse formation that happens between different subpopulations of neurons. Synapses are specialized junctions between two neurons that allow for information transfer. A synapse contains a pre-synaptic component contributed by the axon of one neuron and the post-synaptic component contributed by the dendrite of another neuron. Our model system is the hippocampus, a brain region important for memory and learning. Purpose: While we know a lot about the circuitry of the hippocampus, little is known about the molecules mediating the formation of these synapses. Cadherin-9 is a cell adhesion molecule, and a mutation in the gene is associated with Autism Spectrum Disorder. In the hippocampus, cadherin-9 is exclusively expressed in dentate gyrus and CA3 neurons. Cadherin-9 is necessary for the formation of the mossy fiber synapses that connects the dentate gyrus and the CA3 neurons. Method: To further understand the role of cadherin-9 in synapse formation, we performed a mass spectrometry experiment to identify cadherin-9 molecular interactions. Results: The method successfully identified these types of interactions, and preliminary results suggested that cadherin-9 mediates synapse formation through the formation of an intracellular molecular complex that includes novel proteins. Conclusion: Having demonstrated the viability of the method, we are currently testing whether the new molecules identified by mass spectrometry are associated with a cadherin-9 protein complex in cells and neurons using co-Immunoprecipitation assays.

BIO-17 DELINEATING THE ROLE OF MULTIPLE COPIES OF RNA BINDING DOMAINS IN HUMAN NUCLEOLIN AND ITS HOMOLOGS USING A COMPUTATIONAL APPROACH

Kamrun Nahar Begum (UG), Ruchama Chaya Steinberg, Rahimah Ahmad, Shaneen Singh, Anjana Saxena, Brooklyn College, Brooklyn, NY.

All eukaryotes have nucleoli, the sub-nuclear compartments where ribosomes synthesis occur. Nucleolin (NCL), an abundant RNA binding protein, constitutes 5-10% of total nucleolar proteins. This multifunctional protein plays defined roles in many critical cellular processes including transcriptional and translational regulation of various non-coding and coding RNAs. NCL binds to its target RNAs via two or multiple RNA binding domains (RBDs) to control gene expression during normal cell cycle and in response to stress. Specifically, individual RBD interact via recognition motifs called RNP motifs, and complementary motifs in RNA allow interaction with NCL. Most studies have focused only on the role/s of RDB 1,2; none probing the possible functional redundancy of additional RBDs nor identifying any target-specificity for RBD 3,4. Earlier data from our lab suggested RBD 3,4 can bind RNA in a structurally analogous manner to RBD1,2 although with altered affinity. Here, we continue this research by investigating various homologs of human NCL to better understand the mechanism of its interaction

with RNA and whether the additional RBDs, are in fact, redundant in function. To test this hypothesis, RBDs from various homologs were analyzed by a combination of sequence and structure analysis tools and modeled using template based methods. We show that there is a distinction between plant and animal RBDs and we also suggest a different mechanism for RBD NRE interaction. This study reveals new insights into NCL RBD function and describes the evolution of RBD function with respect to nucleic acid binding.

BIO-18 BARCODING AND SEQUENCING OF DNA EXTRACTED FROM THE SCALES OF PHATAGINUS TRICUSPIS FOR USE IN FORENSICS OF WILDLIFE TRAFFICKED IN INTERNATIONAL TRADE AND BIODIVERSITY STUDIES

Unyque A. Cruz (UG), Brooklyn College, Brooklyn, NY.

There are eight species of Pholidota, also known as pangolins. This study is on one of the pangolin species found in Nigeria, Phataginus tricuspis. These mammals are endangered mainly due to trafficking of their scales in Africa and Asia. It is crucial that we know the DNA sequence of each pangolin species so that it's possible to find out which species is being traded in when confiscated. The aim is to identify which section of the scale and which protocol can provide the best quality DNA. We extracted DNA from scales using two protocols: QIAamp DNA investigator protocol, and Invitrogen PureLink genomic DNA mini kit protocol. We also used two preparation procedures for PCR using Qiagen Taq PCR master mix, and Thermo scientific DreamTaq hot start green PCR master mix. So far we have received the best results using the DreamTaq hot start. We plan to eventually clean and sequence the DNA.

Supported by NIH Bridges to Baccalaureate Program.

BIO-19 PROTEIN INTERACTION IN YEAST PROVOKING GAPDH ACTIVITY

Yulduz Saidinova[1] (UG), Michael J. Cohen,[2] Peter Lipke.[2]
[1] New York City College of Technology, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

Through the secretory system, extracellular proteins that have a signal sequence in eukaryotic cells exit the yeast. GAPDH lacks this secretory signal, but somehow it gets released to the cell walls. Saccharomyces cerevisiae with deletions in genes targeting vesicular transport were screened for changes in GAPDH activity in the cell wall to find out which processes are used for exporting proteins that lack a secretory signal. So far seventy genes have been tested for the GAPDH extracellular activity, 21 of the gene deletions decreased or increased the extracellular activity of GAPDH. These changes are likely to be consequences of altering GAPDH transport to the wall. These genes that affect GAPDH secretion may interact with other gene products affecting the GAPDH secretion. To identify these interactions, I used R, a programming language and software environment for statistical calculation and graphics. With the packages in the R, I created node based diagram, where each node represents a protein and lines between them indicates interaction. There will be a different color for the nodes (protein), based on the GAPDH activity. With node based diagram and specific colors for the activity, we might be able to see a pattern of interaction that might be affecting the activity of GAPDH. Patterns can give us prediction of untested genes based on how many times they interact with proteins that have been hits (effected the activity of GAPDH). In the cell, there are proteins that interacts with each other physically. Node based diagram can indicate the pathway for the GAPDH activity based on other proteins.

Supported by Neuroscience Research Experiences for Undergraduates (REU) Brooklyn College of the City University of New York.

BIO-20 THE MORPHOLOGICAL IMPACT OF PTEN ON MATURE NEURONS

Janai R. Williams[1] (UG), Scarlet H. Park,[2] Stephanie Getz,[2] Bryan Luikart.[2]
[1] Brooklyn College, Brooklyn, NY
[2] Geisel School of Medicine at Dartmouth College, Lebanon, NH

Phosphatase and Tensin Homolog (Pten) is a protein-lipid phosphatase that interacts with the PI3K-Akt-mTor pathway to regulate cell growth, proliferation, and cell division. In humans, mutations in Pten have been found in individuals with both Autism Spectrum Disorder (ASD) and macrocephaly. Previous work has shown that injection of a Cre-mediated retrovirus into the hippocampal dentate gyrus of neonatal Pten Flox/Flox mice leads to an increase in spine density and somatic size. Based on these findings we hypothesized that knocking out Pten in mature mice would also show an increase in somatic size and spine density of dentate gyrus granule cell neurons. To better understand the effects of Pten loss on mature neurons,we injected the dentate gyrus of mature Pten Flox/Flox mice with a Cre-mediated adeno-associated virus then compared these results to wild-type mice receiving the same viral injection, and Pten Flox/Flox mice receiving only a control lentivirus and Cre-expressing lentivirus . We found that there was increase in somatic size shown in the mature Wild type and Pten Flox/Flox mice with a Cre-mediated adeno-associated virus. Our results also showed that when mature Pten knockout neurons must compete with each other, synaptic input is not improved. Finally, our findings indicate that there is a difference in the impact of Pten in the developing neurons of the neonatal Pten Flox/Flox mice compared to the mature Wild type and Pten Flox/Flox mice with a Cre-mediated adeno-associated virus.

Supported by NIH NIGMS GM62981 (RISE) and GM08078 (MARC), NIH grant R01 MH 097949, and by the Autism Speaks Pilot Grant # 7359. This work was also supported by the Optical Cellular Imaging Shared Resource and Norris Cotton Cancer Center at the Geisel School of Medicine at Dartmouth (5 P30 CA023108).

BIO-21 BUILDING A MS/MS BASED PROTEOMICS PIPELINE FOR SCENEDESMUS OBLIQUUS (DOE152-Z)

Rashaun Williams (UG), Dr. Juergen Polle, and Dr. Zaid Mckie-Krisberg, Brooklyn College, Brooklyn, NY.

Tandem Mass Spectrometry (MS/MS) is a powerful technique used for proteomic methods including targeted (top-down) and shotgun (bottom-up) approaches. For over a century, the mass spectrometer has been evolving and scientists have been developing new techniques and types of mass spectrometry to analyze biological extracts through soft ionization techniques. Several types of tandem mass spectrometry are used for proteomics including Quadrupole Ion Trap Hybrid, and Quadrupole Orthogonal Time-of-Flight Mass Spectrometry (Q-ToF). Our hypothesis is that we can identify proteins in our samples using a mass spectrometry based proteomics pipeline, using our own protein sequences generated from genome sequencing, assembly, and annotation efforts of a non-model organism. Protein was extracted from our algae Scenedesmus obliquus (Strain: DOE152z) in two steps. We employed the use of two different types of tandem MS for analysis of peptide spectra (Ion trap MS and Q-ToF MS) both performing an initial separation by Ultra-High Pressure Liquid Chromotography using a solvent gradient of acetonitrile and H2O (from 95%-5% over 15 minutes). Following MS/MS analysis we employed several search engines within the program SearchGUI to identify specific spectrum and fragmented ions in our sample. Out of the ten suspected matches, we matched with five proteins. We identified the mass-to-charge ratios of several spectra and the proteins through PSMs. MS based proteomics allows us to avoid longer, methods of protein extraction and identification. With modifications of the search constraints, as well as fine tuning of the LC and MS/MS platforms, we can

increase our accuracy of peptide mapping and create an effective workflow for shotgun proteomics analysis for non-model organisms.

Supported by DE-SC0012556.

BIO-22 GROWING IN THE DARK: CHLOROPHYLL METABOLISM UNDER MIXOTROPHIC AND PHOTOTROPHIC CONDITIONS IN TWO GREEN ALGA SPECIES

Lisa Valenti (UG), Arwa Gabr, Zaid Mckie-Krisberg, Juergen E. W. Polle, Brooklyn College, Brooklyn, NY.

The goal of this study is to better understand chlorophyll metabolism and the role of organic carbon in two species of green alga; Coelastrella sp. and Acutodesmus obliquus. Media containing organic carbon (acetate) resulted in growth and maintenance of green color in Coelastrella sp. when cultured in complete darkness. In comparison, A. obliquus was less successful and developed an olive-green color when cultured with acetate without light. These observations suggest that the chlorophyll degradation and synthesis pathways and acetate uptake mechanisms differ in these two organisms. It is expected that Coellastrella is more successful in acetate uptake and less active in chlorophyll breakdown or more active in its biosynthesis than A. obliquus. Cultures were grown on both phototrophic and mixotrophic solid media under constant light and constant darkness. Microscopy was used to observe changes in cell morphology and size. Fluorescent microscopy allowed for the detection of chlorophyll. Cultures were also grown in liquid media with and without acetate under the two light conditions for pigment extraction. Absorbance was measured over a range of wavelengths for each condition using a spectrophotometer. Further investigation was conducted by searching the genomes of each organism to determine the number of loci for the genes of interest. Industrial cultivation, for products like biofuels, requires large cultures which can become severely light limited as density and depth increases. The study of dark stress will aid in determining conditions and potential outcomes of large scale production.

BIO-23 THE MODELING AND CLASSIFICATION OF BAR DOMAINS IN ARABIDOPSIS THALIANA USING BIOINFORMATICS

Rahimah Ahmad (UG), Jessica James, Zaina Naeem, Dameeka Lambert, Andrew Botrous, Jessen Thomas, Shaneen Singh, Brooklyn College, Brooklyn, NY.

The aim of this study is to identify and model all BAR (Bin/Amphiphysin/Rvs) domains in the Arabidopsis thaliana genome. Arabidopsis is a well-studied model organism for dicot plants, and has extensive protein sequence information available in online databases. The BAR domain superfamily is a specialized protein domain family with a structural fold that is involved in selectively binding to and curving the plasma membrane from within a cell. BAR domain containing proteins are known to be important in cell signaling, fission, nutrients uptake as well as metastasis and immune function in higher organisms. The functional unit is a crescent shaped dimer that is composed of two identical monomers, each of which takes on a tri-helical structure. The dimers have positive residues on their surface that allow for interaction with the negatively charged lipid headgroups of the plasma membrane. We have located 16 protein sequences of Arabidopsis in online databases that fit the BAR domain motif. Each sequence was analyzed for chromosome location, domain architecture and sequence similarity using bioinformatic tools. We have modeled each of the putative BAR sequences in their dimer forms and visualized the electrostatic profiles. We discuss predicted membrane-binding properties of the BAR domains of Arabidopsis thaliana proteins, suggest putative functions, compare them to known BAR domains found in other organisms and ultimately explore the range of BAR domains sufficient for a functioning cell.

BIO-24 USE OF LANDMARKS IN FORAGING BY NAUTILUS

Sheila Moaleman[3] (UG), Naomi Lewandowski,[2] Mahwish Ashfaq,[2] Daria Postavnaia,[1] Wajeh Masud,[1] Jensine Sajan,[1] Chaya Fastow,[1] Jennifer Basil.[1]

[1] Brooklyn College, Brooklyn, NY

[2] Department of Biology, LIBE Lab, Brooklyn College, Brooklyn, NY

[3] New York City College of Technology, Brooklyn, NY

Until recently, little was known about the feeding behavior of chambered nautiluses (Nautilus pompilius) due to their deep-sea habitat and solitary lifestyle. Recent studies have shown nautiluses are capable of scavenging on dead food items both in the laboratory and in the field. In the field they prefer dead items to live items. Not much is known about the exact combination of cues (odor, visual) used by nautilus to find food. In the laboratory, a tank was created to replicate the nautilus habitat and test whether nautiluses use olfactory cues, visual cues, or a combination of both to locate food. Nautiluses were acclimated to the tank environment and trained to find food in the substrate. Each location was associated with a visual cue (white for food, black for no food, counterbalanced). The nautiluses were then tested under two conditions: 1) visual cues, but no food cues to determine if the visual cue alone was sufficient to cue a rewarded location, and 2) visual cues with odor cues, to determine if visual cues overshadow odor cues, once they have been learned. The animals are currently in the learning stage of the experiment. Discovering more about how nautiluses forage will help determine how to protect this vulnerable species.

Supported by Research Experiences for Undergraduates (REU) and by the National Science Foundation (Award # 1461099).

BIO-25 COMPUTATIONAL MODELING AND CHARACTERIZATION OF DIEDEL PROTEINS THAT REGULATE IMMUNE SIGNALING

Aulon Jerliu (UG) and Shaneen Singh, Brooklyn College, Brooklyn, NY.

The NF-kB and JAK/STAT pathways are well-established signal transduction pathways, conserved from insects to mammals. They regulate several key biological processes such as cellular proliferation and innate immunity responses. Consequently, their dysregulation results in aberrant conditions, often with deleterious consequences. The focus of this study is the protein Diedel, which was identified as one of the novel genes involved in the regulation of the JAK/STAT pathway in a genome-wide RNA interference screen in Drosophila cells. Drosophila Diedel and its viral homolog also suppress the conserved Imd-mediated NF-kB pathway in flies. Diedel is a small cysteine-rich protein: It is comprised of only 115 amino acids out of which 10 are cysteines. A recent crystal structure has revealed that Diedel is composed of two sub-domains and incorporates special structural features. However, its precise molecular function and mechanism of action still remains unclear. Based on current sequence information in the databases, Diedel seems to be highly conserved in drosophilids. While investigating the mechanism of infection of Drosophila melanogaster larvae by the wasp, Leptopilina heterotoma, we have uncovered two wasp venom sequences that are putative Diedel homologs. This study explores the detailed characterization of various Diedel homologs with an end to establishing structure-function correlations in this family of novel proteins, using a combined tool-kit of template based modeling, sequence and structure analyses algorithms. Our results confirm a conserved structural fold but there are significant sequence differences among the homologs. We present a comparative analysis of the theoretical models of Diedel homologs and their biophysical characterization.

BIO-26 MANIPULATION OF WHOLE GENOME PLOIDY IN CAENORHABDITIS ELEGANS

Erlyana K. Clarke (UG), Malika Khidoyatova, Ann Jose, Mara Schvarzstein, Brooklyn College, Brooklyn, NY.

Whole genome polyploidization has been implicated as a key step in development of cancer and drug resistance. In addition, polyploidization is important in nature for adaptation, speciation, organogenesis,and biological scaling. Our understanding of the roles and consequences of polyploidization in multicellular organisms has been limited by the fact that whole genome polyploidy could not be easily induced in laboratory model systems. Nigon was the first to generate Caenorhabditis elegans tetraploid strains, but this method is strenuous and inefficient, yielding only a handful of tetraploid stains in the last 30 years. One way in which tetraploidy arises in nature is by the generation of diploid gametes, which upon fertilization form a tetraploid organism. We have developed an efficient scheme based on the finding that the meiosis-specific cohesin component rec-8 mutant produces diploid gametes. In rec-8 mutants asymmetric segregation of chromatids in the second spermatocyte division yields both anucleate and diploid sperm. rec-8 mutant oocytes fail to extrude the second polar body, giving rise to diploid female gametes. Our method utilizes transient RNAi for rec-8 to generate tetraploids from any diploid strain, by generating diploid gametes that may give rise to a tetraploid stable strain. rec-8 RNAi treatment of diploid hermaphrodites for two generations occasionally yields larger than normal (Lon) animals, which are characteristic of polyploid animals. Lon animals are screened to identify stable tetraploid strains. Using this methodology several complex strains have been generated. Manipulation of ploidy within a single species is enabling us to inquire the role of genome size on development, intracellular and cellular scaling, animal size, and gene dose.

Supported by NIH SC2 41 952-00-01.

BIO-27 GENERATION OF A SIDEROPHORE DEFICIENT MYCOBACTERIUM SMEGMATIS MUTANT

Gabrielle Germain (GRAD), Brooklyn College, Brooklyn, NY.

Generation of a siderophore deficient mutant of Mycobacterium smegmatis" The saprophyte Mycobacterium smegmatis (Ms) produces two types of iron chelating siderophores (mycobactin and exochelin) which are proposed to be required for iron acquisition in iron limiting environments. To test this hypothesis, we used homologous recombination and counter selection to generate a mycobactin and exochelin deficient strain of Ms. We confirmed the mutations using PCR analysis and then characterized the strain along with strains producing only one siderophore on iron-limiting media. We also complemented the mutations to rule out any polar effects. The results of these experiments are presented herein.

BIO-28 THE ROLE OF SGO-1 IN C.ELEGANS

Anthony James (UG), Sauly Betesh, Mara Schvarzstein, Brooklyn College, Brooklyn, NY.

Accurate inheritance of a centriole pair by the sperm is crucial to ensure a normal first mitotic division of the embryo. Centriole separation (disengagement) allows for their duplication, which means that the centriole pairs must remain together (engaged) during the second stage of meiotic division and within the sperm until after fertilization. This prevents abnormal extra duplications of the centrioles and multipolar first mitosis of the embryo. A number of genes including the separase protease (sep-1), the meiosis specific cohesin component rec-8, and the HORMA domain containing genes htp-1/2 and him-3 are centriole engagement in the second meiotic division of spermatocytes in addition to regulating sister chromatid cohesion in the first division. Recently, we found that in C. elegans shugoshin, sgo-1, also

plays a vital role in maintaining centrioles engagement, but the mechanism by which this happens is unclear. We aim to further understand the role of sgo-1 by performing comparative phenotypic analysis of both the single and double mutants using C. elegans meiosis as our model system. We generated sep-1(dm);sgo-1 double mutants to assess whether sgo-1 functions to prevent centriole disengagement by protecting centrioles from sep-1 protease. Our analysis comparisons between each mutant suggest a genetic interaction between sep-1 and sgo-1. Preliminary fecundity assays shows the double mutant have a reduced fecundity compared to single mutants. In addition, imaging of the sep-1(dm);sgo-1 revealed abnormal gonad and germ cells morphology in some animals. To further understand the mechanism by which sgo-1 maintains centriole engagement will combine genetic analysis with immunofluorescence imaging of centriole disengagement in the mutant and wild type backgrounds.

Supported by SC2 41952-00-01.

BIO-29 EPISTATIC INTERACTION BETWEEN SGO-1 AND HTP-2 MUTANTS IN CHROMOSOME AND CENTROSOME INHERITANCE

Hufsa Tasnim[2] (HS) and Mara Schvarzstein.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

During cell division, proper segregation of chromosomes is vital to avoid aneuploidy (formation of cells with abnormal number of chromosomes). Aneuploidy in the gametes is the main reason for miscarriages and developmental abnormalities, and a major contributor to cancer development. Despite the importance for human reproduction and health, little is known about mechanisms preventing aneuploidy. One way scientists investigate the role of genes is by disrupting them and looking at their effects on generated mutant animals. C. elegans are microworms that were used to create the double mutants. Two such genes involved in meiosis are htp-2 and sgo-1. Mutations in these genes individually result in little or no defects (i.e. phenotype) in C. elegans. However, these genes' products (proteins) are thought to enhance the defects of other meiosis mutants. By combining these two mutations, (creating double mutants), we are able to see if these two proteins work within the same pathway to promote accurate chromosome segregation. In order to identify these mutants, who do not have a phenotype on their own, we have devised a molecular genotyping assay using Polymerase Chase Reaction. This releases the DNA of the worm so it can be run in a gel to visualize what genes there are. Our attempts at generating the double mutants suggested that the htp-2 sgo-1 double mutants worked. We are currently locating the desired recombinant gene using Polymerase Chain Reaction and will continue to analyze the genotypes of the double mutant.

HNS-1 HSN-DIET AND ACCULTURATION IN GHANAIAN AND JAMAICAN IMMIGRANTS: DIETARY, HEALTH AND SOCIODEMOGRAPHIC PROFILES OF PARTICIPANTS IN A MIXED METHODS RESEARCH STUDY

Patricia J. Pauyo (GRAD), **Tashanne Distin** (UG), Naudia Jones, Shanaz Hosein, Margrethe Horlyck-Romanovsky, Brooklyn College, Brooklyn, NY

Background: Black immigrants from the Caribbean and Africa constitute 23% of all immigrants living in New York City (NYC). Ghanaians, a rapidly growing immigrant group in NYC, have lower risk of obesity and type 2 diabetes (T2D) than Jamaican immigrants and African Americans. Little is known about the effects of acculturation on the diet and health of Ghanaian and Jamaican immigrant families because they are categorized as African Americans in public health research. The purpose of this study was to understand how cultural practices and acculturation experiences influence dietary patterns and risk of

obesity and T2D of Ghanaian and Jamaican families across generations. Objective: We aim to describe the sociodemographic profile, diet, health behaviors and health outcomes of youth, parents and grandparents of Jamaican and Ghanaian immigrant families participating in the acculturation study. Method: Prior to qualitative interviews or focus group sessions participants completed a print or online survey with questions about sociodemographics, diet, health behavior and health outcomes. Results: Of the 25 Ghanaian participants, there were 12 youth, 7 parents and 6 grandparents, and 76.0% were female. Of the 23 Jamaican participants, there were 10 youth, 6 parents and 7 grandparents, and 47.8% were female. Mean age was 39.1, mean BMI 26.9 and 11.9% of adults reported having T2D. Dietary intake included mean fruit and vegetable intake 2.5 servings/day, 15.2 take-out meals/month and 1.5 sugar sweetened beverages/day. Discussion: Participants in both groups were more likely to be youth. Ghanaians were more likely to be female, whereas Jamaicans were equally likely to be male or female. Consumption of fruits and vegetables were similar to national averages of 2.7 times per day.

Supported by CUNY Graduate School of Public Health & Health Policy Dean's Dissertation Award 2017.

HNS-2 DIET AND ACCULTURATION IN GHANAIAN AND JAMAICAN IMMIGRANTS: RECRUITMENT FOR A MIXED METHODS RESEARCH STUDY

Naudia Jones (UG), Tashanne Distin, **Shanaz Hosein** (UG), Patricia J. Pauyo, Margrethe Horlyck-Romanovsky MPH, Brooklyn College, Brooklyn, NY.

Background: Between 1980-2013, Black immigration to the US increased by 365%. The US Census predicts that by 2060, 16.5% of all Blacks in the US will be foreign born. Little is known about acculturation and health in foreign born Blacks (FBBs). In New York City, Ghanaians and Jamaicans are the largest FBB groups from the Caribbean and West Africa. Ghanaian Immigrants have a lower risk of obesity and type 2 diabetes compared to African Americans. Conversely, Jamaican Immigrants have higher risk of these chronic diseases, when compared to Ghanaians and African Americans. Objective: Recruit Ghanaian (n=15-20) and Jamaican (n=15-20) immigrant participants for a qualitative research study to understand how cultural practices and acculturation experiences influence dietary patterns and health of FBB across generations. Methods: Flyers were posted via social media outlets, CUNY campus bulletin boards, in-person outreach and a snowball effect. An online survey screened for eligibility. Those who met the inclusion criteria were invited for individualized interviews or focus groups. Participants signed a consent form detailing the process of the interview, risks, privacy and confidentiality. For de-identification, each participant was given a 12- digit code which included: date of interview, culture, family, generation. An intake survey collected socio-economic and health-related data. Sessions lasted about 60 minutes per interview and 90 minutes per focus group. Questions were open ended. The interviews were recorded and transcribed. Gift cards ($20) were given to participants upon completion of the interview. The transcribed recordings were analyzed and coded using the software Dedoose version 7.0. Results: 25 Ghanaians and 23 Jamaicans were recruited and enrolled in the study.

Supported by CUNY Graduate School of Public Health & Health Policy Dean's Dissertation Award 2017.

HNS-3 ENGAGING CULINARY EXPERTS IN PUBLIC HEALTH NUTRITION RESEARCH: INITIAL FINDINGS FROM THE HISPANIC CARIBBEAN RESTAURANT STUDY

Kevin Guerrero[1] (UG), Guarionex Emmanuel Acosta Bonifacio,[2] Dally Gomez,[1] Melissa Fuster,[1] Ph.D.

[1] Brooklyn College, Brooklyn, NY

[2] CUNY Graduate School of Public Health and Health Policy, New York, NY

Healthy People 2000, the national health and disease prevention report which sets objectives with 10-year targets, published a goal to increase the number of restaurants offering identifiable low-fat, low-energy food choices. This objective underscores the trend of eating away from home, which has placed an increased emphasis on the role of food establishments to provide healthier meals. Despite the important role of restaurants, there is a lack of research among food establishments serving minority populations, such as the Hispanic Caribbean (HC) community, who carry a disproportionate burden of nutrition-related chronic conditions such as Type 2 diabetes, hypertension, and obesity. Addressing this need, the Hispanic Caribbean Restaurant Study (HCRS), encompassed key informant interviews with restauranteurs and chefs (n=15) serving Puerto Rican, Cuban, and/or Dominican cuisines in NYC. Findings from the HCRS include insights on how these culinary experts perceive the healthfulness of HC diets and their role to improve the HC community's health. Findings also address barriers in recruiting this population in research. The implications drawn from this study will help inform interventions targeted at chefs working in the HC community of NYC to quell the rise of diet-related chronic diseases.

HNS-4 THE ASSOCIATION BETWEEN THE SELECTION OF MODERATE INTENSITY PHYSICAL ACTIVITY AND BMI

Marina N. Mekhail (UG) and Kristie Rupp, Brooklyn College, Brooklyn, NY.

Caloric expenditure from physical activity is an important component of the energy balance equation in weight loss and weight management programs. Caloric expenditure is determined by the intensity and volume of physical activity, with higher intensity and higher volume producing greater caloric expenditure. PURPOSE: The purpose of this study is to examine, in a sedentary overweight or obese population, if BMI is predictive of intensity selection when given the directive to engage in moderate intensity physical activity. METHODS: This study was a preliminary analysis of a larger on-going study. Twelve participants (83% male, age (41.1 ± 12.5 years; mean±sd), and BMI (31.8 ± 3.8 kg/m2) attended three study visits. During the first visit, height and weight were measured and fitness was assessed by a graded-exercise test. For the second and third visits, participants engaged in a self-selected bout of moderate intensity physical activity for 20 minutes on either the treadmill or cycle ergometer; the order of which was randomly selected. Heart rate was recorded every minute and breath-by-breath oxygen consumption was measured by a Parvo Medics True One 2400 metabolic cart. Average metabolic equivalents (MET) levels for the exercise sessions were utilized as the measurement of intensity selection. RESULTS: There was a moderate negative association between self-selected intensity on the cycle ergometer and BMI (r=-.322; p=.335). There was a small negative association between self-selected intensity on the treadmill and BMI (r=-.163; p=.632). However, these associations were not significant. CONCLUSION: While these associations were not significant, the magnitude of these correlations warrants further investigation following the completion of the parent study.

HNS-5 ASSOCIATION BETWEEN FITNESS LEVEL AND PERCEPTION OF MODERATE INTENSITY IN AN OVERWEIGHT AND OBESE POPULATION

Cathleen A. Janeczko (GRAD), Brooklyn College, Brooklyn, NY.

Introduction: For adults trying to lose weight, it is recommended that those individuals engage in 150-250 minutes of moderate intensity (≥3 metabolic equivalents (METS), but < 6 METS) physical activity per week. Purpose: The purpose of this study was to examine whether self-selection of moderate intensity was associated with fitness level in an overweight or obese population. Methods: Participants were 83% male, age 41.8±12.2 years, with a BMI of 31.8±3.8 kg/m2 and attended three study visits. During the first visit, baseline fitness was assessed by a graded-exercise test to 85% of age-predicted heat rate maximum (85% HR max). At the second and third visits, participants were assigned to mode of exercise

(treadmill or cycle ergometer) and directed to engage in 20 minutes of moderate intensity physical activity; the order of which was random. Oxygen consumption was measured by a Parvomedics True One 2400 metabolic cart and HR was measured by a Polar HR monitor. Average MET level and average HR were used as measures of intensity selection. Results: There were large significant negative associations between average heart rate (% HRmax) for both the cycle [r=-.650; p=.031] and the treadmill [r=-.675; p=.023] with fitness (time to 85% HR max). There was a moderate positive association between average METS and fitness for the cycle [r=.256; p=.447; r=.447], however, non- significant. There was no association between average METS and fitness for the treadmill [r=-.007; p=.984]. Conclusions: Further analysis is warranted at the completion of the parent study to determine if the significant negative association between self-selected intensity (% HRmax) on the cycle ergometer and fitness remain in a larger sample where other key correlates may be controlled for in the analysis.

HNS-6 INFLUENCE OF CHOLINE DERIVATIVES ON PLACENTAL MACRONUTRIENT UPTAKE AND TRANSPORT

Khatia Nanobashvili (GRAD), Chauntelle Jack-Roberts, Rachel Bretter, Xinyin Jiang, Brooklyn College, Brooklyn, NY.

Gestational diabetes mellitus (GDM) is characterized with excessive fat and glucose transport through the placenta to the fetus, resulting in fetal overgrowth. Our previously study suggests that supplementation of choline, an essential nutrient, normalizes fetal growth in GDM mice at mid-gestation. In this study, we further assessed the influence of choline and its oxidized derivative betaine on placental nutrient transport in GDM mice and human trophoblast cells. Female C57BL6/J mice were fed 60% kcal high-fat (HF) diet 4 weeks prior to mating and during gestation to induce GDM. These mice received 25mM choline chloride, 1% betaine, or control drinking water. Placentas were collected at embryonic day (E) 12.5 and E17.5 for histologic analysis. Results suggest that GDM mice had thinner placental labyrinth zone indicating impaired blood flow compared to non-GDM control mice, whereas both choline and betaine supplementation prevented this change. In an in vitro hyperglycemic model, the human trophoblast cell line BeWo was cultured under high (4.5 g/L) or low (1 g/L) glucose and treated with choline (1 mM) or betaine (1 mM) for 48 hours. Fatty acid uptake was increased by high-glucose treatment but normalized by choline supplementation. In conclusion, choline and betaine supplementation alleviated GDM-induced placental dysfunctioning.

Supported by New York Academy of Sciences Nutrition Research Award.

HNS-7 CHOLINE AND PLACENTAL MACRONUTRIENT METABOLISM IN GESTATIONAL DIABETES-COMPLICATED PREGNANCIES

Chauntelle Jack-Roberts[1] (GRAD), Shira Wolfson,[1] Ashley Morse,[1] Dr. Michelle Haughton,[2] Dr. John Kral,[2] Dr. Madur Dalloul,[2] Dr. Xinyin Jiang.[1]

[1] Brooklyn College, Brooklyn, NY

[2] SUNY Downstate Medical Center

Gestational diabetes mellitus (GDM) occurs in 7% of births in the US which has also been associated with macrosomia, defined as a birth weight of more than 4500g. Macrosomia increases the risk for obesity and diabetes in adulthood. Placental transfer of fatty acid and glucose to the fetus is elevated in cases of GDM, which may partly explain the incidence of macrosomia. Choline, a semi-essential nutrient that participates in lipid metabolism and transport, has been shown to normalize fetal growth at mid-gestation of GDM mice in our prior study. In the current study, we seek to determine the association between choline intake/status and GDM outcomes. We are recruiting GDM and non-GDM pregnant

women in their second trimester of pregnancy to assess their dietary intake using 24-hr dietary recalls and measure blood status of choline metabolites. We also collect the placentas and birth outcome data. Our preliminary results (including 4 non-GDM and 4 GDM women) demonstrate that choline intake differ between the two groups (GDM: 628 ± 247 mg/day vs. non-GDM 374 ± 75 mg/day). GDM is associated with higher rates of pre-term birth, C-section, and macrosomia. Further study is warranted to finalize data for placental gene expression and choline status.

Supported by New York Academy of Sciences Nutrition Research Award.

ENV-1 EVALUATING EFFICIENT METHODS FOR DETERMINING BIOACCESSIBLE LEAD

Jasleen Kaur (HS), Midwood High School, Brooklyn, NY.

Lead (Pb) is common in urban soils and may present serious risks for all urban residents. Total Pb values are generally reported, even though only a fraction of most Pb is bioavailable and absorbed by the human body. A reliable and efficient method for determining bioavailability in the lab (bioaccessibility) is needed for farmers and gardeners who cannot afford USEPA Method 1340 for their soil due to the high costs of using ICP-MS. This study tested USEPA Method 1340 along with three variations of this method with modified pH and varying solutions. The three variations included glycine plus HCl, glycine only, and 10% HCl. Three contaminated soil samples were used in this study. One was from a home backyard and two others were from community gardens. While EPA Method 1340 uses solutions leached from soil, the alternative methods employed for this study used actual soil samples analyzed by X-Ray Fluorescence (XRF) to evaluate bioaccessible lead. The objective of this study was to compare the concentration of lead in soil detected by XRF to the results received by ICP-MS. With the EPA method, there was an average of 49% bioaccessibility. T-tests were conducted to compare the results between the EPA method and the three variations. It was found that there was no significant difference (p-value= 0.06) between the lead bioaccessibility yielded by the EPA method and the experimental glycine plus HCl method. Other results which included using only glycine and 10% HCl were significantly different from the EPA method (p-values=0.03 and 0.0000003 respectively). These results suggest that measuring bioaccessibility by XRF with glycine plus HCl has the potential to determine lead bioaccessibility similar to that of the standard EPA method.

ENV-2 HOW EFFECTIVELY DO VEGETABLES GERMINATE IN A CONSTRUCTED TECHNOSOL?

Marzana Rafa[1] (HS), Sara Perl Egendorf[2], and Zhongqi (Joshua) Cheng,[2] Ph.D.
[1] Midwood High School, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

To deal with soil contamination, new soil is needed to grow vegetables. The Mayor's Office of Environmental Remediation created the Clean Soil Bank (CSB) to meet this need. Soils were made from sediments and compost at three ratios. In order to know if this soil works like natural soil, a seed germination experiment was conducted to see how different crops would grow. After conducting the experiment, the results will show how effectively vegetables germinate in a constructed technosol. 50% will be the best for germinating seeds because this mixture has the most nutrients and nutrients help plants grow faster. Seed germination is the process where a seed is observed as it grows into a plant. Finding out if certain seeds can germinate in certain types of soil is very beneficial to the society especially for the farmers because they are able to buy that type of soil and use it for their needs. Clean sediments from the clean soil bank were mixed with three different ratios of compost: 20%, 33%, and 50%.These were also compared to a control soil purchased by the Parks department, referred to as v-soil. This experiment used seeds from six types of crops: chard, pea, parsnip, kale, squash and tomato. There were 18 pots in each compost type and 72 plants in total. The plants were watered, measured, and the heights were recorded every week for ten weeks. After conducting the experiment, it seemed as if all three ratios are able to grow crops. After analyzing the data, 50% compost has the best growth for all the vegetables. These results show that CSB sediments mixed with compost grow crops. This means that these types of soils can be used to help deal with soil contamination and they can be used by urban farmers and home gardeners as well.

ENV-3 TROPHIC STATE INDEX AND FUZZY LOGIC ASSESSMENT OF WATER QUALITY IN JAMAICA BAY

Aleksandra Kravtsova (GRAD), Brooklyn College, Brooklyn, NY.

A continuous increase in urban, agricultural, and industrial activities has raised concerns about environmental problems and in particular the effects on water quality. Jamaica Bay is an important wetland complex of New York State that has experienced significant physical and chemical changes over the years. These changes have impacted water quality with potential negative impacts to vital ecosystems. The main objective is to evaluate recent trends of water quality in Jamaica Bay. The trophic state index (TSI) was used to examine changes in Jamaica Bay due to management actions. Fuzzy logic is a useful tool for analyzing water quality monitoring data because of its ability to work with sparse datasets and qualitative interpretations of data. Second objective is to determine if fuzzy logic is a useful tool for trophic state assessment. A fuzzy trophic state index (FTSI) was also created using trapezoidal and triangular functions for comparison with the TSI. The FTSI was implemented with both weighted and unweighted parameters. Parameter weights were determined using entropy. The resulting TSI, unweighted, and weighted FTSIs were analyzed for four sampling stations in Jamaica Bay over the period of 1996-2015. Considerable improvement in trophic state is seen in water quality in the Bay due to the effects of the wastewater treatment improvements (N load reduction, water volume reduction). Results suggest that fuzzy logic is an effective tool for assessing water quality in Jamaica Bay, but as a standalone tool, it did not change the interpretation of the water quality trends.

ENV-4 X-RAY FLUORESCENCE TESTING ON LEAD CONTAMINATED VEGETABLE TISSUES

Lilin Liu[2] (HS), Sara Perl Egendorf,[1] Joshua Cheng.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

As people in modern times become more knowledgeable and aware, the push for living healthier lifestyles increases. In urban areas, such as New York City, many people are growing their own organic produce as opposed to buying commercial fruits and vegetables. However, recent studies have found that many of these soils are contaminated with high lead levels (Mitchell et al., 2014; Cheng et al., 2015). This project further examines not only the lead content found in vegetable tissues grown in a community garden but also the effectiveness of the XRF analyzer in determining lead content. Instead of using the conventional method via ICP-MS, the XRF, a less expensive and less time consuming alternative, was used to measure lead levels of plant samples. A range of leafy greens were grown in the NYC community garden and harvested to test for traces of lead. Due to the large surface area of leafy greens, the risk of high lead levels increases. The majority of the produce samples come from garden beds with lead contamination. Samples were washed, dehydrated, ground, and scanned by XRF. The same samples were also tested through microwave digestion and ICP-MS to compare and determine the accuracy of the data formulated by the XRF. Results indicated that the XRF was not as accurate as the ICP-MS due to the less sensitive model used. Concentrations ranged from 0.38 ppm to 2.03 ppm of Pb in fresh weight vegetable tissues by XRF. The same samples were then analyzed using the ICP-MS. Concentrations of Pb in tissues ranged from 0.03 ppm to 0.63 ppm. The percent differences ranged from basil: 13% to chive: 94%.

ENV-5 PRIMARY PRODUCER DOMINANCE AND PHYSICO-CHEMICAL CONDITIONS IN PROSPECT PARK LAKE

Christine Halloran (GRAD), Brett F. Branco, Dept. of Earth and Environmental Sciences, Brooklyn College, Brooklyn, NY.

Prospect Park Lake, located in Brooklyn, New York, is fed by New York City's drinking water, which has been enriched with food grade phosphoric acid since the 1990's. The excess phosphate in the inflow promotes hypereutrophic conditions, growth of cyanobacteria in less sheltered areas of the lake, and growth of duckweed in the sheltered areas. The aim of this research was to identify important differences in the physico-chemical properties of the water column under each primary producer community, and the possible mechanisms which keep these states in dominance. Weekly sampling throughout the summer of 2015 at the less sheltered Peninsula and sheltered Boathouse yielded vertical profiles of dissolved oxygen, temperature, pH, and specific conductivity. Chlorophyll-a profiles, nutrient concentrations, and secchi depth were also measured. The physico-chemical differences are driven by wind sheltering from nearby trees and shading by the thick mat of duckweed. Ample sunlight at the Peninsula supports prolific growth of nitrogen fixing cyanobacteria which results in tight coupling of dissolved oxygen, pH, and nitrogen. In the dark and anoxic Boathouse waters, changes in dissolved oxygen, pH, and nitrogen are decoupled. The Peninsula waters had significantly higher dissolved oxygen, temperature, pH, specific conductivity, chlorophyll-a, and Total Kjeldahl Nitrogen (TKN) compared to Boathouse waters. Amongst 14 New York City lakes and ponds, Prospect Park Lake has some of the highest nutrient and chlorophyll-a concentrations and the lowest dissolved oxygen concentration. Most of NYC's lakes, including Prospect Park, are nitrogen limited.

ENV-6 THE EFFECT OF TIME AND PARTICLE SIZE OF SOIL ON CONTAMINATED SOIL

Sophia Khoja [1] (HS), Sara Perl Egendorf [2] and Zhongqi (Joshua) Cheng,[2] Ph.D.
[1] Midwood High school, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

Soil contamination is a major problem in many areas around the world, including New York City. People and children are exposed to contaminated soil through inhalation, direct ingestion and consuming vegetables grown in areas contaminated with heavy metals. This is detrimental to their health. The purpose of this experiment was to examine the effect of time and soil size on contaminated soils in terms of their trace metal concentrations. This research was based on the following questions: How are metals associated with different size fractions? How do soil metal concentrations change over time? Two hypotheses were examined: 1. As the size particle of soil decreases the concentration of heavy metals will increase. 2. As time increases the heavy metal contamination will increase. The research done in this experiment determined what size fraction the heavy metal concentration is associated with most and how time affected the contaminated soil samples. Contaminated soil samples from Sterling community garden were collected, dried and sieved to 2 mm, 1 mm, 0.59 mm and finally 0.044 mm. Then, soil samples were sieved and placed into X-ray Fluorescence (XRF) sample cups and analyzed for the heavy metals lead, zinc, copper and arsenic by the XRF analyzer. The averages showed that in the majority of contaminated soils, as the particle size decreased, the concentration of heavy metals increased. There were three cases where the concentration of heavy metals decreased as the particle size decreased. The results also showed that the concentration of lead decreased over time from 979 ppm to 927 ppm, while the concentration of zinc, copper and arsenic increased. People in low income areas should grow produce without having to worry about the associated risks of any heavy metals.

ENV-7 TRANSGENERATIONAL EFFECTS OF WATER POLLUTION ON CAENORHABDITIS ELEGANS FITNESS

Wensi Wu[2] (HS) and Mara Schvarzstein.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

This bioassay tested the effects of water on fecundity, the ability to produce healthy offspring, and changes in physical traits of the progeny produced. In this assay, Caenorhabditis elegans mothers were exposed to different water sources. The number and the fitness of unexposed progeny were analyzed. Water from Brooklyn urban waters in Gowanus Canal and Prospect Park and bottled water were compared to distilled water. Gowanus Canal water should show the worst effects to the C. elegans compared to the other waters. The first generation and the second generation of progeny unexposed to pollutants produced by exposed mothers were analyzed. The first generation showed worms with abnormal physical traits. These affected worms are likely due to non-genetic (epigenetic effects). The second generation of progeny also showed worms with abnormal physical traits, but these are likely due to inherited genetic mutations from the mother. The analysis suggests an increase in the number of mutations on the maternal genome of mothers grown in waters from Gowanus Canal and Prospect Park Lake, and to a much lesser extent, bottled water. People should be aware with their environment and the water they are drinking is safe to consume.

ENV-8 STUDY ON THE EFFECT OF CLIMATE CHANGE ON THE SALADOID PEOPLE OF SEAVIEW, BARBUDA

Rachel Chen[2] (HS), Sophia Perdikaris,[1] Reaksha Persaud.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

Human-induced climate change is erasing the history of our past. Rising sea and in particular the response of the Saladoid people of Seaview to naturlevels and coastal erosion are destroying cultural heritage sites once found deep in Earth's layers. This is indeed the case on many islands in the Caribbean, especially the archaeological sites of Seaview in Barbuda, Lesser Antilles. Prior to the 1900s, most climate change was considered natural. This research addresses the people-environment interactions from AD 400-600 al climatic shifts. Archaeofauna and artifacts from specific layers of the Seaview excavations were examined so that we can look for diachronic change. Through this study, we record history of peoples that have left no historical records. Archaeology is the only direct way to investigate, understand and record past events and interactions when writing was not a part of the specific society.

ENV-9 THE EFFECT OF HEAVY METAL CONCENTRATIONS AND pH LEVELS ON COMPOST AND GROWTH RATE IN PLANTS

Zenab Jamil (HS), Midwood High School, Brooklyn, NY.

The purpose of this study was to test different types of composts and see how their characteristics such as heavy metal concentrations, pH levels, and salt concentrations will affect the growth rate of arugula. It was hypothesized that lower metal concentrations, a slightly acidic environment, and lower salt concentrations in the composts will result in a better growth rate in the arugula samples. X-ray fluorescence was used to determine the heavy metal concentrations in the compost and showed that the amount of Cu and As never exceeded 200 ppm in any sample. However, there were higher levels of Zn and Pb reaching up to 200 to 300 ppm in compost samples EMC and EMFT. The pH results showed

very little variation among the compost samples which generally ranged from 6 to 7 on the pH scale and only went up to 8 for the control group. There were however, very big differences in the salt concentrations collected from the total dissolve salt (TDS) test, and they ranged from less than 1 ppm in samples like WCC, EMC, and EMFT all the way to 200 ppm in samples like CM, BP, and DSNY while the control group was approximately 50 ppm. In addition, the t-tests showed that each of the composts when compared to the control, showed a significant difference, which means that the addition of compost improved plant growth dramatically. Overall, compost samples WCC and DSNY showed the best growth rate while the control group which had no compost showed the least amount of growth. Meanwhile compost samples EMFT, EMC, BP, and CM all showed intermediate growth. Based on the growth rates, it was concluded that the plants did grow better with lower heavy metal concentrations, slightly acidic pH, but did not seem to be affected by the salt concentrations.

ENV-10 PILOT STUDY: ARSENIC (As) AND CADMIUM (Cd) DISTRIBUTION IN METALLURGIC OPERATION SITE, AGRONOMIC AND URBIC GROUNDS, SANTO AMARO, SALVADOR-BAHIA, BRAZIL

Victor M. Flores[1] (UG), Marcela R. Bomfim,[2] Maria Conceico,[2] Jorge A. Gonzagas.[2]

[1] Department of Environmental Science, Environmental Sciences Analytical Center, Brooklyn College, Brooklyn, NY

[2] Department of Agriculture, Environment and Biology, Universidade Federal do Recôncavo da Bahia (UFRB), Cruz das Almas, Brazil

Metallurgical operations create critical waste that has been shown to contain high levels of heavy metals, and bad waste handling practices cause soil, water, air, and environmental pollution. Santo Amaro, Salvador-Bahia, Brazil, started having heavy metal contamination problems with the introduction of a smelting company to the region in the 1960s. By the time this company stopped operations in 1993, it had extracted more than 900,000 tons of lead (Pb) ingots, leaving behind approximately 500,000 tons of untreated lagoons of slag waste, being spread by weathering process. UFRB research studies have found high concentrations of heavy metals further out from the operations site in different directions. Making use of previous findings, this grid map pilot study has as objective to map arsenic (As) and cadmium (Cd) distributions starting at the smelting site towards surrounding areas, farm land and urban sectors. On a satellite ArcMap of Santo Amaro, we laid out a 10,000km2 grid using GPS, and we collected 3 soil samples at different pedons (0-20cm and 20-40cm) every 1000 meters. Early findings suggest high pH acidity near operation site and a slow and steady decrease of pH as we move outwards, farmland and urban grounds. It was observed similar trend with organic carbon (O.C.), suggesting high likeability for Cd concentrations in outer soil samples. Keywords: Arsenic (As), Cadmium (Cd), smelting site, Santo Amaro, farmland, urban grounds, distribution, pollution, pH, delta pH, and organic carbon (O.C.)

Supported by LSAMP, Summer International Research Assistantship.

ENV-11 HYDRAULIC FRACKING FOR OIL AND GAS AND INDUCED EARTHQUAKES IN TEXAS AND OKLAHOMA

Jack R. Edelman[1] (GRAD), Fern Bromley,[2] Dr. Micha Tomkiewicz.[1]

[1] Brooklyn College, Brooklyn, NY

[2] Midwood High School, Brooklyn, NY

Hydraulic fracturing, commonly known as "Fracking", has been gaining popularity over the past two decades. This procedure maximizes the yield of oil (petroleum) and natural gas (methane) from drilled wells. The procedure involves using liquids, usually saline wastewater produced during the drilling

process, under high pressure, to fracture sedimentary rock layers below the ground. This releases as much residual oil and gas trapped in these rock layers as possible, thereby increasing the yield. Adding this high pressure wastewater lubricates these rock layers and reduces their pore pressures. Upon our examination of recent literature and reports on fracking and earthquake activity in this and other regions, as well as personal correspondence with the United States Geological Survey (USGS) and geologists involved in fracking operations, we have found that this process induces seismic/earthquake activity. In Oklahoma and Texas, this has resulted in earthquake activity that has surpassed the high levels of high seismic activity regions such as California. State and local authorities have banned fracking in many of these areas for such reasons. We have also uncovered recent findings that using other materials, such as carbon dioxide and propane, rather than saline wastewater, may mitigate/reduce the induction of earthquakes caused by fracking.

ENV-12 SUSTAINABLE HYDRAULIC FRACTURING AND WASTEWATER DISPOSAL

Fern Bromley[2] (HS) and Jack Edelman.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Midwood High School, Brooklyn, NY

Hydraulic fracturing (or fracking) is a natural gas extraction process that consists of injecting volumes of water, sand, and chemicals at high pressures to create fissures in rock, allowing gas to flow up the well. This method produces large amounts of a substance known as wastewater, a usually brackish substance consisting of flowback from fracking fluid and water present in the ground. As all types of waste, the liquid must be disposed of; most companies opt for deep well injection of this water. Deep well injection allows for the permanent disposal of wastewater in underground caverns where it is thought to cause no harm to human health or the environment, and is therefore seen as the best option. However, in recent years, many studies have revealed the potential geological consequences of deep well injection, as it is shown to cause increased detrimental seismic activity. Fortunately, the technology for proper disposal and/or utilization of this liquid does exist in the form of desalination. Desalination plants would serve to purify the wastewater and make it potable and useful. It is possible to construct cost effective desalination sites for purification of fracking wastewater that would run on the energy resources extracted through the same processes that produced this waste. Thus the system would be as self-sufficient as possible, avoiding transportation and keeping the net energy yield of the natural gas as high as possible.

ENV-13 THE EFFECTS OF WATER ENVIRONMENTS ON THE FECUNDITY OF CAENORHABDITIS ELEGANS

Mara Schvarzstein,[1] **Carla D. Cervantes**[2] (HS).
[1] Brooklyn College, Brooklyn, NY
[2] Edward R. Murrow High School, Brooklyn, NY

The purpose of this experiment was to conclude if there would be any effects on the fecundity count of Caenorhabditis elegans after being exposed from the embryonic stage in water environments that humans believe to be safe to drink. The worms were exposed to tap, fountain, distilled, and Poland Spring water. After incubation in NGM liquid media, hermaphrodite L4's were picked from each media type. To progeny of each worm was counted every two days until the worms no longer laid embryos. My hypothesis was that worms exposed to tap water and fountain water would yield fewer worms than those in distilled and Poland spring water. The reproductive system of C.elegans would be negatively impacted which would also reflect damage in the human.

CHEM-1 TARGETING PHOTOCHEMICAL SCALPELS OR LANCETS IN THE PDT FIELD. THE PHOTOCHEMIST'S ROLE

Radhika Viswanathan[1] (UG), Stefano Protti,[2] Angelo Albini,[2] Alexander Greer.[1]
[1] Brooklyn College, Brooklyn, NY
[2] University of Pavia, Pavia PV, Italy

This poster covers photochemical approaches aimed at supplementing surgical instruments with hand-held photodynamic therapy (PDT) instruments. PDT is not widely used in hospitals, because of the laser equipment and expertise needed, and because insurance policies often do not cover the procedure. Accordingly, this review focuses on advances in photochemistry, photophysics, nanotechnology and miniaturization techniques that may likely inspire the use of hand-held instruments in PDT. A takeaway point is that the advent of photochemical scalpels or lancets that deliver reactive oxygen species (ROS) on site may better equip medical practitioners and allow for eradication of tumors or infections in general. Specifically, the review is divided into several sections: sensitizer types, multiphoton and plasmonic topics, sensitizer delivery, light delivery, dosimetry, fiber optics and hand-held implements in PDT.

CHEM-2 PORPHYRIN (3D STRUCTURE)

Nadia Okyere (UG), New York City College of Technology, Brooklyn, NY.

The goal of this research is to computationally design and visualize the 3D structure of a porphyrin macrocycle and its derivative. Porphyrin is the name given to a family of intensely colored compounds. It is made of a large macro-cycle of twenty carbon atoms and four nitrogen atoms. In order to get the structure in a 3D form, we are using Chemdraw Professional to draw the molecule with the hydrogens attached to it and then save it into sdf and mol file which comes in moltext and mol V3000. The purpose of using all these files is to obtain a pdb file which will visualize with VMD to be viewed in a 3D mode. Once we have the 3D structure, we will be able to see where it’s binding on a protein surface together with its derivatives.

Supported by NIH.

CHEM-3 HETEROGENEOUS PEROXIDES: TRIPLET ENERGY TRANSFER TO THE OXYGEN–OXYGEN BOND

Niluksha Abeykoon Walalawela[1,2] (GRAD), Mihaela Minnis,[1,2] Prabhu Mohapatra,[1] Alexander Greer.[1]
[1] Brooklyn College, Brooklyn, NY
[2] The Graduate Center of the City University of New York, NY

Our study has focused on the photosensitized dissociation of peroxides in the heterogeneous phase. We have examined sensitizer triplet energy transfer to peroxide O–O bonds on silica particle surfaces as a means to generate alkoxy radicals. 4,4’-Dimethylbenzil sensitizer and dicumyl peroxide were co-adsorbed onto silica. The sensitizer and peroxide coverage was varied on the silica and the UV photolysis of these loaded particles was investigated using a tumbling motion. Our results show that a maximal peroxide photocleavage arises when the distance between peroxide and sensitizer is ~12 Å. Lower sensitizer loadings reduced the photocleavage efficiency due to less available sensitizer. Higher loadings were inefficient likely due to the crowding of sensitizer molecules and sensitizer-sensitizer self-quenching. The results provide needed insight to the factors influencing sensitized peroxide photocleavage for the development of a solid-state alkoxy-radical generating system. Ongoing work

includes the synthesis of a tripod-like adamantane "foot" for the orthogonal orientation of the sensitizer relative to the surface for additional insight on the photodissociation of peroxides.

Supported by NSF (CHE-1464975).

CHEM-4 EVIDENCE FOR PEROXIDE INTERMEDIATES IN INTRALIPID PHOTOOXIDATIONS FROM 31P AND 1H NMR STUDIES. IMPLICATIONS FOR LIPID PEROXIDATIONS, SUPERFICIAL PHOTODYNAMIC THERAPY, AND TISSUE SIMULATING PHANTOMS

Callistus O. Chiemezie[1] (GRAD), Prabhu Mohapatra,[1] Arina Kligman,[2] Timothy C. Zhu,[3] Alexander Greer,[1] Michele M. Kim.[3]

[1] Brooklyn College, Brooklyn, NY

[2] The Graduate Center of the City University of New York, NY

[3] Department of Radiation Oncology, University of Pennsylvania, Perelman Center for Advanced Medicine, Philadelphia, PA

The reactions of singlet oxygen with intralipid in an aqueous solution/emulsion were studied. For the first time, 31P NMR and H2O-soluble phosphine traps such as sSPhos were used to quantitate the peroxides in the reaction of singlet oxygen with intralipid fluid in solution/emulsion. A caveat of this study is that the peroxide structures cannot be distinguished in the intralipid photooxidation mixture, even though sSPhos trapping is a credible technique to determine peroxide concentrations. Thus, additional reactions (31P NMR with triphenylphosphine in 1O2–oleic acid reactions and 1O2–soybean oil reaction in deuterated organic solvents, and the direct detection of peroxides by 1H NMR of the reaction mixtures) support the sSPhos trapping studies that are shown to quantitate peroxides in water. The results suggest a singlet oxygen-induced reaction of the alkene bonds in the solutions examined. In a broader context, the importance of the work includes a deeper understanding of photooxidative aging of intralipid fluid with possible applications in superficial photodynamic therapy and its use as a tissue-simulating phantom.

Supported by NSF.

CHEM-5 PHOTOINDUCED BACTERIAL INACTIVATION BY AZOSULFONES

Sayuj Zachariah[1] (UG), Radhika Viswanathan,[1] Stefano Protti,[2] Maurizio Fagnoni,[2] Alexander Greer.[1]

[1] Brooklyn College, Brooklyn, NY

[2] University of Pavia, Pavia PV, Italy

Attention to high-energy intermediates is growing because of their key role in both organic synthesis and biological applications. In particular, photochemical activation of thermally stable compounds has been successfully applied in different fields of medicine, including photodynamic therapy and bacteria inactivation. Herein we present an in vitro investigation of the bacteria inactivation induced by 4-acetylphenylazo mesylate or other arylazosulfones. Such colored stable derivatives of aryl diazonium salts have been demonstrated to be valuable photoprecursors of either aryl radicals (Ar•) and aryl cations in their triplet state (3Ar+), depending on the chosen irradiation wavelength. Preliminary experiments have been carried out in the presence of 10-3 M 4-acetylphenylazo mesylate showed UV-B (366 nm) photoinduced inactivation of planktonic E. coli with some dark toxicity. A 30% decrease in bacterial colony count was observed without irradiation, and a 70% decrease was observed when irradiated with UV-B light. Control experiments carried out by UV-B irradiation in the absence of 4-acetylphenylazo mesylate that showed no bacterial inactivation. However, with 4-acetylphenylazo

mesylate at higher concentration (10-2 M), dark toxicity with no bacteria growth in dark control was observed.

CHEM-6 EXPERIMENTAL AND DFT COMPUTATIONAL EVIDENCE FOR NEW NITROSAMINE PEROXIDE INTERMEDIATES GENERATED BY PHOTOOXIDATION

Mikey Kwon (GRAD),[2] Ashwini Ghogare,[1] Ciro Debaz,[1] Paolo Di Mascio,[3] Inna Abramova,[1] Prabhu P. Mohapatra,[1] Edyta Greer,[2] Alexander Greer.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Baruch College, New York, NY
[3] University of São Paulo, São Paulo, Brazil

A nitrosamine photooxidation reaction is shown to generate a peroxy intermediate by physical-organic methods. In this study, the irradiation of phenyl and methyl-substituted nitrosamines in the presence of isotopically labeled 18-oxygen revealed two oxygenation reactions. First, a dioxygen molecule covalently attached to the N=O bond of nitrosamine, presumably as a ring-closed 1, 2, 3, 4-trioxazetidine or dimer, after which dioxygen was released back. Second, an O atom was transferred from the peroxy intermediate to a trimethylphosphite or triphenylphosphine trap, or to the nitrosamine itself, forming two moles of nitramine. The unstable peroxy intermediate showed chemiluminescence upon thermal decomposition, which is reminiscent of the behavior of 1,2-dioxetanes, indicating the formation of a cyclic nitrogen peroxide species. A DFT study is also consistent with the formation of a cyclic nitrogen peroxide species on the reaction surface.

CHEM-7 ANTHRAQUINONE AS AN EFFECTIVE ELECTROLYTE FOR REDOX FLOW BATTERIES

Nomon Mohammad (HS), Midwood High School, Brooklyn, NY.

Storing large amounts of energy is becoming increasingly important as the dependence on electrical energy is rising. This has put great concern into using redox flow batteries to store energy generated by the sun and the wind. Anthraquinone (ANQ) is an organic electrolyte present within quinone/bromide flow batteries. Such an electrolyte can be created by adding functional groups to anthracene which is extracted from rhubarb (Rheum rhabarbarum). The purpose of this experiment was to determine the efficiency of ANQ by examining its conductivity with varying temperature. The activation energy of ANQ was also measured to determine how the activation energy changes across varying concentrations. This was done by creating three samples of different concentration: ANQ1 contained 30 mM of ANQ and 1.0 M H2SO4, ANQ2 contained 18 mM of ANQ and 1.0 M H2SO4, and ANQ3 contained 7.9 mM of ANQ and 1.0 M H2SO4¬. The results showed that an increase in temperature resulted in an increase in conductivity which relates to the fact that a greater availability of kinetic energy causes an increase in conductivity. Furthermore, the activation energy of the most concentrated sample was the lowest while samples 2 and 3 and approximately the same activation energy. A lower activation energy is favored because this results in a reaction occurring with minimal energy required to initiate it. The data collected showed that temperature and conductivity are positively correlated and that the most concentrated sample of ANQ had the least activation energy. Understanding the different conditions at which ANQ functions is essential in determining the conditions at which the electrolyte has optimal performance allowing for the development of a battery that can store greater amounts of energy.

CHEM-8 ALKYL CHAIN LENGTH INFLUENCE ON CONDUCTIVITY AND ACTIVATION ENERGY OF PYRROLIDINIUM-BASED RTILs

Marco Ramirez[1] (HS), Domenéc Paterno,[2] Stefano Passerini,[3] Sophia Suarez.[2]
[1] Midwood High School, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY
[3] University of Müenster, Münster, Germany

Room-temperature ionic liquids as solvents for lithium salts may eliminate lithium-ion batteries' flammability issues. The effect of the alkyl side chain length on the conductivities and activation energies of N-alkyl-N-methylpyrrolidinium cation (Pyr1M+) and bis(trifluoromethanesulfonyl)imide (TFSI-) ionic liquids was investigated. Pyr1M cations' superior conductive capabilities and many structure variations made it the central focus of this paper. The number of carbons in the cationic structure, denoted by a subscripted, M, ranged from 3 to 9—excluding four. At 20 °C, most ionic liquids yielded conductivity values above 10^-4 Scm-1 and proceeded to increase with increasing temperature. Increasing the alkyl side chain length led to subsequent conductive decreases. Therefore, Pyr13LiTFSI ionic liquid had the lowest activation energy. Overall, the results show that increasing alkyl chain length for LIB application is counterproductive.

CHEM-9 LAUNCHING A SYNTHETIC PLATFORM FOR NOVEL LINCOSAMIDE ANTIBIOTICS

Chabely Rodriguez[1] (UG), Ioana Moga,[2] Katherine Silvestre,[2] Andrew G. Myers.[2]
[1] Brooklyn College, Brooklyn, NY
[2] Harvard Universitry, Cambridge, MA

According to the Center for Disease Control, in the United States an estimated minimum of two million people acquire serious antibiotic-resistant infections annually. In addition, antibiotic resistance leads to the death of at least 23,000 people per year. The number of antibiotics approved over the past 25 years has declined, demonstrating a need to develop new antibiotics. Lincosamides target the bacterial ribosome, inhibiting protein synthesis and leading to cell death. Lincomycin was the first drug discovered of this class. Its semi-synthetic derivative clindamycin is the most clinically relevant member of the family, active mostly against gram-positive bacteria. The Myers laboratory investigates synthetic routes to create novel lincosamide antibiotics, a historically under-explored class of antibiotics. The focus of this project is to expand the spectrum of activity of lincosamides to include gram-negative bacteria. Semi-synthesis gives access to a limited number of analogs. Our laboratory launched a platform that targets the synthesis of new lincosamide antibiotics using a convergent and diversifiable route. This research project focused on introducing modifications that have previously shown to have potency against gram-negative bacteria through cross metathesis. The study used novel proprietary methods to synthesize the lincosamide analogs. We were able to successfully synthesize six lincosamide analogs, demonstrating the viability of our methods of synthesis of lincosamide antibiotics for testing. The next step involves testing the potency of the analogs against a panel of both gram-positive and gram-negative bacteria, in comparison to clindamycin, currently the only member of the lincosamide family in clinical use.

Supported by NIH/NIGMS MARC GM008708.

CHEM-10 DEVELOPMENT OF ABPP BASED PLATFORM FOR REVERSIBLE COMPOUND IDENTIFICATION

Samuel I. Honore[1] (UG), Ku-Lung Hsu,[2] Myungsun Shin.[2]
[1] Brooklyn College, Brooklyn, NY
[2] University of Virginia, Charlottesville, VA

Introduction: Regulation of lipid signaling pathway is a tightly controlled process that involves numerous enzyme species including monoacylglycerol lipase (MGLL), and diacylglycerol lipases (DAGLs). There has been increasing evidence demonstrating the importance of lipid signaling in immune cell functions. It has been shown that inhibition of DAGLβ in peritoneal macrophages decrease the inflammatory lipid signaling mediators such as PGE2 and PGD2. Therefore, the development of reversible small molecules that inhibit DAGLβ could be a potential avenue for anti-inflammatory effects in immune cells. Although the covalent inhibition of DAGLβ activities could be measured using activity based protein profiling (ABPP) probe HT-01, there has not been a report showing small molecules' effects on DAGLβ enzyme activities. Purpose: The purpose of this study was to screen reversible compounds to inhibit the activity of the enzyme DAGLβ which could be an avenue for anti-inflammatory effects in immune cells. Method: This study used the methods of Activity Based Protein Profiling (ABPP), and with the usage of HEK 293 cells (Human Embryonic Kidney Cells), and the HT-01 probe used to track the activity of DAGLβ. Results: Our results showed that the reversible compound we tested did not show as much inhibition as we expected. Conclusion: We are continuing to test the reversible compound to confirm these results and further test the compound's ability to inhibit the activity of the enzyme DAGLβ.

Supported by NIH/NIGMS RISE GM062981.

CHEM-11 IDENTIFYING POST-TRANSLATIONAL MODIFICATIONS OF HISTONES IN THE AGGREGATION OF ALPHA_SYNUCLEIN IN PARKINSON'S DISEASE

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

Parkinson's disease (PD) is a progressive neurodegenerative disease that is associated with a loss of dopaminergic neurons and the presence of protein aggregates known as Lewy bodies, mainly composed of the protein alpha-synuclein (a-syn). There is no known cure for PD, and current treatments do not slow the progression, instead they relieve short-term somatic symptoms. Epigenetic means, specifically post-translational modifications of histones can unravel the molecular mechanisms linking a-syn aggregation to the development of PD. Eukaryotic DNA is wrapped around an octameric histone core formed by one H3-H4 tetramer and two H2A-H2B dimers. The N-terminal histone tails are subject to many post-translational modifications (PTMs). PTMs modify the interaction between the histone and DNA. Depending on the amino acid modified, and the number of modifications, transcription of genes may be activated or silenced. Saccharomyces Cerevisiae (yeast) models overexpressing a-syn were used to explore which histone PTMs are associated to a-syn aggregation and cytotoxicity in cells. Western blotting with specific antibodies for each PTM is used to qualitatively see which PTMs change in the context of PD. With a specific focus on the methylation of histone H3, we were unable to detect significant changes in the level of modification between control and cells overexpressing a-syn. This suggests that the cytoxicity elicited by a-syn aggregation is not correlated to changes in methylation patterns of histone H3. We continue to test for other PTMs on the H3 histone as well as on other histones that make up the nucleosome core. We are trying to identify molecules targeting the specific modifications in order to reduce cytotoxicity, which may slow or reverse the progression of PD.

CHEM-12 YEAST REVEALS CHANGES IN HISTONE H3 MODIFICATIONS ASSOCIATED WITH ALS

Mohamed S. Said (UG) and Mariana Torrente, Brooklyn College, Brooklyn, NY.

ALS is a neurodegenerative disorder that progressively affects motor neurons in the brain and spinal cord. Patients who are diagnosed with ALS die within 5 years – mainly due to respiratory failure. ALS is thought to be caused by alterations to the motor neuron microenvironment, including protein aggregates and defective RNA processing.TDP-43 and FUS are RNA binding proteins that are involved in transcription and slicing between the nucleus and cytoplasm. Mutations in TDP-43 and FUS lead to ubiquination and aggregation of proteins in ALS. However, not every ALS case can be traced back to specific genes. We aim to study the epigenetic changes involved in ALS. DNA is packed into an organized protein-DNA complex called chromatin and changes in the structure of chromatin are capable of causing changes in gene expression and phenotype without changing the DNA sequence. These changes are termed epigenetic. DNA is wrapped around proteins called histones. Histones can be post-translationally modified with methyl, acetyl or phosphoryl groups. These modifications dictate whether or not a gene will be transcribed. In this study, we look at changes in the levels of particular histone modifications in yeast ALS models by western blot analysis, with a focus on histone H3 modifications. We detect statistically significant changes in H3K56ac and H3K4me2 in yeast cells expressing TDP-43 and FUS compared to controls. Chemically reversing these epigenetic changes could lead to improved cell survival and potential treatments for ALS. In the near future, we will also exploit stem cells models to expand our findings into human cells.

CHEM-13 HISTONE H3 PHOSPHORYLATION IS DECREASED IN YEAST MODELS OF ALS

Natalie F. Mendo (UG), Karen Chen, Mariana Torrente, Brooklyn College, Brooklyn, NY.

Amyotrophic Lateral Sclerosis (ALS) is a neurodegenerative disease associated with cytotoxic proteinaceous cellular inclusions affecting both upper motor neurons in the motor cortex and lower motor neurons in the spinal cord and brainstem. Mutations in two specific RNA-binding proteins, TDP-43 and FUS, occur in this disease. These proteins are usually found in aggregates in post-mortem ALS brains. To further investigate the causes of neuronal cell death, we aim to explore the epigenetic makeup of ALS. DNA is wrapped around histone proteins, which are modified to either activate or stop the transcription of the DNA. We examined histone modifications in a yeast cell model of the disease using modification specific antibodies. One particular histone modification—H3S10 phosphorylation—was decreased in yeast cells overexpressing TDP-43. Moving forward, we will study the levels of this modification in fibroblasts, human stem cells, and motor neurons derived from stem cells. We will then begin testing for a drug that can reverse the changes in S10 phosphorylation and potentially stop neuronal cell death and lead to treatments for ALS.

CHEM-14 CHARACTERIZING HISTONE H4 METHYLATION AND ACETYLATION IN PARKINSON'S DISEASE MODELS

Mariana Torrente, Karen Chen, and **Sadiqa Taaseen** (UG), Brooklyn College, Brooklyn, NY.

Parkinson's disease (PD) is a progressive neurodegenerative disease that does not currently have a cure. The disease includes a loss of dopamine-secreting neurons and the presence of Lewy bodies, which are intraneuronal protein aggregates. Lewy bodies contain a protein called α-synuclein, whose mutations have been linked to PD. The way in which environmental factors impact the progression of disease and the relationship between Lewy body formation and the loss of dopamine secreting neurons are unknown. This study considers the epigenetic mechanisms, particularly histone modifications, which may link α-synuclein aggregation to PD. Epigenetics looks into how gene transcription is regulated,

primarily by way of post-translational modification of histone proteins and the methylation of DNA. Here, we examined histone modifications associated to α-synuclein aggregation in the budding yeast Saccharomyces cerevisiae. Since its widely modified, we focused on methylation and acetylation sites on the histone H4.We were not able to find any significant changes in the H4 modification levels between the cells overexpressing α-synuclein and the control cells. This implies that the cytotoxicity from the α-synuclein is not associated with the changes in methylation and acetylation of histone H4. We continue to test the expression of other histones in order to find which histone modifications change levels in PD. We hope these results will contribute to the development of therapies for PD.

CHEM-15 PROTEASOME-DEPENDENT DEGRADATION OF KMT2D-COMPASS COMPLEX

Khadija Wilson[1,2] (UG), Rizwan Saffie[2], Luca Busino[2], Ph.D.
[1] Brooklyn College, Brooklyn, NY
[2] University of Pennsylvania, Philadelphia, PA

The ubiquitin proteasome system (UPS) regulates the balance between protein synthesis and protein degradation by marking proteins for degradation by the 26S proteasome. Proteins are targeted for degradation through a processive series of enzymatic reactions. A molecule of ubiquitin is activated by an E1 enzyme, transferred to an E2 ubiquitin-conjugating enzyme and then unto its target through a substrate-specific E3 ubiquitin ligase. Cancer cells exploit the UPS by causing mutations in target substrates to prevent the degradation of oncogenic proteins or to induce increased degradation of tumor suppressors. Targeting the UPS involves selective intervention at substrate-specific E3 ligase. Characterization of ligase-substrate pairings has been found to be important in the context of cancer and may serve as a new therapeutic target. Our lab worked on identifying putative substrates for the E3 ligase Skp1-Cul1-Fbox (SCF) protein Complex. Via mass spectrometry, KMT2D was identified as a candidate substrate that interacts with the SCF Complex. KMT2D is a methyltransferase that catalyzes methylation of lysine 4 on histone 3, which serves an epigenetic mark of gene activation. Downregulation of KMT2D via deletions and mutations has been described in a variety of cancers suggesting a tumor suppressor function. We demonstrated the SCF-KMT2D interaction to be phosphorylation-dependent and that KMT2D is potentially a MAPK substrate. Based on these results, we hypothesize that cancer cells utilize proteasome-dependent degradation to downregulate KMT2D favoring cell proliferation. Our data are preliminary and further studies will be performed to directly test if the SCF-Complex can control KMT2D protein levels and activity and to analyze KMT2D binding to DNA by ChIP-Seq. Understanding the basis of this mechanism will open novel therapeutic avenue in cancer treatment.

Supported by NIH NIGMS GM08078 (MARC).

CHEM-16 IONOPHORIC POLYPHENOLS INCREASE CELLULAR DEATH IN YEAST MODELS OF PARKINSON'S DISEASE

Navin Rana[1] (UG), Alberto Martinez,[2] Mariana Torrente.[1]
[1] Brooklyn College, Brooklyn, NY
[2] New York City College of Technology, Brooklyn, NY

Resveratrol is a naturally occurring antioxidant found in red grape skin. Many resveratrol-based ionophoric polyphenols selectively bind to Cu2+ ions and display potent antioxidant and anti-amyloidogenic properties in neuronal models for Alzheimer's Disease. Interestingly, Cu2+ ions have also been found to be related to processes involved in Parkinson's Disease (PD). PD is a progressive, incurable neurodegenerative disease affecting millions of people worldwide. Here, we examine the

effects of the ionophoric polyphenols on yeast cells that overexpress human alpha-synuclein. Alpha-synuclein is one of the many proteins found in Lewy bodies, which are protein aggregates and microscopic markers of Parkinson's disease. Yeast cells overexpressing alpha-synuclein were treated with the aforementioned ionophoric polyphenols at varying concentrations. Surprisingly, these compounds increased alpha-synuclein cytotoxicity in yeast. Future investigation will elaborate on the molecular pathways whereby these compounds exacerbate cellular death in yeast cell model of PD.

CHEM-17 PHOSPHORYLATION OF HISTONE H2B IS DECREASED IN YEAST MODEL OF ALS AND PARKINSON'S DISEASE

Huda Yousuf (UG) and Dr. Mariana Torrente, Brooklyn College, Brooklyn, NY.

Amyotrophic Lateral Sclerosis (ALS) and Parkinson's disease (PD) cause the progressive degeneration of neurons. Thus far, no cure is available for patients diagnosed with these diseases. We aim to understand the role of epigenetics on the progression of ALS and PD. The study of epigenetics focuses on changes in an individual's phenotype without altering the genotype. Main epigenetic mechanisms involve the methylation of DNA or the modification of histone proteins. Histones are proteins around which DNA spools. The modification –methylation, acetylation, or phosphorylation- of histones can determine which genes will be transcribed and eventually translated. Histones from yeast cells overexpressing human proteins known to be associated with ALS and Parkinson's disease were probed for different histone modifications by western blot. We found changes in phosphorylation of histones H2A and H2B to be particularly interesting. While levels of phosphorylation of histone H2A on T129 have showed no changes for both ALS and PD models; phosphorylation of H2B on T129 is decreased in the PD model and one ALS model. Recent studies have shown that histone H2AT129 and H2BT129 are involved in DNA repair in budding yeast. We are currently working on modifying cell survival by manipulating removal or addition of the phosphoryl groups on a specific histone of interest. We will expand our studies to human fibroblasts and stem cells from ALS and PD patients, as well as motor neurons derived from stem cells.

PHYSICS-1 PREPARATION AND CHARACTERIZATION OF GOLD NANOPARTICLES ON GLASS SUBSTRATE

Israel Kurtz (UG), Nikesh Maharjan, and Mim L. Nakarmi, Brooklyn College, Brooklyn, NY.

Gold thin films of thicknesses 5, 25, and 50 nm were deposited on glass substrates by sputtering. The samples of each thickness were annealed at temperatures of 400, 500, and 550o C on a hot plate. After annealing, each sample turned from a gold color into a pink color due to the formation of gold nanoparticles of varying sizes depending on sample thickness and temperature. Atomic force microscopy (AFM) was used to image the surface morphology of each sample to investigate grain sizes. The AFM images revealed the formation of gold nanoparticles. We also performed optical reflectance spectroscopy on the samples. Comparative results of gold nanoparticles with different sizes will be presented.

PHYSICS-2 DETERMINING THE IONIC CONDUCTIVITY OF VANADYL SULFATE DISSOLVED IN TRIFLIC ACID SOLUTION (TFSA)

Menna Elaskandrany[2] (UG), **Vivian Luu**[1] (HS), Domenec Paterno,[2] and Sophia Suarez.[2]
[1] Midwood High School, Brooklyn, NY
[2] Brooklyn College, Brooklyn, NY

Vanadyl sulfate has conductivity properties which makes it ideal for use in redox flow batteries. Therefore, the vanadium redox flow battery is a good candidate for use in large-scale electrical energy storage technology. Samples of vanadyl sulfate differing in concentration from 0.05-2.0M will be dissolved in solvents such as trifluoromethanesulfonic acid (TFSA), and temperature will be varied from 25℃ -95℃ using a silicon oil bath. A Solartron 1287 Electrochemical Interface in conjunction with a Solartron 1260 Impedance/Gain-Phase Analyzer will be used to effectively measure and analyze the AC impedance spectroscopy of the samples at a frequency range of 3MHz-300Hz, in order to determine conductivity. We hypothesize that ionic conductivity will increase with the use of TFSA, a strong acid and an excellent proton donor.

Supported by Louis Stokes Alliance for Minority Participation (LSAMP)

PHYSICS-3 THE WATER CRISIS: GAZA'S MAIN THREAT

Zhi Zhang, **Rafat Shhadeh** (UG), **Tameika Bramwell** (UG), Brooklyn College, Brooklyn, NY.

The goal of this study is to investigate the water crisis in Gaza and its effects on the surrounding territories. Political issues affect the process of providing water to the region; however, there have been a lot of agreements made in hopes of improving the situation. The World Bank reported that Gaza region would be uninhabitable by the year 2020 due to inhuman living conditions. This study will highlight all the issues that contribute to the water crisis, especially the cross-border efforts done by the Israeli government and Palestinian authority. It will also show that without immediate attention, the water crisis will get worse leading to irreversible damage to the natural water sources and the surrounding habitats. The illegal wells and the lack of water recycling will lead to contamination of the natural water supplies in Israel and potentially Jordan and Egypt.

PHYSICS-4 EFFECT OF PRESSURE ON SPIN CROSSOVER COMPOUNDS FOR BAROCALORICS

Steven Vallone[1] (GRAD), Antonio M. dos Santos,[2] Jamie Molaison,[2] Malcolm Halcrow,[3] Karl Sandeman.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Oak Ridge National Laboratory, Oak Ridge, TN

[3] School of Chemistry, University of Leeds, Leeds, United Kingdom

Spin crossover occurs in compounds where the crystal field splitting of d-orbitals associated with a magnetic moment is of the order of kBT. The effect is typically most observed in octahedrally coordinated complexes of Fe in e.g. d5 or d6 electronic configurations. As a result, a change of state from low spin (LS) to high spin (HS) can occur at the so-called spin crossover temperature, TSCO. The low temperature state breaks Hund's rules. Crucially for caloric applications, the change of state from LS to HS can be either continuous or first order, and it can occur at temperatures up to and beyond room temperature. Since SCO compounds are paramagnets, the largest caloric effects will be barocaloric (triggered by applied pressure) rather than magnetocaloric effects brought about by an applied magnetic field. In magnetocaloric materials research, an essential point of comparison has been the caloric output of first order and second order materials. First order materials yield a larger entropic output at a single temperature, but offer a reduced temperature response window, and may possess hysteresis, which is a source of loss in application. Hence there has been interest in (tri)criticality, or tunable magnetoelastic coupling (termed "cooperativity" by the SCO community). In this presentation, we use neutron scattering to examine the evolution of the structure of a first order SCO compound with applied pressure. In particular, we examine sub-1 kbar pressures and their effect on SCO transition hysteresis.

PHYSICS-5 SAUDI ARABIA EFFORTS FOR USING RENEWABLE ENERGY AND WATER DESALINATION

Hadeel Alsayed (GRAD) and **Kamila Shojaa** (GRAD), Brooklyn College, Brooklyn, NY.

Saudi Arabia is among the most arid regions on Earth facing water crisis. It covers 2,149,690 square kilometers of land according to the United Nations Statistics Division, making it the 13th largest nation in terms of land area. It has one of the fastest population growth rates in the world. According to the 2016 census, the country's population was estimated at 32,157,974, But recent estimates for 2017 indicate that the total population has increased to 32,742,664. This is an increase of 1.82 % compared to population in 2016 and expected to reach about 46 million by 2050. Saudi Arabia is the world`s biggest oil producer, and has decided to improve renewable energy. Vision 2030 identifies renewable energy as one of the pillars of economic diversification away from oil. It sets an "initial target" of producing 9.5 gigawatts (GW) of power from renewable energy. As well as, Saudi Arabia depends heavily on desalination and it requires a huge amount of energy and approximately 10% of domestic energy consumption is used for water desalination. In 2010, the initiative of Water Desalination was launched with the support of renewable energy under the supervision of the King Abdulaziz City for Science Technology (KACST) aimed at treating 60,000 square meters of seawater daily for the northeastern city of Al Khafji. The plant has installed capacity of 15MW and will be connected to both the desalination plant and the national grid. We will provide some information about Saudi Arabia`s efforts on the use of alternative energy and water desalination. Also, what its plan for Vision 2030.

PHYSICS-6 EXAMINATION OF MAGNETOCALORIC EFFECT IN LA-FE-SI AND CoMnSi

Kemal I. Aziz[2] (HS) and Karl Sandeman.[1]
[1] Brooklyn College, Brooklyn, NY
[2] Staten Island Technical High School, Staten Island, NY

The magnetocaloric effect (MCE) is the temperature change of a magnetic material caused by exposing the material to a change in magnetic field. The primary industrial application of the MCE is magnetic refrigeration, which has the potential to replace conventional refrigerators. For high cooling device efficiency, a large change of magnetic entropy (ΔS) coupled with a high refrigerant capacity (RC) is

desirable. The objective of my research project is to compare a conventional magnetocaloric material (La-Fe-Si) and an inverse magnetocaloric material (CoMnSi) in terms of cooling efficiency. Data from two previous experiments was used but it was viewed from an original perspective. The data consisted of measurements of the materials' magnetization at different temperatures with a varying magnetic field. Entropy change (ΔS), RC as a function of applied field, hysteresis curves, gradient plots and 3D visualization plots are incorporated to carry out a holistic comparison of material behavior. La-Fe-Si loses magnetic entropy upon the application of a magnetic field while CoMnSi gains magnetic entropy upon the application of a magnetic field. Additionally, CoMnSi magnetizes over a broad temperature range while La-Fe-Si magnetizes over a narrow temperature range. As expected, La-Fe-Si has a much larger refrigerant capacity and entropy change than CoMnSi at similar applied magnetic fields. This project has also yielded a set of software tools for the analysis of data from other materials in the future.

CIS-1 SIMPLIFYING GLOBAL SIMULATION

Micha Tomkiewicz and **Yanna Skorokhodova** (UG), Brooklyn College, Brooklyn, NY.

The book “The Limits to Growth” by Dennis Meadows describes World3 model. This model is a system dynamics model for computer simulation of interactions between population, industrial growth, food production, and limits in the ecosystems of the Earth. Focus of our work is on part of this model regarding Fertility. In World3 model many factors affected Fertility such as ‘need for fertility control’, ‘family size’; however, it is also indirectly affected by many parameters such as ‘pollution’, ‘nonrenewable resources’, ‘food production’, ‘land development’ and many others. Our main goal is to build a fertility model which would simplify global simulation. We limit our model to only four main parameters affecting Fertility such as GDP, Gender Parity Ratio, GINI coefficients, and Availability of Contraceptives. We use historical data for 1960-2015 years for all parameters to build graph of Fertility and get results close to actual Fertility rate during 1960-2015 years by only using these four parameters.

CIS-2 FAST COMPUTATIONAL METHODS FOR STUDYING MOLECULAR ORBITALS IN POSITION AND MOMENTUM SPACE USING GAUSSIAN 09 AND MATLAB

Jonathan Hanon (UG), Andrzej Jarzecki, Theodore Raphan, Brooklyn College, Brooklyn, NY.

Quantum chemical simulation of molecular orbital structure of complex molecules have brought important insights into understanding a wide range of physical and biochemical phenomena. Many of these studies have relied on a quantum-mechanical software that solves the Schrodinger equation numerically, to generate the energy, molecular orbitals (wave function) and other molecular properties of interest. Most of current software for visualization of molecular orbitals work incredibly slowly and has a limited utility. For example, cubegen generates a discrete representation of the wave function for a particular orbital only in the position domain. However, ability to generate fast an orbital in a momentum space might be a great interest. However, it requires computing an FFT in three dimensions, which is incredibly time consuming, and extremely inaccurate, followed again by an isosurface computation. We have developed a MATLAB program that utilizes Gaussian 09's output files, MATLAB's Symbolic Math Toolbox, and the simple Analytical Fourier Transform of needed gaussians that decreases the computation time by orders of magnitude, allowing us to rapidly render both the position and the complex momentum domains. This methodology allows the possibility of analyzing the quantum mechanical properties of complex molecules in almost real time.

CIS-3 WORD EMBEDDINGS AND DECEPTION DETECTION

Tatsiana Varabyeva (UG), Brooklyn College, Brooklyn, NY.

Words encode a person's unique psychological fingerprint. We want to use words as features in classification tasks such as deception detection. In this study, we explore how word vectors built using word2vec can be used to improve the classification tasks of deception detection. Word vectors are a continuous representation of words that retain their semantic and relational meaning. We compare the performance of machine learning classifiers for deception detection with word embeddings or with bag-of-words features. We also experiment with more sophisticated ways of using word vectors as features in a deception classifier using various clustering algorithms and preprocessing based on the training data.

CIS-4 ARTIFICIAL INTELLIGENCE IN THE GAME OF SET

Philip W. Gringer (UG) and **Christopher B. Menedes** (UG), Brooklyn College, Brooklyn, NY.

The game of SET consists of a deck of 81 cards. Each card in the deck has four features, each of which can have one of three possible values. A set is a collection of three cards that has the following property: for each feature, either it is the same on all three cards or it is different on all three cards. Our research compares the performance of various classical Artificial Intelligence algorithms playing the game. Two of the algorithms utilize a brute force approach, which exhausts all possibilities of sets on the screen, while three others use heuristics based on reasoning similar to how humans play the game, and based on the combinatorics of the game. These algorithms are compared to the performance of human players who have played the game on our custom built web platform that supports four playing modes: Single, Multiplayer(player vs player), Multiplayer(player vs AI), and AI vs AI. Data on age, experience and gender of players has been collected. Along with this, information about average number of sets found and time between sets found (whether correct or incorrect), and patterns of what sets human players gravitate towards has been logged.

CIS-5 ACOUSTIC-PROSODIC ENTRAINMENT AND NATURALNESS IN OUTLIER SPEAKERS

Alyssa C. Caputo (UG), Brooklyn College, Brooklyn, NY.

Humans are the world's greatest communicators. Advances in technology have allowed humans to communicate faster with not only other humans, but also with technology itself. This gave rise to the field of Natural Language Processing, which combines computer science, artificial intelligence, and linguistics. Our research in Natural Language Processing observes the relationships among entrainment, outlier speech, and the "naturalness" of conversations. Entrainment is the changing of one's speech patterns in imitation of his interlocutor, to result in clearer communication. We hypothesize that outlier speech - that in which one's acoustic-prosodic features significantly deviate from the norm - will increase levels of entrainment. Additionally, we hypothesize that entrainment is a good feature for predicting the quality of conversations and that conversations with higher entrainment on outlier turns will seem more natural. In this study, we observe the Switchboard-1 Telephone Speech Corpus, which has over 2,000 conversations that are annotated by the participants for "naturalness." Our results showed that local entrainment did not increase in the presence of outlier speech. Continuing this research, we try to predict naturalness scores using global and local entrainment measures for all the features we have examined, both overall and for outlier conversations and turns. Using hierarchical clustering on the entrainment measures, we will derive five new features to predict naturalness.

CIS-6 NEURAL NETWORK CONTROLLER TO DO OBSTACLE AVOIDANCE IN A MOBILE ROBOT

Aleksandra Kruzel (UG) and Frank W. Grasso, Brooklyn College, Brooklyn, NY.

Autonomous control of vehicles like cars has been of great interest in recent years. Biological systems, which are controlled by neural networks provide compact computational methods for self-guided navigation. We explored ability of artificial neural networks, inspired from biological systems, to produce automatic obstacle avoidance in a mobile robot. We hypothesized that a small neural network (with 5 model neurons) could produce robust obstacle avoidance. In simulation we implement a neural network including two input neurons, one bias neuron and two output neurons. The sensory inputs on our robot are IR distance sensors, providing information about objects in the vicinity. The motor neurons were positively coupled to the same side sensor neurons and negatively coupled to the opposite side sensor to produce steering. The bias unit was positively coupled to both motor units and produced constant speed motion. We found this to be true. We conducted a parameter sensitivity study to determine the best connection weights in the successful architecture. We found sets that produced no obstacle avoidance and largely successful ones. Therefore robust obstacle avoidance is possible with the proper parameters. This type of compact neural network can implement low level control with low computational load. With the result, more computational resources can be allocated for higher level processes including planning.

CIS-7 BIOLOGICALLY-INSPIRED CENTRAL PATTERN GENERATORS FOR COMPACT APPENDAGE CONTROL IN HEXAPOD ROBOTS

Roberto Coyotl (UG) and **Matthew Griffin** (UG), BCR Lab, Brooklyn College, Brooklyn, NY.

The operation of autonomous robots in unpredictable environments is a challenging problem that places serious demands on the computational resources of a robot micro-controller. Artificial neural networks are one method of developing such controllers. One such solution involves implementing neural networks that implement biological circuit such as central pattern generators to provide walking locomotion and grasping control in robots. Our hypothesis was that the 5-neuron Wilson Oscillator could coordinate control of two opposable grippers and six walking legs on a legged robot such as the Lynxmotion Hexapod. As a step towards developing such a compact neural controller we implemented and studied the Wilson oscillator model that included one input (or command) neuron, two inter neurons and two output neurons with feed-forward and recurrent connectivity. We found that a single command neuron could control the amplitude of gripping or walking stride length and that the connection weights in the other neurons controlled the frequency of virtual stride or grip. We conducted a parameter sensitivity study to determine the best connection weights in the successful architecture. We found that the oscillations were insensitive to input weight, most sensitive (linearly) to recurrent autapse connections and tightly tuned to an ideal inter-neuron inhibition weight. This suggests optimal weights for configuring the Wilson Oscillator for robot control. This simple 5-neuron network provides potential, compact control for robots with a robust, low level controller which frees computational resources from walking and gripping for other processes such as planning.

CIS-8 A SERIOUS GAME TO TEACH COMPUTING CONCEPTS

Florencia Salinas[1] (UG), **Chava Shulman**[1] (UG), Claudia Bergeron,[2] Devorah Kletenik,[1] Deborah Sturm.[2]

[1] Brooklyn College, Brooklyn, NY

[2] College of Staten Island, Staten Island, NY

Game-based learning allows educators to tap into the enthusiasm that students show for computer games and bring those attitudes to the classroom. A number of serious games have been created for specific topics in CS education. Experimental evaluations of these games have indicated that they are an effective and fun teaching tool. However, we do not know of any games developed for advanced programming topics needed to prepare students for the critical Data Structure courses. We have developed a game in Unity that teaches and assesses student knowledge of advanced programming topics; we focus on C++ pointers, which we find to be particularly confusing to students. Research has shown that there are fundamental differences in the ways that male and female players play computer games. Hence, effort must be invested to ensure that educational games are appropriate for both genders. This game was designed by a team of women developers and we tried to make the game appealing to female players through the use of a storyline that included a meaningful goal, the use of facial expressions and human-like animations on our sprites. This is a “by women, for women'' game that we hope will help all students, especially female ones, learn difficult Advanced Programming concepts. To measure the effectiveness of our game, we require participants to complete a short quiz before playing the game, and then another short quiz upon completion, to evaluate what influence (if any) the game has had on their performance. We are currently testing this game on students of Brooklyn College and College of Staten Island who are currently taking or have recently completed the Advanced Programming techniques course. We will report on the results of the experiment.

Supported by CREU (Collaborative Research Experience for Undergraduates), CDC (Coalition for Diversifying Computing)

CIS-9 VIRTUAL REALITY SYSTEM FOR STUDYING VERTIGO MOTION SICKNESS

Hindy Drillick (UG), **Eugene Dorokhin** (UG), Theodore Raphan, Brooklyn College, Brooklyn, NY.

Feelings of vertigo and motion sickness can be generated by moving visual stimuli in the same way that head and body movement can induce vertiginous and motion sickness sensations. The same stimuli that induce motion sickness have also been shown to be effective in habituation of motion sickness following repeated exposure to these stimuli. We have used the Oculus Rift virtual reality display and the OpenGL graphics API to generate moving environments that will allow the study of this habituation. We are also investigating different methods of tracking the user’s perception of the spatial vertical through analysis of data collected from both the Leap Motion hand sensor and a handheld accelerometer. Our goal is to create a portable, stand-alone system that can be used to study and habituate motion sickness as well as study perception of the vertical.

INDEX

* The names of presenters are bolded and underlined

E

F

G

H

J

K

L

M

N

O

P

Q

R

S

T

V

W

Y

Z

LEGEND:

BIO – Biology
CHEM – Chemistry
CIS – Computer Information Science
ENG - Engineering
ENV – Earth and Environmental Science
HNS – Health and Nutrition Science
PHYSICS - Physics
PSY – Psychology
SCAS – Speech Communication & Arts Sciences