ILLINOIS STATE UNIVERSITY

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2021 ONLINE UNIVERSITY RESEARCH SYMPOSIUM

Celebrating Creativity, Research and Knowledge

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Welcome to the 2021 Online University Research Symposium

Research is fueled by curiosity, the desire to innovate, and the need to find solutions to the world's pressing problems. Illinois State University recognizes that research encompasses diverse forms of inquiry, creativity, and innovation and we invite all students to participate in our community of scholars. Student research occurs across the campus in the context of specific courses, independent studies, summer research experiences, and theses and dissertation projects. Faculty and staff mentors work with our students to make valuable intellectual or creative contributions to their disciplines. Remarkably, over one-third of Illinois State University faculty publications, conference papers, and other creative works typically include student contributions and recognition.

Our offices and campus partners are proud to support student research with grants and travel funds, workshops, technical resources, research competitions, and exhibitions. We regularly facilitate student participation in off-campus professional and academic conferences at the regional, national, and international level. On campus, the University Research Symposium is the premier showcase for student scholarship, featuring close to 400 individual or group oral and poster presentations. This year marks the 30th University Research Symposium, indicating its importance to student achievements.

We've now lived through a year full of unprecedented challenges that impacted our ability to perform research and to host the Symposium on campus. Our student researchers and faculty mentors have persevered and adapted and we applaud you. Congratulations on your achievements!

Dr. Gina Hunter, Director, Office of Student Research
Dr. Craig C. McLauchlan, AVP for Research and Graduate Studies
Dr. Noelle Selkow, Interim Director, Graduate School

ABSTRACTS BY DEPARTMENT/SCHOOL

Agriculture

WOMEN IN RURAL PROFESSIONS

Presenter	Robinson, Calli Undergraduate, Agriculture
Mentor	Prof. Maria Boerngen

The Illinois Society of Professional Farm Managers and Rural Appraisers (ISPFMRA) is an organization made up of both men and women who are employed in rural professions such as farm management, farmland appraisal, and rural consulting. The society was once all men, but the membership of women is on the rise. Although today this society is mostly made up of men, the group of women within the society play a very important role in the rural professions industry. As young agriculture students some young women may feel that there are many career opportunities not stressed to them as much as other career opportunities. Therefore, it is often a struggle to find information from other women about the careers they have chosen to pursue. The objective of this research was to describe the current participation of women within rural professions in Illinois and to discuss how women can pursue opportunities in professional farm management. Through phone and Zoom interviews in Fall 2020, eight women involved in rural professions from across the state of Illinois provided information related to their background, challenges they have faced in the industry, and advice for young women interested in a future career path similar to theirs. The interviewees ranged from women just beginning their careers to those nearing retirement, allowing for a wide variety of opinions and career stories. Results of the interviews indicate that many young women in the agriculture industry have at one time or another felt they were encouraged to pursue a career they were not interested in, due to their gender. However, many of the women spoke of still following the career path they wanted and having success alongside their male colleagues. Many of the interviewees stressed that young women today should not be intimidated because they are women but should embrace their difference and push for excellence in their careers. The results of this study can inform young women about the career options they have and the mentors they can lean on in the industry.

COVID-19 AND MARKETING PRACTICES OF ILLINOIS GRAIN ELEVATORS

Presenter	Walton, Aidan Graduate, Agriculture
Mentor	Prof. Aslihan Spaulding
Authors	Aidan Walton; Aslihan Spaulding

Over the past decade in Illinois, both the number of grain elevator companies and their number of customers served have steadily declined. At the same time, the storage capacity of these elevators has increased. This has required grain elevators to offer the most advanced tools to their customers. In turn, this has led to multiple questions regarding the type of marketing tools grain elevators offer to their customers, how the marketing tools have changed, and how customers react to new offerings. To investigate the change in various marketing tools offered to and used by customers, country grain elevator managers in Illinois were surveyed in 2006, 2010, and 2016. Upon surveying, it was discovered that both elevator storage capacity and makeup of the business organization have an effect on marketing contracts offered and used. This year the survey is being conducted again, via both an online and paper version. The intention is to illustrate the changes in marketing tools offered to customers, identify challenges that grain elevators may face five years into the future, and assess the impact of COVID-19 on Illinois grain elevators.

PENNYCRESS ESTABLISHMENT FOLLOWING CORN HARVEST

Presenter	Wohrley, Bethany Graduate, Agriculture
Mentor	Prof. Nicholas Heller

Cover crops have been identified as a key practice for environmental conservation in agriculture. Despite the benefits of cover crops, such as reduction of nutrient leaching, decrease of soil erosion, and improved soil organic matter, few farmers have adopted the practice. This is primarily due to the cost of implementation. The adoption of field pennycress into crop rotations could be a solution to this problem. Pennycress, a winter annual plant and formerly considered a weed, has been bred for its oil content and is intended for use in biofuels. As demand for biofuels grows, the additional revenue source from implementation of pennycress as a cover crop could incentivize farmers to adopt an environmentally beneficial practice while not displacing the corn or soybeans grown during the summer.

Although a profitable yield threshold for pennycress has been identified and successfully achieved in breeding plots, challenges such as late corn harvest and massive amounts of corn stover arise when trying to introduce a small-seeded cover crop like pennycress into a typical Illinois crop rotation. Therefore, two studies have been initiated to identify best practices for the fall establishment of pennycress following corn.

One study will examine the tradeoffs between different corn hybrid maturities and their influence on the following pennycress establishment. Hybrids with a shorter CRM, or Corn Relative Maturity, often have lower corn yields but mature earlier in the fall, which is beneficial for pennycress. An additional study will examine different approaches to manage the residue left behind after corn harvest. If this remaining biomass can be broken up in a way that allows improved seed to soil contact, pennycress establishment may improve.

The identification of best practices is important when introducing a new crop like pennycress into Illinois cropping systems. For the environmental benefit and additional profitability to be seen, pennycress needs to be successfully and profitably grown in a typical crop rotation.

THE NEW AGRICULTURAL LENDERS IN DEVELOPING COUNTRIES: HOW AGTECHS ARE PROVIDING FINANCIAL SOLUTIONS IN AGRICULTURE

Presenter	Yeboah, Benjamin Graduate, Agriculture
Mentor	Prof. Iuliia Tetteh
Authors	Benjamin Yeboah; Iuliia Tetteh

Agriculture has seen several technological changes aimed at improving efficiencies and productivity over the years. Majority of these changes in agriculture are driven by the growing world population and the resulting increased demand for food availability, affordability, safety as well as sustainability. The world's population is growing at an unprecedented pace, necessitating greater agricultural production efficiency. To keep up with the increasing demand for food, some necessary investments must be made. According to the World Bank (2020), at least $80 billion in annual investments will be required to meet the 70 percent increase in global food demand by 2050, the majority of which will have to come from the private sector. Over the last decade, Agricultural Technology companies (AgTech) are capitalizing on the need for innovations in agriculture by providing services in agricultural biotechnology, farm robotics, mechanization, and equipment, software, sensing, and IoT in farm management, and agribusiness marketplaces, among other areas. However, some AgTech companies have recently begun to take on lending positions in the agricultural sector. This study looks at the contribution of AgTech companies in solving these challenges in agricultural production, particularly in four developing countries, with emphasis on agricultural lending.

EFFECTS OF SIRE BREED ON EMBRYONIC DEVELOPMENT AND FETAL GROWTH

Presenter	Zinke, Maya Undergraduate, Agriculture
Mentor	Prof. Drew Lugar
Authors	Maya Zinke; Julissa Navarrete; Drew Lugar

The objective of this study was to determine how the use of different sires affects embryonic development and fetal growth. Crossbred ewes (n = 15) were synchronized and randomly allocated to be naturally mated with one of two rams (Suffolk vs. Hampshire). Natural mating occurred over a 24 h period, after which the rams were removed and the ewes from each treatment were combined. Transabdominal ultrasonography (at 3.5 MHz) was conducted twice weekly during weeks 3 to 6 of gestation. Pregnancy diagnosis, fetal count, and ultrasonic images were recorded for embryonic measurements. Out of the group of 15, eleven ewes were confirmed pregnant. The mixed procedure in SAS was used for statistical analysis. Sire did not have an effect on embryonic vesicle length (EVL), crown rump length (CRL), trunk diameter (TTD), and placentome blood area (PBVA; $P \geq 0.634$). Sire tended to effect both embryonic vesicle depth (EVD) and placentome area (PA; $P = 0.085$), where ewes mated with the Suffolk ram tended to have a greater embryonic vesicle depth and placentome area compared to those mated with the Hampshire ram.

Art

WELCOMING IN THE FRONT DOOR

Presenter	Hamzeh, Shahrbanoo Graduate, Art
Mentor	Prof. Elisabeth Friedman

My research and my studio practice are on the concepts of home, our displacement from it, and the suffering that is endured inside or outside of it. I believe that our bodies, our domestic spaces, and our home countries function as three parallel homes on different levels. Our definitions of these three ideas of home are related to our definition of Us versus Others. These definitions and their relationship to borders and boundaries can be problematic and cause otherness and cultural alienation. The borders, and the lines we draw around ourselves and others also leave open possibilities for authorities to enforce unjust laws; even obviously brutal and antihuman ones suffer from a lack of public awareness. This is the case with the current regime of my country, Iran.

The homeland that I left behind three years ago. This experience of displacement and of residing in a foreign land for the first time has shaped the path I took in my research, though it was not my first experience of displacement as a female artist from Iran. In my country, living under the dictatorship of the Ayatollahs has meant most of us Iranians, are already strangers in our own homeland: a primary displacement from our own government. The regime in Iran is actively and blatantly fighting our traditions and culture to replace them with their own so-called 'purified' version. Laws inside the country are fundamentally designed against us, and international laws do not extend far enough. Borders and boundaries create a paradox in which they provide safety while creating a barrier to aid if one is in need.

The contradiction between these concepts is expressed in my paintings through vulnerability, flesh, fluids, and open lacerations in contrast with the durability of the cold, rusty, and earthy nature of the metal doors. I use the imagery of metal doors to talk about what is going on behind the "closed doors" of domestic spaces on one level and to evoke the severe and ongoing brutality towards women within the borders of my country on another level. My doors function as the household's skin, conveying information about those inside. Through their damage and oxidation, they depict possible scars, traumas, and lacerations suffered by family members within.

The overall goal of my research is to attract attention to the human rights violations in Iran, especially towards women, in hopes of putting an end to them.

Keywords: Borders, Boundaries, Displacement, Diaspora, Metal doors

Biological Sciences

PARKINSON'S DISEASE GENES INTERACT WITH ATP7 TO REGULATE COPPER DISTRIBUTION AND AVAILABILITY IN DROSOPHILA MELANOGASTER

Presenter	Allen, Brooke Graduate, Biological Sciences
Mentor	Prof. Alysia Vrailas-Mortimer

Copper is an essential element for enzymes that catalyze oxygen-dependent reactions. When an organism is exposed to either excess copper or deprived of copper, this micronutrient becomes detrimental. A mechanism used to control copper distribution and availability involves the ATPase transporter, ATP7. This X-linked transmembrane protein is responsible for delivering copper into the lumen of the cell by utilizing both endocytic and exocytic mechanisms. Mutations in ATP7 have been shown to cause Menkes disease and Wilson's disease, which both share the phenotype of neurodegeneration. These genetic disorders with ATP7 defects both lead to mechanisms of neurodegeneration that is likely shared with other, more common neurodegenerative diseases, such as Parkinson's disease. A screening of possible candidate genes that interact with ATP7 was conducted by inhibiting a Parkinson's disease gene in a ATP7 loss of function background. We find that five of the Parkinson's disease genes showed a genetic interaction with ATP7, indicating that the mechanisms of neurodegeneration caused by ATP7 mutations may be conserved in Parkinson's disease. These interactions and their link to neurological disorders will be further discussed.

DO ISU STUDENTS DIFFER FROM OTHER UNIVERSITIES' STUDENTS IN THEIR SOCIAL DISTANCING BEHAVIORS, EXPERIENCE WITH COVID-19, TRUST IN SCIENCE, AND VACCINATION INTENTION?

Presenter	Allen, Tae'lor Undergraduate, Biological Sciences
Mentor	Prof. Rebekka Darner
Authors	Tae'lor Allen; Rebekka Darner

College students are an important population to consider when trying to slow the COVID-19 pandemic. While young people display less serious symptoms of the infection, their tendency to have asymptomatic infections increases risk to campus and surrounding communities. The goal of this study was to understand how Illinois State University students' social distancing behaviors and beliefs about the COVID-19 pandemic differed from that of students at other colleges/universities. We administered a nationwide survey that asked about social distancing practices, experience with COVID-19, amount of trust in science and likelihood to receive the COVID-19 vaccination. This poster presents findings to four research questions: 1) Do ISU students differ from non-ISU students in their social distancing practices? 2) Do ISU students differ from non-ISU students in their experience with COVID-19? 3) Do ISU students differ from non-ISU students regarding their trust in science? 4) Do ISU students differ from non-ISU students regarding their likelihood of receiving the COVID-19 vaccine? We conclude that ISU students practice social distancing more than non-ISU students, ISU students have had more experience with COVID-19 than non-ISU students, ISU students trust in science more than non-ISU students and ISU students are more likely to get the COVID-19 vaccination than non-ISU students.

CELLULAR LOCALIZATION OF IRON-HANDLING PROTEINS REQUIRED FOR MAGNETIC ORIENTATION IN C. ELEGANS

Presenter	Awe, 'Tope Graduate, Biological Sciences
Mentor	Prof. Andres Vidal-Gadea
Authors	Tope Awe; Plow Freebairn; Chance Bainbridge; Andres Vidal-Gadea

Many species of organisms can sense and orient to the earth's magnetic field. While the existence of this magnetic sense is widely accepted, little is known about the molecular and cellular mechanisms of magnetoreception. One favored mechanism involves magnetic particles that are capable of exerting force on adjacent mechanoreceptors when pulled by the force of the earth's magnetic field. Evidence of magnetic particles has been reported in magnetotactic animals including C. elegans. We have previously discovered that AFD neurons play an important role in C. elegans magnetotactic behavior. However, it remains poorly understood how AFD neurons detect magnetic fields. Preliminary data from our lab have shown that some iron-handling proteins are required for normal magnetic orientation. We will be investigating the pattern of expression of these iron-handling proteins in C. elegans and if they are expressed near the AFD and AMsh. The results from this study could open a new research direction to the better understanding of mechanisms of in animals.

THE ROLE OF COPPER IN PARKINSON'S DISEASE

Presenter	Burkhart, Jessica Graduate, Biological Sciences
Mentor	Prof. Alysia Mortimer

Parkinson's Disease (PD) is a neurodegenerative disease caused by the death of dopaminergic neurons in the substantia nigra region of the brain. PD is characterized by the presence of dysfunctional mitochondria and increased levels of oxidative stress. Though a handful of genes, such as parkin and PINK1, have been identified in familial forms of PD, most cases are sporadic. Therefore, it is thought that environmental factors may act on genetic risk factors to promote disease onset. Therefore, we are exploring the relationship between copper toxicity, which has been linked to other neurological disorders, and parkin and PINK1. We are testing the effect of environmental exposure to copper as well as altering copper levels genetically by manipulating the copper transporter ATP7, which is mutated in the neurodegenerative disorder, Menkes disease.

PEPTIDE NEUROMODULATION SUPPORTS TEMPERATURE-ROBUST NEURONAL ACTIVITY BY INCREASING DENDRITIC ELECTRICAL SPREAD

Presenter	DeMaegd, Margaret Graduate, Biological Sciences
Mentor	Prof. Wolfgang Stein
Authors	Margaret L. DeMaegd; Wolfgang Stein

Acute temperature changes can disrupt neuronal activity, leading to loss of motor control and failure of vital behaviors. Acute warming of the isolated crab stomatogastric nervous system from 10°C to 13°C disrupts the rhythmic neuronal activity underlying mastication by silencing an important motor neuron, the Lateral Gastric neuron (LG). The disruption of activity in response to a 3°C temperature increase contrasts with observations that in vivo the same neuron is active after the temperature has increased b even more than 10°C. It was recently discovered that peptide neuromodulation present in vivo but not in vitro restores LG's rhythmic activity and thereby allows the animal to sustain its ability to chew over a large temperature range. This effect could be replicated in vitro if the peptide neuromodulator was augmented experimentally.

Neuronal activity depends on adequate signal spread throughout the dendrites - a process sensitive to shunting when ion channel conductances increase. We hypothesize that warming leads to an overall increase in membrane shunt, which disrupts rhythmic activity in LG by reducing signal spread in the dendrites. However, peptide neuromodulation restores LG's rhythmic activity by counterbalancing the membrane shunt and reinstating the signal spread necessary for neuronal activity.

To test these hypotheses, we quantified signal spread in LG's dendrites while increasing the temperature from 10°C to 13°C, and applying the neuropeptide, Cancer borealis tachykinin-related peptide Ia (CabTRP Ia). We used two approaches to quantify signal spread; fluorescent Calcium imaging and two-electrode current- and voltage-clamp. We found that membrane shunt increased and signal spread decreased as the system warmed, but was reversed in the presence of CabTRP Ia. Our results indicate that peptide neuromodulation restores neuronal activity at warmer temperatures by increasing signal spread and opposing membrane shunt in the dendrites.

CabTRP Ia activates an NMDA-like current called the modulator-induced current (IMI). To assess whether IMI increased LG's temperature robustness, we introduced IMI into LG using a computer-brain interface. We found that introducing IMI at 13°C was sufficient to increase signal spread in the dendrites and restore LG's rhythmic activity. Altogether, our results indicate that peptide activation of an NMDA-like current increases signal spread in the dendrites to sustain neuronal activity during temperature changes.

ILLINOIS STATE UNIVERSITY STUDENTS' EXPERIENCE WITH THE COVID-19 PANDEMIC

Presenter	Dumas, Ashley Undergraduate, Biological Sciences
Mentor	Prof. Rebekka Darner
Authors	Ashley Dumas; Rebekka Darner

This study focused on students at Illinois State University and their experience with the COVID19 pandemic. This was done by surveying undergraduate students with differing demographics at ISU. They were asked varying questions on their backgrounds, including political affiliation, geographical location, and religious beliefs. They were also asked to report their practices in preventing the spread of COVID-19. With these data we aimed to explore the following research questions: 1) What is the relationship between socioeconomic status between trust in science? 2) Does community type affect one's social distancing measures? 3) Does financial hardship affect social distancing measures? 4) Does experience with the disease influence how they social distance? 5) What is the relationship between religiosity and trust in science? 6) Does trust in science correlate with plans to be vaccinated? Generally speaking, socioeconomic status mediates ISU students' experiences during the COVID-19 pandemic. However, students with more experience with COVID-19 exhibited poorer social distancing practices than those that had less experience.

DYNAMIC TERMINAL INVESTMENT IN MALE BURYING BEETLES

Presenter	Farchmin, Paige Graduate, Biological Sciences
Mentor	Prof. Scott Sakaluk
Co-Mentor	Prof. Anne-Katrin Eggert
Authors	Paige Farchmin; Anne-Katrin Eggert; Scott Sakaluk; Kristin Duffield

Animals often increase their investment in reproduction in response to a threat to their survival (e.g. an infection), a life history strategy known as terminal investment. The dynamic terminal investment threshold model proposes that the tendency of an individual to terminally invest depends on other factors that alter an individual's residual reproductive value. Here, we test the dynamic terminal investment model in burying beetles, insects that bury small vertebrate carcasses as a source of food and that

provide extensive biparental care. We injected males at two different ages with heat-killed bacteria and measured their reproductive effort, predicting that immune-challenged males would show a longer period of parental care, consume less of the carcass, and produce a greater number of larvae in the current reproductive attempt compared with control males. We further predicted that older males would be more likely to terminally invest than younger ones. Males, when challenged with heat-killed bacteria as virgins prior to their first reproductive attempt, did not terminally invest, whereas these same individuals when challenged in a subsequent reproductive bout produced a greater number of offspring. Older, immune-challenged individuals gained less mass during their time on the carcass than control males, suggesting that terminal investment was subsidized by their consuming less of the carcass than they might have otherwise done in the absence of an immune challenge, leaving more for their offspring to consume. We conclude that the age-specific terminal investment shown by immune-challenged males in the current study supports the dynamic terminal investment model.

ASSESSING THE EFFECTS OF PHOSPHORYLATION ON THE FUNCTION AND ACTIVITY OF THE KINESIN-2 MOTOR

Presenter	Fasawe, Ayoola
	Graduate, Biological Sciences
Mentor	Prof. Martin F. Engelke
Authors	Ayoola S. Fasawe; Martin F. Engelke

Cilia are cellular protrusions that are important for many actionsin the body. For instance, motile ciliary structures clear material from the upper airways via directional mucus flow across the respiratory epithelium. The assembly of cilia is coordinated with the cell cycle and is known as ciliogenesis. Intraflagellar transport (IFT) is essential for ciliogenesis and aids the maintenance and function of cilia. During this transport process, cellular cargoes are shuttled along the microtubules of the axoneme: Kinesin-2 (KIF3A/KIF3B/KAP) drives transport to the tip of the cilium and dynein-2 motors drive transport back to the cell body. Heterotrimeric kinesin-2 belongs to the super family of the kinesin motors and next to IFT also drives membrane organelle transport in the cytoplasm.

Proteins generally undergo post-translational modifications like phosphorylation, glycosylation, ubiquitination, and methylation. These modificationsincrease the functional diversity of proteins and regulate their activity. Misregulation of any of these modifications can result in unphysiological functionality of the target protein. For example, Chaya and colleagues (EMBO J., 2014) generated a KIF3A mutant in which all eight potential serine and threonine phosphorylation sites in the tail domain of the protein were removed and this mutant was unable to drive ciliogenesis. These results demonstrate that KIF3A phosphorylation is important for the function of KIF3A. However, it is unknown which of the exact phosphorylation sites is necessary to drive ciliogenesis. I hypothesize that dephosphorylation of a specific residue will stop IFT, outlining my aim to delineate the function of specific phosphorylation site in the tail of KIF3A. Kinesins have high medical relevance, but for technical reasons, there are very few drugs that directly affect the activity of specific kinesins. My effort to contribute to the understanding of the effects of phosphorylation on kinesin-mediated processes on a molecular level may thus open new avenues for drug discovery and therapeutical intervention.

EXOTIC LEGUME'S LEAF LITTER BENEFICIAL TO PRAIRIE PLANTS

Presenter	Gardner, Asher
	Undergraduate, Biological Sciences
Mentor	Prof. Victoria Borowicz
Authors	Asher Gardner

Lespedeza cuneata is an invasive, non-native species of bush clover that is invading prairies where the native *Lespedeza capitata* grows. Both species of bush clover are legumes, which are nitrogen fixers. Legumes and their senescent leaves (i.e., “litter”) are well known for increasing levels of available nitrogen in the soil. However, the exotic *L. cuneata* also produces tannins that reduce the rate of germination in some prairie plants. The purpose of this study was to clarify whether these compounds in the

litter of the invasive species of bush clover deter early growth in its native competitors, and to determine whether litter of each species of legumes would increase growth of native prairie plants. To address the influences of *L. cuneata*, we tested whether the impact of *L. cuneata* litter on growth of prairie plants (Goldenrod and Wild Quinine) was consistent with the effect of toxic tannins or improved nitrogen supply. Each prairie plant was divided into three groups of different treatments: native litter, exotic litter, and a control group with no litter. The plants were measured for height weekly, and at 9 weeks harvested, dried, and weighed. Growth trajectories suggested litter treatment was affecting the two species. In the analysis of dry shoot mass, the effect of litter treatment was significant). Surprisingly, for both species of plants, the exotic treatment (*L. cuneata*) displayed the best growth of all groups involved in the study. Addition of *L. cuneata* litter increased final mass more than either the control or addition of *L. capitata* litter, and the control produced greater growth than native *L. capitata* litter. Goldenrod was significantly larger than wild quinine, but the two species did not differ in their response to the litter treatment. Based on the statistical findings, both the Goldenrod and Wild Quinine exotic treatment groups responded with increased growth and increased mass when the opposite had been predicted. These results question assumptions about exotic species and indicate that *L. cuneata*, despite prior findings, may benefit some members of the prairie community.

HISTORY-DEPENDENCE OF NEUROMODULATION AFFECTS THE LEVELS OF CHAOS IN NEURONAL TRANSITIONS

Presenter	Gonzalez, Josselyn Graduate, Biological Sciences
Mentor	Prof. Wolfgang Stein
Co-mentor	Prof. Epaminondas Rosa
Authors	Josselyn Gonzalez; Rosangela Follmann; Epaminondas Rosa; Wolfgang Stein

While transitions between neuronal states are essential to cognitive and motor functions, they are less understood than the states themselves. Transitions often consist of irregular firing activity that computational models predict is chaotic, meaning that it is deterministic and sensitive to initial conditions. Previous work shows that neurons exhibit chaotic activity and that these levels of chaos can be reduced through network interactions, ultimately achieving stable network activity. This indicates that minimizing chaotic activity is desirable for neuronal network function. Therefore, we hypothesize that biological neurons possess mechanisms to reduce chaos during transitions.

To characterize the levels of chaos during transitions, we use a combined experimental and computational approach. In our experimental approach, we induce transitions in the well-characterized crustacean stomatogastric nervous system using the neuropeptide proctolin. In our model approach, we use the Huber-Braun single neuron model and implement the excitatory, depolarizing current that proctolin activates, I_{MI}.

In agreement with previous studies, I_{MI} in the model was sufficient to elicit transitions between stable activity states with chaos occurring between states. However, chaos was only observable when comparing individual models with distinct I_{MI} values or when a time-dependent I_{MI} was implemented for sufficiently long transition durations, i.e. time interval during which the transition takes place. Short transition durations did not exhibit chaos.

To test whether this was the case in the biological system, we synaptically isolated the lateral pyloric neuron (LP) and bath-applied proctolin. This increased firing rates and elicited rapid transitions from silent or arrhythmic spiking to bursting. We quantified the levels of chaos using Lyapunov exponents which measure how quickly a system becomes unpredictable. Although the system exhibited chaos throughout the transition, the levels of chaos did not change significantly during the transition itself. Taken together with the model results, this suggests that rapid neuronal transitions suppress increases in chaos.

To further explore how the history-dependence of neuromodulators affect chaotic transitions, we used dynamic clamp to inject discrete levels of I_{MI} into LP, omitting the time-dependence of proctolin. Increasing I_{MI} induced transitions from silent or arrhythmic to tonic. We found that the levels of chaos did not change significantly throughout this transition, possibly due to LP being unable to burst with I_{MI} alone. To test this, we performed similar proctolin and dynamic clamp experiments with the inherently bursting pyloric dilator neuron (PD) of the pyloric circuit. We are currently analyzing the results of these experiments.

MUSCULAR EXERTION EXACERBATES DEGENERATION IN A C. ELEGANS MODEL OF DUCHENNE MUSCULAR DYSTROPHY

Presenter	Hughes, Kiley Graduate, Biological Sciences
Mentor	Prof. Andrez Vidal-Gadea
Authors	Anjelica Rodriguez; Kristen Flatt; Sneha Ray; Andrew Schuler; Brian Rodemoyer; Visa Veerappan; K Cuciarone; Alex Kullman Calis Lim

Duchenne muscular dystrophy (DMD) is a genetic disorder caused by loss of dystrophin, responsible for connecting actin to the sarcolemma and transferring force into the extracellular matrix. In humans, DMD presents at a young age, resulting in developmental delays, muscle necrosis, increased sarcoplasmic calcium, loss of ambulation, and early death. Current animal models do not model the severity of DMD without the addition of sensitizing mutations. Thus, it remains elusive if increased sarcoplasmic calcium observed in dystrophic muscles follows or leads the mechanical insults caused by the muscle's disrupted contractile machinery. This knowledge has important implications for patients, as physiotherapeutic treatments may either help or exacerbate symptoms, depending on how dystrophic muscles differ from healthy ones.

We observe that sarcoplasmic calcium dysregulation in *dys-1* worms precedes overt structural phenotypes and can be mitigated by silencing calmodulin. Recently, we showed that burrowing dystrophic (*dys-1*) worms recapitulate many salient phenotypes of DMD. Here, we report *dys-1* worms display early pathogenesis and increased lethality. To learn how dystrophic musculature responds to altered physical activity, we cultivated *dys-1* animals in environments requiring either high intensity or high frequency muscle exertion during locomotion. We find that several muscular parameters (such as size) improve with increased activity. However, longevity in dystrophic animals was negatively associated with muscular exertion regardless of the duration of the effort. The high degree of phenotypic conservation between dystrophic worms and humans provides a unique opportunity to gain insights into DMD's underlying pathology and to assess potential treatment strategies.

CHARACTERIZATION OF THE COILED-COIL REGIONS IN THE HETERODIMERIC KIF3A/KIF3B MOTOR PROTEIN

Presenter	Irwin, Samuel Undergraduate, Biological Sciences
Mentor	Prof. Martin Engelke
Authors	Samuel Irwin; Martin F. Engelke

Kinesin motor proteins are vitally important for many cellular functions such as mitosis, ciliogenesis, and transporting cellular cargo. Kinesins move various cargo along microtubules unidirectionally from the minus- to the plus-end of a microtubule. There are three structural features that make up a kinesin: the stalk, the motor, and tail domains. The motor domains directly bind to and walk along microtubules while the tail domains interact with the cargo. The protein's stalk portion comprises coiled-coil segments that allow the motor to dimerize via alpha-helices interacting through hydrophobic forces. These rigid segments are interrupted by flexible hinges that allow the kinesin molecule to fold back on itself in the absence of cargo. In this state, parts of the stalk and the tail domains bind to and inhibit the motor domains in a process called autoinhibition. This prevents the motor from binding and moving along microtubules when no cargo is present to conserve energy. In our lab, we study kinesin-2 family motors, specifically, KIF3A/KIF3B. Some motors of the kinesin-2 family form heterodimers, which is a unique feature compared to all other motor proteins found in mammals which form homodimers.

In this work, we aim to elucidate the function of individual coiled-coil domains in the stalk during autoinhibition. The precise location of the coil domains within the stalk is, however, not known. Available coiled-coil prediction programs such as DeepCoil and COILS Server are programmed to predict coiled-coil formation in homomultimers, complicating the prediction of coil domains in the heterodimeric KIF3A/KIF3B motor. To overcome this hurdle, we took a rational prediction approach. We used

DeepCoil to obtain the probability of individual amino acids being involved in the coiled-coil formation, and mapped these probabilities onto a 3D atomic model of the motor stalk generated by the MODELLER algorithm. We then used rational matching by looking at the hydrophobicity of each amino acid in relation to the probability predicted by DeepCoil and used this information to assign the amino acids sequences to the most probable location for each coilcoiled segment. In agreement with the reported coil domain architecture of the closely related homodimeric kinesin KIF17, we found that KIF3A/KIF3B likely also forms three distinct coiledcoil stretches in its stalk. In future work, we plan to generate mutant kinesins in which each of the predicted coil domains is deleted separately and then use motor activity assays to assess the function of each coil domains in KIF3A/KIF3B autoinhibition.

CREEPY CRAWLY COMPENSATION: EXAMINING THE COSTS OF ECTOPARASITE-INDUCED COMPENSATORY GROWTH IN LATE-STAGE NESTLINGS

Presenter	Lusk, Elliot Graduate, Biological Sciences
Mentor	Prof. Joseph Casto
Authors	Elliot Lusk; Joseph Casto

When normal growth rates are suppressed, organisms may undergo a rapid period of increased growth in order to match the physical requirements of a developmental benchmark. This compensatory growth, however, is not without its costs, which can have varying consequences. In nestlings, a major benchmark is that of fledging, which requires advanced physical maturation. In previous studies, compensatory growth and some of its associated costs have been shown in prefledging nestlings but fledging-aged nestlings and the costs they may have sustained needs further study. Here we examine the costs of compensatory growth in late-stage European starling (Sturnus vulgaris) nestlings under the developmental stress of ectoparasitic infestation. Nests were subjected to either the addition of Northern fowl mites (Ornithonyssus sylviarum) or ectoparasite reduction through use of the miticide Permethrin. We followed nestlings throughout development, and at 10 and 20 days of age, assessed structural growth and collected blood to determine hematological measures and corticosterone titers. On day 20, the day prior to when starlings typically leave their natal nest, their brains were harvested. Starlings under ectoparasitic conditions had significantly smaller wingspans, tarsus lengths, and bodyweights on day 10, but on day 20, structural growth was indistinguishable from nestlings in miticide treated nests – suggesting compensatory growth. While we have yet to assess hemoglobin and corticosterone levels, analyses show that brain weight and hematocrit were significantly lower in nests with ectoparasites on day 20, perhaps indicating the protection of necessary physical traits for fledging through compensatory growth at the cost of these less apparent attributes.

PURIFICATION, BIOTINYLATION, AND TESTING OF A MONOCLONAL ANTIBODY TO IDENTIFY B CELLS IN TRACHEMYS SCRIPTA, THE RED-EARED SLIDER TURTLE

Group Leader	Mool, Allison Undergraduate, Biological Sciences
Group Members	Hanna Paton, Undergraduate, Biological Sciences; Whitney Green, Graduate, Biological Sciences
Mentor	Prof. Laura Vogel
Co-mentor	Prof. Rachel Bowden
Authors	Allison Mool; Hanna Paton; Whitney Green; Rachel Bowden; Laura Vogel

There is a shortage of research in reptile immunity which is further hampered by lack of reptile-specific reagents. Evidence suggests there are important differences between reptile and mammalian immune strategies and our laboratory is interested in

reptile B cell development and function. Our undergraduate research project involved the preparation of a previously developed monoclonal antibody (HL673) that recognizes turtle light chain protein. To begin, culture supernatant from the HL673 mAb murine cell line was received and was applied to a protein A affinity column. Unbound proteins were then washed away, and the bound proteins were removed from the column using low pH glycine-HCl buffer. The purified antibody proteins were collected in fractions, OD at 280nm measured, then positive fractions were pooled and dialyzed. The concentration of the purified antibodies was determined, and reactivity tested using an ELISA plate coated with dilute turtle serum. Dilutions of the purified HL673 were detected by anti-mouse IgG-horseradish peroxidase (HRP). Furthermore, some of the antibody preparation was conjugated to biotin. After dialysis, the HL673-biotin was tested by ELISA with dilute turtle serum and detected by streptavidin-HRP. The newly biotinylated antibody was incubated with blood and spleen samples from both adult and hatchling red- eared slider turtles. Bound antibodies were detected using streptavidin-fluorochrome and B cell populations identified using flow cytometry. Our results showed successful detection of turtle B cells using the labeled mAb in both hatchling and adult turtle cell samples. Future studies will use this reagent to investigate the distribution and function of B cells in reptile gut immunity. This work was supported by NSF 1725199 and NIH 1R15AI140118 – 01.

EFFECTS OF DREDGED MATERIALS ON GROWTH OF PRAIRIE SPECIES

Presenter	Morgan, Allison Undergraduate, Biological Sciences
Mentor	Prof. Victoria Borowicz

Dredged materials are taken from Illinois waterways by the hundreds of thousands of cubic yards each year. These materials make up a composition that varies by the location of dredging but invariably contain sand and clay brought up from the bottom of rivers and lakes. These materials are amassed at three locations throughout the state. While there is wide speculation for beneficial uses, dredged materials do not currently have any definitive use. We tested the hypothesis that dredged materials could be a useful component of constructed soil by measuring the height of native prairie plants grown in one of five soil mixes in a greenhouse experiment. Plants of four species native to Illinois prairies were grown individually in a soil mix ranging from 0 to two thirds dredged material for 8 weeks. These consisted of three herbaceous dicots and one grass- each having 5 replicates. Height measurements were taken when planted, and three additional times including when harvested. Shoots were harvested, dried and weighed. Soil type significantly affected growth of three of the four species with growth peaking in mixes that included small proportions of dredged material. We conclude that dredged sand and silt can be useful components of soil for the four prairie species studied.

DELINEATING THE MOLECULAR MECHANISMS THAT REGULATE THE MOTOR PROTEIN KINESIN-2

Presenter	Murarus, Alexandra Graduate, Biological Sciences
Mentor	Prof. Martin Engelke
Authors	Alexandra L. Murarus; Samuel L. Irwin; Jessica M. Adams; Martin F. Engelke

Intracellular transportation is vitally important to cell function: without the help of motor proteins carrying molecular cargo across the vast distances of the cell's cytosol, few cellular mechanisms would be able to take place. We study the heterodimeric motor protein kinesin-2 (KIF3A/KIF3B), which is of particular interest due to its implication in several human genetic diseases. KIF3A/KIF3B drives cilia formation as well as transport, so it is expressed in many cell types.

Trucks consume gas to travel highways. Kinesins need ATP to walk along microtubules, or "cell highways." The resources of a cell must be allocated economically. To save energy, motors must only run when needed to transport cargo. We aimed to investigate how KIF3A/KIF3B regulates its own movement through a process called "autoinhibition." Previous kinesin research provides a framework for possible autoinhibition mechanisms. The autoinhibition of many kinesins is mediated through hinges in certain regions that allow the protein to interact with itself, folding back and inhibiting the microtubule-binding motor

domains. These interactions are thought to block cargo-kinesin and microtubule-kinesin interactions and thereby inhibit microtubule-based movement and ATP consumption. The specific regions of tail and motor domain that interact in KIF3A/KIF3B to facilitate autoinhibition are, however, not known.

We hypothesize that heterodimeric kinesin-2 is also autoinhibited by specific interactions between tail-, stalk-, and motor domains and that by disrupting these interactions the motor will be rendered constitutively active. To test this hypothesis, we generated a fluorescently tagged, engineered motor in which we fused the motor domain of KIF3A to the stalk and tail domain of KIF3B and vice versa. Fluorescence microscopy revealed that unlike the wild-type motor which was diffusely distributed across the cytosol, this engineered motor strongly accumulated in the cellular periphery. This accumulation is a hallmark phenotype for a kinesin that has lost regulation by autoinhibition. We are moving forward with this project by constructing kinesin-2 constructs that have successively longer truncations of these regions of interest. Analyzing the intracellular localization of these motors will allow us to map the interactions that mediate the autoinhibition of the KIF3A/KIF3B motor.

DEVELOPMENT OF GENETIC TOOLS TO CREATE STABLE LINES OF GENETICALLY MODIFIED MARBLED CRAYFISH FOR THE STUDY OF NEUROMODULATION

Presenter	Roy, Rajit Graduate, Biological Sciences
Mentor	Prof. Wolfgang Stein
Co-mentor	Prof. Andres Vidal-Gadea
Authors	Rajit Roy; Wolfgang Stein; Andres Vidal-Gadea

Animal behavior is a complex phenomenon which makes neuroethology one of the most challenging scientific disciplines. Research so far has revealed that complex behavior is correlated with flexible dynamics of neurons and circuits in the nervous system, caused by a plethora of neuromodulatory signals released during sensory processing. This helps the neuronal circuits to adjust and respond to various external cues in a changing environment.

To better understand how these neuromodulators affect the functioning of the nervous system, we need to study the origin and molecular underpinnings of neuromodulatory actions. This task requires studying the physiological, genetic, and molecular processes that underlie neuronal function, a combination that few established animal models offer. To tackle this, we aim to develop a novel animal model to study nervous system dynamics and modulation.

Neuromodulatory actions and the functional principles of sensorimotor processing and behavior have long been investigated in the crayfish nervous system. More recently, the transcriptome and genome of the marbled crayfish (Procambarus virginalis) were made available, and basic molecular tools to study gene expression have been established, making these animals ideal to study neuromodulation and its influence on behavior. The aim of this study is to develop tools to introduce genetic mutations and create stable lines of genetically modified animals for the study of neuromodulation.

We propose the use of CRISPR (Clustered Regulatory Interspersed Palindromic Repeats)-Cas9 technology to enable the manipulation of molecular cascades involved in neuromodulatory actions. Specifically, we will exploit ReMOT (Receptor-mediated Ovary Transduction of cargo)[1] , for the delivery of the Cas9 Ribonucleoprotein complex and single-guide RNA into the crayfish oocytes.

Our preliminary data shows success in ReMOT assisted transport of Cas9 protein into the oocytes when injected into pregnant animals, which was validated using antibody staining. We are now planning a two-pronged approach to move forward. First, to perform a proof-of-principle experiment in which we knock down eye development in crayfish by cutting the eyeless gene with CRISPR. Loss of eyes are easily detected early in crayfish development, allowing us to quickly identify successful gene manipulation. Second, we will target neuromodulator receptors involved in the neuronal circuit that drive crayfish escape behavior. The neurophysiological properties and behavioral consequences of the escape circuit are well-known, enabling us to identify and study the consequences of neuromodulator receptor knock-downs.

[1]Chaverra-Rodriguez et al. Nat Commun 9, 3008 (2018)

THE SEARCH FOR GENES THAT PREVENT MUSCLE DEGENERATION ASSOCIATED WITH DUCHENNE MUSCULAR DYSTROPHY

Presenter	Tamrazi, Monica
	Graduate, Biological Sciences
Mentor	Prof. Andres Vidal-Gadea

Duchenne muscular dystrophy (DMD) is a degenerative muscular disorder that affects 1 in 3,500 males and is characterized by progressive muscle weakness, loss of ambulation, and premature death. DMD is caused by an absence of the dystrophin protein. Dystrophin connects the actin cytoskeleton to the extracellular matrix, which stabilizes the sarcolemma during muscle contraction. In addition to the phenotypes of muscle degeneration, loss of ambulation, and premature death, other phenotypes of this disease include elevated calcium levels, oxidative stress, and mitochondrial damage. It is not precisely understood how the loss of dystrophin affects the molecular mechanisms that lead to degeneration. We are investigating gene expression in dystrophic *C. elegans* that genetically model Duchenne muscular dystrophy through mutations in the worm dystrophin homolog *(dys-1)*. Under high exertion exercise, the *dys-1(eg33)* strain of dystrophic worms recapitulates the most severe features of DMD. However, a dystrophic strain with a similarly missense mutation near the eg33 loci (*dys-1(cx18)*), displays a significantly less severe phenotype. RNA seq data from muscle specific tissue identified several genes that have differential expression between these two dystrophic strains. We have identified differentially expressed genes with known roles in calcium handling, muscle contractile ability, and mitochondrial function. We are presently using RNA interference as a screen to identify genes that decrease calcium levels in muscle. Genes that show decreased calcium levels when silenced will then be further studied to see how this manipulation impacts locomotor ability and longevity. This approach has the potential to identify therapeutic targets sensitive to manipulation and help improve the quality of life of individuals suffering with Duchenne muscular dystrophy.

THE EFFECT OF ANTIOXIDANTS ON NESTLING GROWTH RATE

Presenter	Tauber, Ashley
	Undergraduate, Biological Sciences
Mentor	Prof. Charles Thompson
Co-mentor	Prof. Scott Sakaluk

Reactive oxygen species (i.e., ROS, free radicals that are atoms or compounds containing unpaired electrons) are generated during the cellular process of respiration as a by-product of metabolic activity and are, therefore, a consequence of animal growth. Oxidative stress, the imbalance between the production and availability of antioxidants and ROS, can have adverse effects on early development as a result of damage to proteins, lipids, and nucleic acids. Anything that leads to increased metabolic activity, such as rising environmental temperatures, will increase the production of ROS, and resources devoted to combating reactive oxygen species and the damage they cause are necessarily unavailable for other essential activities, such as growth. Therefore, I tested the hypothesis that the availability of antioxidants would reduce oxidative stress in rapidly growing nestling house wrens (Troglodytes aedon). I predicted that nestlings in heated and unheated control nest-sites with diets supplemented with the antioxidant vitamin E would be in better condition than those raised without the dietary supplement. I used a split-brood design in which half of the nestlings in both heated and unheated nest-sites received vitamin E and the other half the supplement vehicle (corn oil). The effect of vitamin E on offspring mass (a positively related fitness-related measure of condition) depended on the heating treatment, with increased offspring mass in heated nest-sites and the opposite in unheated nest-sites. I conclude that elevated environmental temperatures enhance the effect of antioxidants, which accelerates their successfulness in combating reactive oxygen species. This ultimately leads to lower levels of oxidative stress in developing birds, promoting higher body masses near the time of fledging.

HABITAT TEMPERATURE DETERMINES THE TEMPERATURE RANGE IN WHICH THE NERVOUS SYSTEM CAN FUNCTION

Presenter	Vink-Lainas, Liisi Graduate, Biological Sciences
Mentor	Prof. Wolfgang Stein
Authors	Liisi Vink-Lainas; Wolfgang Stein

Around the world, climate change is causing fluctuations in environmental temperatures. Since all biological processes are temperature-dependent, environmental temperature fluctuations can be detrimental to important behaviors and physiological functions. This is especially true for ectothermic species whose body temperatures change with ambient temperature. In the nervous system, an increase in temperature causes an imbalance of ionic conductances that are key to neural processing and communication, leading to failure of neuronal function. Thus, maintaining nervous system function over physiological temperature ranges is critical for survival. Although the effects of climate change induced environmental temperature changes on behavior and mortality are well studied, the effects on underlying nervous system function are far from clear.

To better understand environmental temperature effects on nervous system function, I am investigating temperature responses in a well-characterized motor system in the crustacean stomatogastric nervous system (STNS). The STNS controls rhythmic chewing and filtering in the animal's stomach, serving a vital function in survival. Of its two neuronal circuits, one is intrinsically temperature-compensated, while the other requires extrinsic neuromodulation to function in an extended temperature range. In a comparative approach, I record the rhythms of both neuronal circuits using established electrophysiology methods and identify the range of temperatures at which the rhythms remain stable in several related crab species: Cancer borealis, Cancer magister, and Carcinus maenas.

The question driving my research is whether the environmental temperatures experienced by a species affect the temperatures at which the nervous system can function. My results from the intrinsically temperature-compensated neuronal circuit show that the temperatures at which the rhythm is stable correspond to environmental temperatures, both in mean and range of temperatures. The species that experiences a greater mean and range of temperatures in its environment had a rhythm that was stable at a greater mean and range of temperatures. Specifically, C. maenas, which experiences habitat temperatures ranging 0-35°C, had a rhythm that was stable from around 6-34°C while C. borealis and C. magister, which both experience habitat temperatures ranging 3-25°C, had rhythms that remained stable from around 6-24°C. My data thus suggest that habitat temperature determines the mean and range of temperatures at which the nervous system can function.

Chemistry

PREPERATION AND STUDY OF RHENIUM SELENIDE CLUSTERS CONTAINING N-DONOR LIGANDS

Presenter	Lopez, Elizabeth Undergraduate, Chemistry
Mentor	Prof. Lisa Szczepura
Authors	Elizabeth Lopez; Lisa Szczepura

The Szczepura group is interested in developing the chemistry of transition metal cluster complexes. My research focuses on the preparation and study of a cluster containing six trimethylacetronitrile (NC*t*Bu) ligands to the $[Re_6Se_8]^{2+}$ core. This presentation will cover the synthesis and characterization of $[Re_6Se_8(NCtBu)_6]^{2+}$ (characterization techniques include ^1H NMR and IR spectroscopy, mass spectroscopy and elemental analysis). In addition, results from studies examining the use of this compound as a starting material for the preparation of novel cluster complexes containing other N-donor ligands will be discussed.

Communication

EXISTING WITH HIV: A CULTURAL EXPLORATION UTILIZING DALLAS BUYERS CLUB

Group Leader	Green, Alyssa Graduate, Communication
Group Members	Coy Suprunowski, Graduate, Communication
Mentor	Prof. John Baldwin
Authors	Alyssa Green; Coy Suprunowski

Individuals with unique health statuses may find themselves existing untraditionally in American society. As a result of stigmas, a lack of health literacy and education, and unique experiences, individuals with untraditional health statuses may be reluctant to disclose their status or fail to seek treatment to avoid shame and embarrassment. *Dallas Buyers Club* is a film that represents the struggles of those in the HIV positive culture group to help others understand the larger significance and implications of their diagnosis. Using the film as a basis, the authors of this research create a framework to understanding the unique struggles and larger societal impacts that occur as a result of the way society treats individuals with an HIV status. Implications will be explored in relation to effects on the personal level of those infected and the larger impact for those outside of the HIV positive culture group.

2021 UNIVERSITY COVID COMPLIANCE MODEL

Presenter	Green, Alyssa Graduate, Communication
Mentor	Prof. Lance Lippert
Co-Mentor	Prof. John Hooker

Universities across the globe are known for critically analyzing all types of information. Not only do Universities analyze information that has already been researched, but students and faculty continually produce new research to advance learning for current and future fields of study. Interestingly, the existence of the severe acute respiratory syndrome coronavirus 2 (COVID-19, for short) pandemic has thrown a wrench in the research process as officials are working with limited research about COVID-19 specifically. The Centers for Disease Control and Prevention (CDC) releases information to the public once information is obtained regarding prevention measures to minimize the risk of contracting COVID-19. The two most notable prevention measures are to wear a face covering (mask) on your mouth and nose as well as to maintain a 6-foot distance between other people (“Coronavirus Disease,” 2020).

Although the CDC is a highly recognized organization whose information is deemed credible, their health recommendations regarding COVID-19 have been contested. Given the global COVID-19 pandemic, 2020 has challenged health educators not only to understand how to protect oneself from the virus but also how to educate and inform the public regarding safety measures. The suggestions by the CDC have polarized Americans. While some believe that strictly enforcing wearing masks and maintaining a 6-foot physical distance is necessary to eliminate the threat of the pandemic, others argue that mandates are politically charged and infringe individual freedom.

This debate takes an interesting turn on University campuses where students aspire to formulate educated opinions but lack a history of information regarding the best COVID-19 health practices during the pandemic. Rather, information from the CDC must either be accepted or rejected at face value to determine appropriate prevention measures. University officials at one mid-sized Midwestern University support the findings of the CDC and encourage their students to maintain masking and social distancing practices. However, given the severity of the current debate, simple enforcement is not enough. Rather, the University must get creative to encourage students to wear masks and participate in social distancing on their campus. While the University can discipline students when they fail to meet practices the city enforces, they may set their own guidelines for how students must behave on their own physical campus regardless of what the city implements.

INVESTIGATING THE ROLE VIDEO GAME PLAYERS' SUPPORTIVE COMMUNICATION PLAYS IN MODERATING THE EFFECTS OF TOXICITY IN ONLINE GAMING

Presenter	Pham, Duy Graduate, Communication
Mentor	Prof. Kevin Meyer
Author	Duy Pham

Online video games are perceived as a hostile space that welcomes aggression and verbal abuse based on biological sex, gender, race, and sexual orientation. Therefore, video game players may choose to communicate in a supportive fashion toward other players or engage in toxic behaviors due to increased aggression and masculine norms. While scholars have been investigating supportive messages in a computer-mediated context, past research inquiries into supportive communication and video gaming have remained separate. The present study will connect these disparate lines of research. This study explores different levels of verbal person-centeredness (VPC) of support messages, combined with the sex of the message producer, and how these factors impact several video game-based relational outcomes, namely relational closeness, aggression, communication satisfaction, and overall quality of gameplay experience. Participants were presented with one of the four randomly assigned scenarios based on a 2 (high and low VPC messages) x 2 (male vs. female voices) factorial design, then asked to answer survey questions. Results indicated that VPC were more effective than the sexes of the message providers through voice recognition at affecting changes in the dependent variables, and having a teammate communicating in HPC messages is effective at improving the participants' relationship with their teammates and gaming quality. However, there were no significant differences in aggression between groups. Implications and directions for future research are then discussed.

KEYWORDS: online video game players, aggression, verbal person-centeredness, verbal abuse

REMOTE WORKING: HOW DO WE COMMUNICATE IN AN ALL-DIGITAL WORLD?

Presenter	Sullivan, Kaitlyn Graduate, Communication
Mentor	Prof. John Baldwin
Author	Kaitlyn Sullivan

This study examined the patterns of remote workers throughout their typical day. Fifteen remote employees participated in thirty-minute in-depth interviews. A semi-structured interview protocol was used to ask questions about perceptions and patterns concerning remote working and participants' lifestyles. The in-depth interviews were able to illuminate both issues and frustrations of the participants as well as the unique benefits of working remotely. While many employers stated that they are more productive at home, others felt that they had less time off and a harder time logging off when the traditional workday was done. As a result, employees have begun changing their schedules around to better accommodate their lifestyles. This inability to step away from work leads to a host of issues, including employee burnout. It is suggested that employers remind employees that work-life balance is still a priority to avoid employees overworking themselves due to constant accessibility to work.

POLITENESS THEORY PATTERNS IN THE ONLINE AND IN-PERSON CLASSROOM

Presenter	Thedorf, Erianne Graduate, Communication
Mentor	Prof. John Baldwin
Authors	Erianne Thedorf; John Baldwin

Politeness theory and its relevance in the classroom have not been explored to understand how students and instructors maintain face and mitigate face-threatening acts (FTAs). This study sought to understand how instructors and students define "politeness" in the classroom, how both parties maintain face, and what differences between online and in-person classroom contexts occur. Based on computer-aided coding of data from open-ended questionnaires, results indicated that, when instructors use bald-on record FTAs in the classroom, this causes students to become more reticent in in-person and online classroom contexts. Instructors and students both maintain face by preparing for class and exhibiting knowledge, regardless of the context, and with the transition to online classes, both instructors and students expect politeness to be replicated through tasks such as turning off or keeping on video feeds and muting microphones.

Communication Sciences and Disorders

A SYSTEMATIC REVIEW OF LANGUAGE INTERVENTIONS INCLUDED IN FOSTER PARENT TRAINING PROGRAMS

Group Leader	Theleritis, Maesyn Undergraduate, Communication Sciences and Disorders
Group Members	Amanda Regez, Undergraduate, Communication Sciences and Disorders; Meredith Peebles, Undergraduate, Communication Sciences and Disorders
Mentor	Prof. Ciera Lorio
Authors	Maesyn Theleritis; Amanda Regez; Meredith Peebles; Mady Cox Megan Hopf; Melanie Ryder; Ciera Lorio

The purpose of this systematic review was to evaluate language interventions for children between the ages of 0-5 in foster care who were at-risk for language delays. After conducting a systematic search in 4 different databases, we acquired a variety of articles that included descriptions of interventions targeting developmental outcomes for foster children. A total of 52 articles were found eligible for our review. Each article was coded for study design, foster caregiver teaching functions (information sharing, modeling, prompting/guiding/scaffolding, feedback), characteristics of foster children and foster caregivers, intervention and implementation fidelity, and the outcomes of each intervention included in the study. This poster will review our current findings related to the coded items and highlight areas for future research with this population.

SHORT-TERM FOLLOW-UP OF OROPHARYNGEAL DYSPHAGIA IN A PATIENT WITH MULTIPLE SYSTEM ATROPHY

Group Leader	Todd, Marissa Graduate, Communication Sciences and Disorders
Group Members	Breanna Kelly, Undergraduate, Communication Sciences and Disorders
Mentor	Prof. Taeok Park

Purpose

Dysphagia is a common symptom of Multiple System Atrophy (MSA) and may lead to fatal consequences. Various stages of swallowing were examined to enhance knowledge of swallowing dysfunction and its progression in patients with MSA. Another purpose of this study was to gain insight into what stages of swallowing the dysfunction primarily occurs.

Method

The swallows of two patients were examined in the temporal measurements of oral transit time (OTT), pharyngeal transit time (PTT), upper esophageal sphincter (UES), initiation of laryngeal closure (ILC), and laryngeal closure duration (LCD). Each temporal measurement was examined in three different consistencies: thin, thick, and puree. Each consistency was five milliliters. The normal patient's temporal measurements were recorded once, and the patient with MSA's temporal measurements were recorded in both an initial and follow-up evaluation, with three months in between measurements. A videoflurosopic study was used to collect quantitative data in seconds and milliseconds on each patient's swallows.

Results

There were significant differences and trends in temporal measurements when comparing normal data to results from the evaluation of the patient with MSA. There were also trends in regard to the consistency that was being swallowed. Overall, OTT and PTT showed increases from the initial to the follow-up evaluation. UES showed the smallest amount of change across evaluation and consistencies, but there were still increases as evaluations were made and MSA progressed. ILC was longest in the follow-up evaluation for all consistencies. LCD was found to increase from the normal to initial evaluation but decreased from the initial to follow-up evaluation for thick and puree consistencies.

Conclusion

The progression of MSA affects many aspects of swallowing. Some of these effects and changes can contribute to an unsafe swallow and possibly aspiration. However, some processes of swallowing adjust to compensate for losses in other areas. Understanding how swallowing progresses in patients with MSA can be beneficial for determining adequate treatment and management of this neurodegenerative disorder.

Creative Technologies

UNCHARTED TERRITORIES: DEVELOPING DIGITAL EXPERIENCES FOR ANTHROPOLOGY AND ARCHEOLOGICAL EXPLORATION

Group Leader	Bruner, Sam Graduate, Creative Technologies
Group Members	Ella Jahraus, Graduate, Creative Technologies
Mentor	Prof. Kristin Carlson
Authors	Kristin Carlson; Lucy Gill; Firozeh Irannezhad; Amal Abdalla; Annie Sungkajun; Ella Jahraus; Sam Bruner

This paper illustrates the development of digital tools to educate and promote anthropological and archaeological work in the Darien Region of Panama. The Darien Region has been underexplored for the last century and is home to the Darien Gap, the only break in the Trans-American Highway, which helps to preserve the indigenous people and animals living there. The authors have collaborated to share experiences of navigating the Darien Gap in Panama through storytelling, adventure, and exploration with digital media. This project resides as a website with a variety of video and game works. Our goal is to have as much media available in both English and Spanish as possible, to be accessible to the local communities in Darien and to international communities, which is crucial to support locally-initiated conservation initiatives. Current projects include videos documenting known populations that have migrated through the area, videos documenting a current anthropologist's explorations of the region, a game depicting a historical anthropologist's findings of an archaeological expedition from the 1920s, and accessible compilations of research on local flora and fauna.

BUSINESS OR PLEASURE: A QUALITATIVE REPORT ON HOW PEOPLE PRESENT THEMSELVES DIGITALLY

Presenter	Cossio, Ethan Graduate, Creative Technology
Mentor	Prof. Sercan Sengun

Individuals frequently socialize with each other leisurely or professionally with different etiquettes and attires depending on the circumstances. As individuals present themselves to potential new acquaintances, friends, and/or associates, those peers judge them primarily from a visual perspective, typically focusing on their looks rather than their actions and characteristics. With the advancement of technology, individuals meet and socialize more and more in virtual environments and platforms where they can change and control the way they look and sound to others. In addition, individuals are given the choice to exercise different levels of anonymity on many platforms such as social media, forum threads, online gaming, etc. In this study, we analyze the behaviors and preferences of young college students as they design their virtual avatars both for a business and a leisure scenario. We investigate the decisions and interactions of the participants as they create their avatars using quantitative data such as the number of options they explore and the time they spend on each option and category. We create a comparative framework between the avatars created for business versus leisure purposes. By looking at how users want to present themselves in the digital world for different purposes, we aim to provide insights on how to improve sociological aspects of online interactions and gaming.

THE DARIEN GAP

Presenter	Irannezhad, Zahra
	Graduate, Creative Technologies
Mentor	Prof. Kristin Carlson

This project aims to introduce the Darien Province, which is located in Panama, close to the Colombia border. Due to the break in the Pan-American Highway, and the remoteness of this region, there are limited ways to access the Darien and limited resources, there is a limited information about the area and the people of the area. My work uses anthropological and archaeological data to inspire the creations of short videos that tell stories of the region.

The first video, People of Darien, explores the diversity of people in the Darien region (see Figure 1). This work highlights the location of Darien on the world map, the possible ways to get to the Darien province and cross the Darien Gap, and the variety of people that have traveled through the Darien region through history. This region has witnessed the migration of many different people to it and through it, such as Spanish explorers, Scottish explorers, and Asian laborers from the Panama Canal. These settlements have interacted with the local Wounaan and Embera people.

The second video, Travel to the Big Rock in Mogue, highlights an archeologist's trip to the village of Mogue to see a unique rock that is known for the mysterious carvings in it (see Figure 2). Locals have known about the rock for centuries yet have no known records by academic sources. The archeologist's team collected many samples of ceramics and unique plant species to study and further their understanding of the area and its history. This video was constructed by using a variety of photos from the author's field research trip in 2019, and motion graphics. This video is recorded in both English and Spanish, to best reach a variety of local and international audiences.

EMBRACED SEPARATION: EXPLORING METHODS OF BREATH ATTUNEMENT IN SPECULATIVE INFANT SWINGS

Presenter	Oyedokun, Olaoluwa
	Graduate, Creative Technologies
Mentor	Prof. Kristin Carlson
Co-mentor	Prof. Annie Sungkajun
Authors	Olaoluwa Oyedokun; Kristin Carlson; Annie Sungkajun

This paper explores a speculative design for an infant swing based on breath attunement. There are challenges for working parents to juggle working from home and taking care of an infant, especially when infants want to be physically close to the parent. This design explores how a swing can be adaptable to dynamic changes in the parent that can soothe the infant while allowing the parent to be more hands-free. These dynamic changes include the use of breath sensors on the parent to change the rhythm of the swing, while also creating dynamic amplifications of environmental sounds, as though they were being carried by the parent through the home. This work particularly explores qualities of movement and rhythm as key components of comfort for infants in their parent's arms. Results of this paper include design sketches and a usability evaluation of a smartphone interface, as a speculative approach to designing embodied interactions between family members.

Criminal Justice Sciences

PRERELEASE REENTRY PROGRAMS: POSING PROBLEMS FOR OFFENDERS POST-RELEASE

Presenter	Gray, Melissa Graduate, Criminal Justice Sciences
Mentor	Prof. Jessie Krienert
Authors	Melissa Gray

Prison prerelease programming helps offenders develop the skills they need to successfully reintegrate back into society and provides treatment to offenders who struggle with substance abuse and mental health disorders. Prerelease programs are an important part of an offender's reentry as many offenders lack the community support needed for a healthy and safe prison to community transition. In depth interviews were conducted with reentry case managers and parole agents in Illinois to assess their perception of “what works” in relation to successful prerelease programming. Following a qualitative thematic analysis, results indicate that officers believe job skills, substance abuse treatment, utilization of moral recognition therapy and psychosocial groups are needed to help prepare offenders for the real world once they are outside the wall. Further work needs to be done to increase the number of inmates receiving prerelease programming that include these officers identified components.

PRIVACY CONCERNS IN THE DIGITAL ERA: AN ANALYSIS OF THE THIRD-PARTY DOCTRINE'S USAGE IN THE CRIMINAL COURT SYSTEM

Presenter	Harm, Alena Graduate, Criminal Justice Sciences
Mentor	Prof. Michael Gizzi
Authors	Alena Harm; Michael Gizzi

This project is focused on the judicial impact of a United States Supreme Court decision in Carpenter v US (2018), which modified the judicially created “third party doctrine,” that allows law enforcement to seek information from third parties (banks, phone companies, internet providers, etc.) without the use of a search warrant. The third-party doctrine is based on the principle that when an individual conducts business with a business or organization, like a phone company or bank, they have no privacy interest in the transaction records of the user. As a result, they cannot make a claim of protection under the Fourth Amendment to the Constitution against “unreasonable searches and seizures” and government officials are not required to seek a warrant. The third-party doctrine has become a routine tool by police as a way to gain evidence. In *Carpenter,* the Supreme Court limited the government’s ability to conduct warrantless searches involving law enforcement requests to cell phone providers to deliver “cell site location information” (CSLI) for specific phones. These records provided a detailed set of breadcrumb information as to the location of a user’s cell phone. The Court held that the privacy interests
were so significant that the third-party doctrine would not be applied to this type of request.

This study uses legal decisions from litigated cases since 2018 to better understand the scope of third-party usage by law enforcement, focuses on both the primary question of how case outcomes have changed as a result of the Carpenter decision and a broader question of better understanding the population of cases utilizing the third-party doctrine; with additional examinations of criminal investigations involving third-party doctrine requests and what types of third-party doctrine tools were used.

A qualitative content analysis was conducted of 231 decisions of criminal cases that involved varying crimes, including: homicide, armed robbery, sexual misconduct, drugs, property, etc. In these cases, law enforcement were able to obtain defendant information utilizing CSLI data, camera surveillance, IP addresses, bank records, subscriber information, GPS, as well as through a variety of other software and databases. Many cases have concluded that law enforcement’s obtained evidence was subject to inclusion through the good-faith exception, resulting in many case decisions being upheld, much of which has opened numerous concerns for future defendants, such as with drug offenses, where CSLI may be obtained despite the existing precedent generated through *Carpenter* if attained in good-faith.

"STUDENT LIFE: SCHOOL ENVIRONMENT, SAFETY, PUNISHMENT"

Presenter	Lagunas, Karen Graduate, Criminal Justice Sciences
Mentor	Prof. Charles Bell

In the U.S., many K-12 public schools utilize a variety of safety measures, such as security guards, police officers, metal detectors, and cameras to monitor students in response to recent instances of school violence. This qualitative study features semi-structured interviews with ten students and ten parents of students who attended a high school in Waukegan, Illinois that features intense security measures. Throughout the interviews, the researcher examined students' and parents' perceptions of metal detectors, guards, surveillance cameras, and law enforcement officers. This study also stands to provide insight into the fairness of school punishment measures.

FOOD FRAUD: HOW DO CORPORATIONS CHANGE?

Presenter	Perkins, Chelsea Graduate, Criminal Justice Sciences
Mentor	Prof. Ashley Farmer

Food is a crucial necessity required by every living being on this earth in order to survive. When it comes down to the food we ingest, we want to make sure we are putting safe and healthy products into our bodies. Food corporations have cut corners in order to benefit the corporation and shareholders, which results in consequences that have been known to put human health and safety on the line. This study explores how big food corporations convicted of major food fraud crimes change their marketing methods in order to appear safer to the public. Research was conducted by analyzing major food fraud cases among five major food industries, Nestle, Odwalla, The peanut Corporation, and two major Honey corporations. The cases involve four of the most common food fraud crimes: human health and safety, adulteration, mislabeling, and deceit. Marketing trends were also analyzed at the times of these crimes to further explore motivations behind the tampering of products. Furthermore, this study explores what policies were put in place after conviction and if corporations follow through with protocols in order to maintain food health and safety towards the general public. Results from analyzing case studies and marketing trends are compared to corporations today and look at existing issues that are still present. This study shows that corporations still cut corners when it comes to products, and food fraud is on the rise now due to the current pandemic. Implications for the future include policies that force major corporations to comply to health and safety standards when it comes to manufacturing of products. Corporations have shown that when a global crisis is at hand, they are not readily prepared to handle such high demand of products and will continue to cut corners.

THE EFFECTS OF LESS THAN LETHAL WEAPONS

Presenter	Rettig, Ryan Undergraduate, Criminal Justice Sciences
Mentor	Prof. Ashley Farmer

As the Criminal Justice system is continually evolving, there have been many attempts at reforms and alternatives in policing. One specific alternative that has been implemented is the usage of less than lethal weapons. The ideology of less than lethal weapons stemmed from the Cold War in a militaristic setting but have become much more prevalent in law enforcement in recent years. The influence and effectiveness of less than lethal weapons is crucial to officer and suspect safety. Previous research has been conducted with an emphasis in statistical analysis. However, in this research the aim is to focus more on the personal traits of police officers when being armed with a less than lethal weapon. This will be completed by conducting interviews with various police officers and discussing the effects less than lethal weapons has had on their career. We are anticipating that the interviews will present a better understanding on how police feel on the use of less than lethal weapons, and the struggles that come along with the use of less than lethal weapons.

POLICE BODY WORN CAMERAS & POLICY: EXPLORATION OF FEATURES AND EFFECTIVENESS

Presenter	Reyes, Christian Graduate, Criminal Justice Sciences
Mentor	Prof. Mike Rossler
Authors	Christian Reyes; Michael T. Rossler

Body Worn Cameras continue to be a technological tool utilized by law enforcement across the country. As academic inquiry into the effects of this tool are increasing both positive and negative effects have been associated with their implementation. With new legislation being passed in Illinois requiring all police officers to have a body worn camera on them during their shifts by 2025, the topic of their effectiveness and utilization continues to grow. Given the mixed findings found in the current literature, this inquiry aims to identify key points within how the language of body worn camera policy by different departments is phrased regarding the body worn cameras deployment, storage maintenance, footage review and overall officer conduct when the body worn cameras are supposed to be in use. Previous academic studies give insight to how individual law enforcement departments are performing and throughout this article, the content will distinguish whether the policies are consistent or dissimilar in regards body worn cameras.

Economics

COMPARING THE PERFORMANCE OF TIME SERIES MODELS FOR FORECASTING EUR/USD

Presenter — Fatemi, Maryam Alsadat
Graduate, Economics

Mentor — Prof. George Waters

This study compares the efficacy of different time-series models for forecasting Euro/US exchange rate (EUR/USD). The ARIMA and ARMA methodology were used for forecasting the monthly data collected from January 1995 to December 2019. Out of this sample, till December 2014 were used to build the models. The remaining data points were used to do out of sample forecasting and check the goodness of different time series models. The judgment is based on the in-sample information criteria, such as AIC (Akaike Information Criteria), and SIC (Schwarz. Information Criteria), and out-of-sample forecast performance measures such as MSE (Mean Squared Error), RMSE (Root Mean Squared Error), and Ljung-box.

TITLE OF INDEPENDENT PROJECT: AIRLINE PRICE DISPERSION BEFORE AND AFTER THE PANDEMIC

Presenter — Garduno, Caesar
Undergraduate, Economics

Mentor — Prof. Susan Chen

This study is an empirical project on the price dispersion of airfares for popular destinations in the U.S. Specifically, the top 10 busiest North America domestic routes before and after the pandemic, 2019 Quarters 1-3 and 2020 Quarters 1-3. Examine price setting decisions in these 20 markets. Data is cleaned following the appendix in He et al. (2020).

CRITICAL MOMENTS IN CHESS

Presenter — Samsami, Ian
Undergraduate, Economics

Mentor — Prof. Susan Chen

BACKGROUND:

The project incorporates basic knowledge in game theory into the game of chess. The goal of winning in chess is to “checkmate” one’s rival. Following several progressions within the game of chess, the project will provide a basic understanding of making strategic decisions when playing chess. As a reference to readers, a brief summary of how pieces move can be included.

AIMS:

This project aims to investigate critical moments from chess games by some of the best players in history. Specifically, the project will analyze key decisions under normal and advanced time constraints (classical versus blitz chess) that lead to the

success of a game. These equilibrium positions conclude the game can be “solved” by computers, although even the best chess players are not always following the same moves as predicted by the computer. Therefore, this analysis will take into consideration strategic moves made during those critical moments. In short, the aim of this project is to apply backward induction to chess games and examine whether the players adopt the optimal strategies as predicted (in the game of chess, this is known as “calculating”).

METHODOLOGY:

I will analyze 3 or 4 critical moments in selected chess games, which allows me to go into more detail on the strategies that these players employ as they reach this endgame phase. First, I compare the computer’s calculated best moves with the actual moves made in these games and analyze whether each of these moves is reasonable. I will use chess engines such as chess.com and lichess for the computer’s calculated best moves (which I already have access to), and justify why the players may have sometimes deviated from the machine’s optimal strategies. It is in this latter portion where the merging of my two spheres of interest will occur, as I will be examining each players’ strategies and payoffs in detail.

EXPECTED OUTCOMES, SIGNIFICANCE, or RATIONALE:

This is an important study to aid in my understanding of backward induction, a fundamental concept of sequential move games in game theory. It will be the crux of how I defend the moves the players make, as well as how the computer calculates its best-response results. Additionally, the concept of “look ahead, and reason back” is crucial to any area of study. This study highlights only games featuring true masters of chess (these players are called international/grand masters, IM or GM respectively). Their decision making and strategy is the subject of extensive academic research, and I believe that my contribution though small will be well received by a wider audience.

BUBBLE IN THE GOLD MARKET

Presenter	Vaez, Sara
	Graduate, Economics
Mentor	Prof. George Waters

An asset price behaves according to both its “market fundamentals” and self-fulfilling rumors of market participants. The market participants’ expectations can influence the asset price and these fulfilling rumors are often called bobbles. The deviation of an asset price from its fundamental values is mostly attributed to the relative price bobbles. In this research project, I investigate a hypothesis that the gold price volatility can deviate from its real fundamental values with time series approach; by using dividends to drive gold’s fundamental values through a period. Theoretically, to measure gold’s fundamental value, economists use the gold’s convenience yield. Convenience yield reflects the market’s view about gold’s future supply. It is the benefit that the holder of the gold receives relative to the owner of the future or forward contracts[1].

If bubbles exist, the time series of the prices of gold, in any time series obtained by differencing several times, is nonstationary. Therefore, in this empirical work, I check for the nonstationary process. Also, I use the unit root test to look for rational bobbles and Dicky-Fuller tests for existence of periodical bobbles.

JEL Classification: G10, G12.

Educational Administration & Foundations

THE INFLUENCE OF ACADEMIC MAJORS, CLASSIFICATION, AND ENVIRONMENTAL AWARENESS ON STUDENTS' SUSTAINABLE BEHAVIORS

Presenter	Supanichrattana, Tanaporn Graduate, Educational Administration & Foundations
Mentor	Prof. John Rugutt

Using standard multiple linear regression, this study examines predictors of sustainable behaviors among students (*n*= 802) at Illinois State University (ISU). Hypothesized predictors are: (a) student majors, (b) student classification, and (c) environmental awareness. The regression analysis shows the overall regression model to be significant (*F[3,798]*= 32.95, $p < .001$), explaining 11% of the variance in sustainable behaviors. The results indicate environmental awareness has the strongest influence on the sustainable behavioral intention of undergraduate students, followed by student classification and majors (β_{EAW}= .29, β_{SC}= .11, β_{SM}= .02, $p < .001$). Consistent with previous studies, this study demonstrates that students with higher levels of environmental awareness tend to show higher levels of sustainable behaviors. However, student classification and majors seem to have minimal impact on sustainable behaviors. The results of this study illustrate the importance of understanding factors that influence students' sustainable behaviors and suggest that college and university administrators should further emphasize sustainability education strategies in order to increase environmental awareness of college students.

English

HOLDING PROTEST POSTERS AND HANDHELD CONSOLES: ACTIVISM IN ANIMAL CROSSING: NEW HORIZONS

Presenter	Tidmarsh, Bryanna Graduate, English
Mentor	Prof. Mary Moran

The video game *Animal Crossing: New Horizons* (*ACNH*) was released in March 2020, just as the world was going into lockdown due to the COVID-19 pandemic. Designed for children ages 3 and up, *ACNH* hosts a large player base from a wide variety of ages. For many, the idea of building an idyllic, remote island and connecting with friends online has been a valuable outlet in a time of isolation. For activists, it offers a space for engaging in collective action.

Megan Musgrave coins the term "imaginary activism" to refer to the way activism in youth literature incorporates "reactions on the part of fictional characters, imaginative responses on the part of engaged readers, and the positioning toward real-world activism that potentially results from such imaginative responses" (xx). *ACNH* serves as an interactive youth text ripe for real-world applications of this. Summer 2020 saw an increase in *ACNH* gatherings to protest on behalf of Black Lives Matter and Hong Kong independence. While thousands hit the streets, others simulated the experience in the virtual world.

Viewing *ACNH* as a children's literature text, this essay examines the activist practices of Animal Crossing discourse communities in the context of the COVID-19 pandemic. Musgrave claims virtual activism "is becoming the 21st century's most effective mode of building an engaged citizenship" (174). In a time when it becomes increasingly difficult to gather, virtual activism in video games has been crucial to facilitating collective action and encouraging people to participate in cultural conversations about key social justice issues. Youth literature has long been a site for subversive work, and *ACNH* serves as a crucial site of inquiry regarding activism during the COVID-19 pandemic.

Family and Consumer Sciences

ONLINE FOOD DELIVERY: THE ROLE OF DRIVERS' SERVICE QUALITY IN CONSUMER SATISFACTION

Presenter	Mensah, Dylis-Judith Graduate, Family and Consumer Sciences
Mentor	Prof. Erol Sozen
Authors	Erol Sozen; Dylis-Judith Mensah

Over the last several years, and particularly during the global hit COVID-19 pandemic, many food enterprises transact businesses with consumers with just a click of a button. There are many studies on online food delivery (OFD) and consumer satisfaction. They report how consumers are driven positively towards using OFD because they perceive that the system saves them time and effort than conventional options. It is also well documented that working conditions influence employee output, consequently, the service quality they provide to customers. In OFD services, the drivers are the last contact to customers. Therefore, their service has a great potential of leaving a good or a wrong lasting impression on the consumer. In light of this truth, how the drivers feel about work is pivotal for a wonderful customer experience. Despite the revelation that consumers are not entirely satisfied with OFD services, there is no study specifically linking consumer dissatisfaction to OFD drivers. The aim of this study is to determine how employee engagement influences OFD drivers' performance and how OFD drivers' performance is related to consumer dissatisfaction with OFD services. Two online surveys created using Qualtrics will be used in this study, one for drivers and the other for consumers. Amazon Mturk will facilitate data collection from consumers, and a market research company will distribute the survey to the drivers. Both surveys will remain open for four weeks. The data will be analyzed using SPSS version 27. The variables will be measured using a five-point Likert scale, with available responses ranging from 1) Strongly disagree to 5). The study will add novel literature to the foodservice management research field. The strategies and approaches that will be proposed can be employed by OFD operators in the education, training, and re-training of their drivers and in motivating them to exhibit quality in service delivery.

CASE STUDY OF DURABILITY, ABRASION RESISTANCE, AND COLORFASTNESS PERTAINING TO CROCKING AND FROSTING ON FAUX LEATHER FABRICS

Presenter	Parks, Haley Graduate, Family and Consumer Sciences
Mentor	Prof. Ui-Jeen Yu
Authors	Haley Parks; Ui-Jeen Yu; Meara Walsh

This study investigated faux leather’s durability, abrasion resistance, and colorfastness related to various abrasions, surface contact, and rubbing. Authentic leather is not ideal to fashion designers and brands because it can produce an excessive polluting substance due to the use of harmful chemicals in the production process. This is why faux leather would be a prime alternative choice for environmentally conscious production. Our main focus was to test faux leather fabrics’ abrasion resistance because there could be potential issues with the coatings involved. Two different types of faux leather fabrics were tested in this study: 1) faux leather fabric with PU coating (base: 100% polyester, coated: 100% polyurethane), 2) textured faux leather fabric without PU coating (100% polyester). The faux leather fabrics were tested by using ASTM and AATCC standard test methods in relation to durability, abrasion resistance, and colorfastness to crocking (surface contact) and frosting (flat abrasion). Results indicate the PU coating faux leather fabric was durable and abrasion resistant against flat and flex abrasions, and pilling; also had good colorfastness to crocking and frosting. The textured faux leather fabric without PU coating was resistant against flex abrasion and pilling only. The different results from each faux leather fabrics requires more research and investigation as to what may make one faux leather superior to another faux leather.

A COMPARISON OF QUALITIES OF COLORFASTNESS FOR NON-STRETCH VERSUS STRETCH FAUX SUEDE FABRICS

Presenter	Walsh, Meara Graduate, Family and Consumer Sciences
Mentor	Prof. Ui-Jeen Yu
Authors	Meara Walsh; Kylie Victorine; Olivia Asbridge; Marissah Cook; Amy McCaslin; Ui-Jeen Yu

Faux suede textiles have caught the attention of many consumers looking for an eco-friendlier way of wearing leather and animal cruelty-free alternatives. According to prior studies, faux suede fabrics made of microfibers could have unevenness in dyeing because microfibers require more dyestuffs than regular fibers to attain a given shade depth. Since microfibers contain greater amounts of dye than regular fibers, fabrics made of microfibers may have poor wet colorfastness. As few studies have investigated colorfastness of faux suede fabrics made from microfibers, the purpose of this study was to examine the colorfastness of faux suede fabrics. Two faux suede fabrics with and without stretch, commonly used in the textiles market, were selected as samples in this study, including a 100% polyester non-stretch faux suede fabric and a 90% polyester/10% spandex stretch faux suede fabric. These two fabric samples were tested, using AATCC standard test methods about colorfastness. Results indicate the non-stretch suede fabric had significant color staining to other fibers due to laundering and poor colorfastness due to frosting, while the stretch faux suede fabric had significant color staining to other fibers, due to perspiration, laundering, and poor colorfastness to crocking. Both fabrics did not have shade changes due to perspiration, laundering, crocking, and frosting. The stretch faux suede fabric showed more severe color staining/transfer due to perspiration, laundering, and crocking, compared with the non-stretch faux suede fabric. Considering the test results, more detailed care instructions for these suede fabrics should be given to consumers to help them prevent severe color staining on other materials.

Geography, Geology, and the Environment

THE GREEN NEW DEAL AS COVID-19 RELIEF

Presenter	Chambers, Emmi
	Undergraduate, Geography, Geology, and the Environment
Mentor	Prof. Matthew Himley

The COVID-19 pandemic has created or exacerbated concerns relating to unemployment, healthcare, and systemic inequities in the U.S. This comes at the same time as immense threats to human and environmental health posed by climate change. This poster outlines how it is possible and why it is necessary to address these intersecting crises simultaneously through a Green New Deal that implements solutions to the environmental crisis along with a myriad of other crises facing the U.S. Our nation needs a program to eliminate health disparities drawn out by the pandemic as well as to resolve high unemployment levels and remediate the deep inequalities seen in both the healthcare and employment systems. People of color and low-income individuals have been disproportionately affected by the pandemic. Higher rates of pre-existing health conditions among people of color coupled with COVID-19 have led to greater fatality rates within these groups (Villarosa, 2020). Further, Black and Latinx people as well as low-income individuals are experiencing some of the worst unemployment rates during the pandemic (Parker et al., 2020). These systemic inequities do not begin and end with COVID-19. Any plan that seeks to move the U.S. out of the pandemic without also addressing underlying inequities will fail to prepare the country for future global crises. It is all the more pertinent to consider the nation's approach to the pandemic when it is considered in conjunction with climate change. Scientists advise that we must cut global greenhouse gas emissions in half by 2030 and have net zero greenhouse gas emissions by 2050 to prevent massive losses in global ecosystems, plant and animal species, and human life (Klein, 2019, pp. 23-24). The Green New Deal presents a way to simultaneously address the COVID-19 pandemic and the climate change crisis. By developing legislation that addresses climate change, creates good quality jobs, provides universal health care, and remedies the systemic inequalities that have compounded the effects of COVID-19, the U.S. can come out of the pandemic having built a more sustainable and equitable world.

ISOLATING LOCATIONS OF POTENTIAL EPISODES OF CAVE COLLAPSE AND THEIR RELATIONSHIP TO CAVE LEVEL DEVELOPMENT THROUGH MAJOR RIVER SYSTEM INCISIONS

Presenter	Conley, Ethan
	Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Authors	Ethan Conley; Eric Peterson; John Kostelnick; Toby Dogwiler

Karst landscapes, in which dissolution of bedrock is the dominant geomorphic process, make up 10%-20% of Earth's land surfaces and supply between 20%-25% of the global population with drinking water. Dissolution dominates the genesis of karst systems, creating flow pathways, conduits, and caves. Despite the significant role dissolution plays in the initial genesis, physical erosional processes enhance the formation of these karst systems and should not be ignored. For example, catastrophic failure of conduit ceilings results in areas of cave collapse. Cave collapse is an important indicator of the past hydrogeological and geomorphological conditions of a karst system; however, the location and extent of cave collapse are not always easily identifiable. Episodes of collapse can be triggered in response to the incision of major river systems and the lowering of the water table. Different periods of river system incisions can also result in the formation of multiple cave levels due to the varying elevations of the static regional base-level. Using a LiDAR derived DEM, a weighted overlay was created utilizing slope percentage, distance from caves, and distance from streams to display areas that have most likely experienced episodes of cave collapse. In addition, cave levels were geospatially identified using natural breaks in cave entrance elevation data. Correlations between areas of high probability of past collapse and the contacts between cave levels exist. This indicates that cave collapse may preferentially occur at the boundaries between cave levels.

NATURAL NITRATE REMOVAL IN SHALLOW SUBSURFACE STREAM FLOWS

Presenter	Heath, Abigail Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Authors	Eric Peterson; Catherine O'Reilly; Wondwosen Seyoum

As agricultural growth increases across the planet, more anthropogenic nitrate from fertilizers and sewage effluent is contributed to the aquatic system, exacerbating both ecosystem- and human-health issues. Nitrate is naturally processed and removed within the environment, and those processes have been observed in a segment of substrata and porewater below streams called the hyporheic zone (HZ). The interaction of stream water with groundwater can promote denitrification; however, the rate of nitrate reduction within the HZ is unknown. This study determined the extent of surface water-groundwater interactions in a HZ and assessed the nitrate reduction in this zone via monthly sampling of three wells inserted along the length of T3, a stream located in the agriculturally dominated, Central Illinois landscape. Samples were taken from 10, 20, 30, and 50 cm below the streambed, the stream, and a groundwater well from spring to fall of one year to assess the full mixing patterns and nitrate contributions of the landscape to the stream system. The chemical composition of the stream water, groundwater, and HZ waters were analyzed using an Ion Chromatograph and applied in a mixing-model. Results show that stream water and groundwater contribute proportionally inverting amounts to water flow through the depth of the HZ. The conservative ion chloride is a chemical indicator of mixing in waters, and in the studied HZ, chloride concentrations were 48.8% higher in surface water than groundwater, and a gradient of change between these two endmembers was observed along depth throughout the HZ. Reducing nitrate levels along depth can be positively correlated to this gradient of mixing in the HZ. This relationship supports that the mixing of surface water and groundwater that occurs along the depth of the HZ dilutes the surface water and removes its excess nitrate. A better understanding of how different water sources contribute to the HZ and how that water flows through this zone will better equip regulators and remediators to use streams and their hyporheic zones to remove excess nitrate from agricultural runoff, contributing to healthier ecosystems and drinking water.

MICROPLASTIC CONCENTRATIONS IN A CENTRAL ILLINOIS URBAN

Presenter	Noseworthy, Caitlin Graduate, Geography, Geology, and the Environment
Mentor	Prof. Catherine O'Reilly
Authors	Caitlin Noseworthy; Catherine O'Reilly; William Perry; RJ Rowley

Microplastics have become an increasingly pervasive problem in many aquatic ecosystems. To date, most microplastic research has focused on marine systems as well as larger lakes and rivers. Studies conducted in the Chicago, Seine, and Danube Rivers found the mean microplastic concentrations to be: 1.94 microplastics per m3 , 30 microplastics per m3 , and 0.32 microplastics per m3 , respectively. We investigated the microplastic concentrations and types in a small urban stream and its tributaries in Bloomington, Illinois. We also considered the relationship between watershed characteristics, such as the size of watersheds, and microplastic concentrations. The area of watersheds in this study ranged from 3.6 km2 to 96.2 km2 . GIS methods were used to determine other characteristics such as the percentage of impervious surfaces in the watersheds. Samples were collected in the fall and winter to see if seasonality affects microplastic content. Grab samples were collected from Sugar Creek and respective tributaries. The samples were processed following a standardized method created by the NOAA. We discovered that microplastic concentrations in a small urban stream can be orders of magnitude greater than those found in larger rivers. Land use and seasonality is expected to influence the types and concentrations of microplastics. Our results indicate that urban landscapes may be major contributors of microplastics in freshwater environments.

TERRA NULLIUS OR TERRA INCOGNITA? DOCUMENTING LAND USE PRACTICES IN SOUTH KENSINGTON, PHILADEPHIA

Presenter	Olson, Alexander Undergraduate, Geography, Geology, and the Environment
Mentor	Prof. Alec Foster
Authors	Alexander Olson; Alec Foster

Greenspaces offer many environmental and social benefits for urban residents. The benefits that urban greenspaces provide improve neighborhood quality of life, and environmental justice concerns arise when they are distributed unevenly across a city's urban fabric. In this study we analyze the distribution of formal and informal greenspaces (IGS) across the Olde and South Kensington neighborhoods of Philadelphia using high resolution aerial imagery. By using widely accessible tools like Google Earth Pro, we hope to provide a method replicable for community groups and others interested in documenting urban environmental conditions in their neighborhoods. IGS offer increased greenspace access, improving neighborhood quality of life. We documented 351 greenspaces, 69% of which are informal. Replicating this study's methods for data acquisition on the distribution of greenspaces within the communities of Philadelphia, offers the opportunity to address environmental injustices within the city.

SENSITIVITY OF THE SUDD WETLAND TO CLIMATE AND HUMAN IMPACTS

Presenter	Persico, Geno Graduate, Geography, and the Environment
Mentor	Prof. Wondwosen Seyoum

Today's existential crisis of climate change not only affects temperature, changing of sea levels, and ice present, but it impacts the hydrologic cycle. The hydrologic cycle is a consistent rotating belt of water to different parts of the system through various processes in and around the globe. Anthropogenic methods such as irrigation for economic and agricultural needs, contamination of water systems, and urbanization put large amounts of stress on the hydrologic cycle; due to increased populations, expanding urbanization, deforestation, and industrialization. Altering the two main climate constituents, precipitation and temperature, will upset the balance of regions around the world that could lead to serious impacts on natural and human systems. Certain regions that need to be monitored may be inaccessibility to scientists and their equipment.

The study area, Sudd Wetlands South Sudan, East Africa, that is focused on in this project is in the Nile River drainage basin, which extends from the northern borders of Tanzania to the mouth of the Nile River in Egypt where it flows into the Mediterranean Sea. The Sudd is the largest wetland system in Africa and one of the largest tropical wetlands in the world. With it being the largest wetland, the diversity of flora and fauna are prevalent to the dynamics of the wetland and region. Due to the geography, inaccessibility, and continuous conflicts unsettling the region, the wetland has not seen many in-situ studies performed. The rapid development of technology and scientific innovations have allowed for scientists to have the ability to observe from afar. Using satellites, climate data has been compiled over the decades to develop trends. Remote sensing and modeling allow for researches to be conducted on regions in the world that are hard to access because of terrain or human conflicts, which will be the focus of this project. Due to seasonal and long-term variability of the climate and increase in human development in the region, the wetland is speculated to reduce in size from the stress put on it.

EFFECTS OF THERMAL VARIABILITY ON FLOW DYNAMICS IN THE HYPORHEIC ZONE

Presenter	Riedel, Jake Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Authors	Jake Riedel; Eric Peterson

Heat is a naturally occurring and cost-effective tracer to study groundwater flow to, from, and throughout the subsurface. Heat has been used extensively to identify gaining and losing portions of streams and for the quantification groundwater discharge. Connecting ground and surface reservoirs is an area known as the hyporheic zone (HZ) where waters from either source interact. The flux of water throughout the HZ is controlled by stream bedforms, sinuosity, surface water velocity, local water table, seasonality, and sediment hydraulic conductivity. The HZ is known to fluctuate in size seasonally where it is slightly smaller in the winter and larger in the summer. Hydraulic conductivity has been defined as being dependent on both the viscosity and density of water, and it is well established that temperature influences both variables. In most studies, these changes have been neglected because of the little effect viscosity and density has on hydraulic conductivity. However, these variations are important to understand because an increase in hydraulic conductivity will result in an increase in groundwater velocity, which has implications relating to residence time and therefore subsurface nutrient processing. To better understand how water temperature effects flow dynamics in the HZ, multiple two-dimensional models will be created using the free USGS software VS2DHI to determine hydraulic conductivity under both hot and cold thermal conditions. Data were collected from a series of varying temperature hydrologic flume trials where the effects of hyporheic flow altering variables like sinuosity, surface water velocity and volume, and bed-forms were able to be reduced to a minimum. Stream substrate was a homogenous, fine-grained sand to reduce complexity and analyze only the changes resulting from thermal conditions. We expect that hydraulic conductivity in the HZ will be greater under warm conditions and lower under cool conditions, which will govern flow dynamics. Understanding these changes could help prepare us for future urban expansion, climate change, and other changes that could modify surface and ground water temperatures.

UTILIZING A TRACER TEST TO CALCULATE THE TRANSPORT AND FATE OF NITRATE WITHIN A SATURATED BUFFER ZONE

Presenter	Sahad, Alhassan Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Co-mentor	Catherine O'Reilly

The Upper Mississippi basin, which includes Illinois, has some of the best fertile soils and experiences intensive agricultural practices. This has led to the excessive export of nitrates (NO_3) from the agricultural fields into surface and subsurface waters. Excess nitrate in water bodies contributes to eutrophication, development of algal blooms, and development of hypoxic zones. To reduce this excess nitrate exportation, methods known as Best Management Practices are employed. One of these methods that exhibits success in lowering the NO_3- is the diversion of tile drained waters from the agricultural fields into a saturated buffer zone (SBZ) before it enters a stream. Previous works have shown a reduction in the NO_3- content in the SBZ but the extent to which this removal occurs cannot be quantified without knowing the residence time of the reintroduced tile waters into the SBZ. This study seeks to use sodium bromide (NaBr) as tracer to determine the residence time of the tile waters in the SBZ at the T3 site in Hudson, Illinois and to quantify the amount of reduction or dilution of the NO_3- in the SBZ using a mixing model. This work will quantify the benefits of redirecting tile waters into SBZ as a method of reducing NO_3- from agricultural tile-drained waters.

TOTAL SUSPENDED SEDIMENT AND PHOSPHORUS TRANSPORT IN RESPONSE TO STORM EVENTS IN AN AGRICULTURALLY DOMINATED WATERSHED

Presenter	Schukow, Elijah Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Authors	Elijah Schukow; Eric Peterson; William Perry; Catherine O'Reilly; Jack Wang

Increased sediment introduction and transport in streams negatively impact water quality. Deleterious effects include reservoir filling, water pollution and ecological impairment. Sediment introduction and transport typically takes place during storm events. Phosphorus introduction, generally from loss of agricultural runoff and soil erosion also typically takes place during storm events. When phosphorus is applied for agricultural uses it is preferentially retained by smaller sediments. During storm events, these phosphorus rich sediments are more likely to enter the stream system. A small number of large storms can account for a large percentage of sediment and total phosphorus (TP) introduction, leading to elevated levels in waterways. Increased phosphorus introduction into waterways is a main driver of algal blooms and hypoxic conditions such as the dead zone that forms in Lake Erie.

The goal of this study is to determine if turbidity (NTU), total suspended sediments (TSS) and TP exhibit similar transport behaviors in an agricultural watershed. Three years of data are available at the Six Mile Creek watershed located in McLean County Illinois. Analysis of TSS, NTU, and TP data show that both TSS and NTU display a correlation ranging from moderately to strongly positive with TP and an R-value ranging from 0.569 to 0.832. When broken down by phase TSS and particulate phosphorus (PP) and NTU and PP display a moderately positive correlation with an R-value of .606 and .718, respectively. However, TSS and dissolved reactive phosphorus (DRP) and NTU and DRP display a correlation ranging from weakly positive to moderately positive with an R value of .472 and .781, respectively. Ongoing hysteresis analysis is being conducted to elucidate the similarities in transport mechanisms between TSS, NTU and TP. Evaluation of hysteresis patterns allows for further breakdown on an annual, seasonal, or event-based scale. Farmers and agricultural managers may be able to better develop sustainable land management practices if there is a consideration of the correlations between NTU, TSS and TP. This could ultimately mitigate the excessive amount of TSS, and TP introduced into surface waters.

MULTI-YEAR ANALYSIS OF GROUNDWATER TEMPERATURE FLUCTUATIONS

Presenter	Wassik, Jack Graduate, Geography, Geology, and the Environment
Mentor	Prof. Eric Peterson
Authors	Eric Peterson; Catherine O'Reilly; Dagmar Budikova

Groundwater temperature (GWT) plays a significant role in biological, geochemical, and physical processes, influencing water quality. While GWT is known to be controlled through surface/subsurface water and energy fluctuations, the rate and extent of which this occurs remains poorly understood due to variation from depth, lithology, climate, and seasonality. Air temperature (AT) is noted as the primary control for shallow GWT (>10 m); however, precipitation and tile drainage have been inferred to exhibit influence. The goal of this study is to understand how GWT might differ horizontally and vertically across a tile drained field. GWT was measured from nine wells at the T3 study site, north of Normal, Illinois, on a bi-weekly basis from June 2015 to August 2019. GWT (°C) and water elevation (m) was measured at depths 1.5, 2.3, 3.0-, and 4.6-meters depth from wells 2-12 and at 2.3-meters depth at wells 13,14, and 15. AT was measured on 15-minute intervals between June 2016 to March 2019, while precipitation measurements (cm) were obtained from Bloomington Airport using WeatherUnderground.com. Initial results display that horizontally, there is little difference between wells 2-15 further supported by ANOVA analysis, showing no variation. However, vertically, between the four depths, there is a noticeable muted response of GWT as depth increases, also supported by ANOVA analysis showing variation between 1.5 and 2.3-meters and 3.0 and 4.6-meters depth.

Health Sciences

QUALITATIVE STUDY EXPLORING IMPACTS OF FOOD INSECURITY AMONG COLLEGE STUDENTS

Presenter	Lemp, Haley Undergraduate, Health Sciences
Mentor	Prof. Jacqueline Lanier
Co-mentor	Prof. Alicia Wodika

Food insecurity, or the inability to consistently obtain the amount of food or quality of food necessary for one to live a healthy lifestyle, remains a relevant and often unnoticed issue that college students face. The purpose of this study is to understand how the different dimensions of college students' health are affected by food insecurity and to learn about what support or resources these students utilize and desire to help cope with their food situations. This study contains two components, including semi-structured interviews with the participants and a photovoice component. Through photovoice, participants take and submit photos that they feel represent how food insecurity impacts their health and their lives as college students. Analysis of the results focuses on detecting recurring themes of health effects derived from food insecurity as well as reported benefits and desires regarding resources intended for people, especially college students, facing food insecurity. Emerging themes consist of a lack of energy, missing out on wanted socialization, feeling the need to make unhealthy nutritional or health-related choices, and other health impacts. Patterns of a desire for a larger variety of food options and more advertising of resources available for food-insecure college students were also prominent.

TEST THE FILTRATION EFFICIENCY OF N95 RESPIRATORS RECOVERED USING AN ELECTROSTATIC CHARGING DEVICE

Group Leader	Ornelas, Gabriela Undergraduate, Health Sciences
Group Members	Rowan Carroll, Undergraduate, Health Sciences
Mentor	Prof. LC Yang

The purpose of this research is to test the filtering efficiency of N95 respirators when recharged using an electrostatic charging device invented by the F.N. Smith corporation. If charging is found to be successful, potential opportunity lies within increasing protection, efficiency, and reuse of N95 respirators.

All 20 unused respirators were fitted to a mask holder made of PVC pipe with two tubes, one for the vacuum pump set at 10 LPM and the other to measure the background particle concentration, using a particle counter. Each mask was tested once for filtration before being charged, with frequent background concentration checked every 30 minutes to ensure accurate readings. Recharging of the new respirators was done for five minutes then the filtration was tested again. The N95 respirators were decontaminated by two methods, cooking and UV irradiation, then recharged for an additional five minutes post cleaning. Test filtration was done again using the same experimental procedure noted at the start. The largest obstacle faced was creating an environment to mimic ideal conditions for proper N95 respirator use and filtration. This issue was resolved by using outdoor air from above a street, which when tested had substantially more particles than the air inside the lab.

The results showed us information regarding the efficiency of new respirators and post- decontaminated respirators. Data analysis showed that the efficiency of the new mask without recharge was 93.1% for 0.3 micrometer particles. After the five-minute recharging, the efficiency was increased to 97%. the filtration efficiency didn't decrease after going through the reuse- decontamination-recharging cycle twice, but slightly decreased after the third time.

History

"TWENTY YEARS OF MISSPENT LIFE": FREE LOVE IN BERLIN HEIGHTS

Presenter	Breit, Jake
	Undergraduate, History
Mentor	Prof. Amy Wood

This project will explore free love in the United States in the 19th century, specifically in the form of a case study surrounding the short-lived 1850s utopian settlement in Berlin Heights, Ohio. The Free Love movement was part of a wider utopian spring in the United States in the 19th century, in which radical religious and socialist communities drew national attention and ire with their experimental ideas for society. Free Lovers, a part of this larger group, dismissed marriage as a form of sexual slavery, and saw humanly love as inherently non-monogamous. These beliefs could not have contradicted the standard conception of the Victorian Age more – one that many regard as the most prudish and restrained in American history. Indeed, Berlin Heights experienced multiple controversies and was a subject of national attention, despite its small size and shorter life span. My project will address the following questions: Was free love so removed from the Victorian age, or was it more a part of the wider culture than we might presume? How was free love viewed by both broader American society and the rest of the utopian movement? How did Berlin Heights seek to address the issues of sex, gender, and marriage, and in what ways did it succeed or fail? My project will provide a more complete insight into the utopian movement as a whole, a closer look at this seldom studied settlement, and deepen our understanding of the America that created it.

To assess the passionate discourse surrounding Berlin Heights, from both its adherents and opponents, I study utopian publications, such as The Oneida Circular and The Liberator, and mainstream papers, such as New York Times and The Cleveland Daily Herald. Most importantly, I will use publications specific to the settlement, such as The Social Revolutionist.

Information Technology

A NEW VISUALIZATION PLATFORM FOR ANALYZING COVID-19 DATA AND EXTRACTING CRITICAL INFORMATION

Presenter	Brokaw, Jim Graduate, Information Technology
Mentor	Prof. Qi Zhang
Authors	James Brokaw; Qi Zhang

Visualization is an integral part in the investigation of information hidden in the collected healthcare data. Innovative data visualization can provide users with intuitive feedback for decision making. For purpose of analyzing the COVID-19 data collected from the Centers for Disease Control and Prevention (CDC), effectively designing and visualizing these data are especially critical for interpreting the pandemic transformation patten. In this project, the initial raw data was collected and input to a data processing program developed by R, a statistical programming language, which was used to generate datasets that can be further visualized and analyzed. Next, we developed several web-based new algorithms to dynamically visualize and analyze the output data from R program using D3, a JavaScript library that allows for data visualization. Our algorithms can create unique interactive features that can be employed to generate innovative data display in a webpage. With the dynamic and interactive capabilities, our visualization software platform can be used to study how the COVID-19 spreads among different age groups and genders, which will yield fruitful insight of the data for medical professionals and healthcare industry to take suitable preventive measures.

USING MACHINE LEARNING TO MEASURE SENTIMENT DURING THE COVID-19 PANDEMIC

Presenter	Luu, Truong (Jack) Graduate, Information Technology
Mentor	Prof. Rosangela Follmann
Co-mentor	Prof. James Wolf

Keywords: COVID-19, sentiment analysis, machine learning, NLP

Social media has created an unprecedented way for individuals to share their concerns, fears, optimism, and happiness, for example, in ways that were not even conceivable some 20 years ago. Extensive data from these social media platforms, such as Twitter, makes it an invaluable resource for opinion mining and sentiment analysis. Starting in December 2019, the corona virus pandemic has had devastating consequences all over the planet, sparing no country. Health, social, and economic tolls associated with the pandemic has generated intense emotions and spread fear in people of all ages, genders, and races. During these difficult times, many have shared their feelings and opinions on many aspects of their lives via Twitter. In this project we use machine learning to measure subjectivity polarity in COVID-19 related tweets, labelling it as positive, negative, and neutral, depending upon the vocabulary encountered in the tweets. Our work focused on a detailed study of the distribution of opinions among the primary U.S. states. We also tested the relationship between the sentiment scores and the cases of COVID-19 in the United States, establishing a link between the sentiment scores, the reported cases and the death toll. The findings may assist with implementing legislation related to COVID-19, act as a reference for scientific work, inform and educate the public on critical pandemic-related issues.

EXPLORING INFORMATION TECHNOLOGY STUDENT RETENTION

Group Leader	Nowlin, Preston Undergraduate, Information Technology
Group Members	RJ Benefiel, Undergraduate, Information Technology; Evan Hazzard, Undergraduate, Information Technology
Mentor	Prof. Pruthikrai Mahatanankoon
Co-mentor	Prof. Qi Zhang

The purpose of our research project is to explore and analyze an anonymized data set of 2,300 School of Information Technology students who attended ISU between 1996 and 2016 and present a visualization of student retention predictors. Visualizing various factors influencing student retention required knowledge of both computer programming and data analysis. We used Microsoft Power BI for data visualization and applied Python programming language to explore potential predictors leading to Information Technology (IT) student retention.

Moreover, Power BI was used to create a dashboard which helped us visualize demographic attributes. We later conducted predictive analytics (i.e., multiple linear regression and logistic regression) using Python. We found that logistic regression is most suitable for our student retention data. Exploring these factors through various data science techniques helped us better understand the relationships between student retention and other factors. Insights for our data analyses and retention strategies are provided.

VEHICLE-COLLISION WARNING SYSTEM AND DEEP LEARNING APPROACH

Presenter	Shi, Tianyuan Undergraduate, Information Technology
Mentor	Prof. Haiyan Xie

Worker behaviors are complicated and under the influences of various factors when worker-vehicle collisions happen on construction job sites. The proposed research targets the safety challenges of construction management when industrial trucks are operating around workers. To solve the research question of how to identify the most influential safety hazards and patterns of the worker-vehicle coordination, this research first reviews and compares multiple data-mining algorithms for pattern analysis to select the Latent Dirichlet Allocation (LDA) approach and design the corresponding analysis system. Then it investigates the patterns of collision accident from the Occupational Safety and Health Administration (OSHA) database with the expectation to understand safety hazards and violations in worker-vehicle collisions based on the unstructured OSHA data. The intellectual meanings that occur in the collection of documents through the proposed LDA and statistical analysis of this research can support their future implementations of automated construction. This research also models the topics through text classification and suggests that the uneven ground and objects that are under-construction are the primary obstacles when workers and trucks move on the sites and should be managed for safety improvement.

Kinesiology and Recreation

SLEEP QUALITY AND PREVALENCE OF ANXIETY AND DEPRESSION IN YOUNG ADULTS WITH CONCUSSION HISTORY

Presenter	Barrack, Jessica Graduate, Kinesiology & Recreation
Mentor	Prof. Nikki Hoffman
Co-mentor	Prof. Noelle Selkow
Authors	Jessica Barrack; Noelle Selkow; Nikki Hoffman

Background: Concussions are a growing public health concern, and emerging possible long-term health risks may negatively impact an individual's quality of life. With concussions, there can be a diverse multitude of signs and symptoms, but frequent long-term sequelae of concussions including mood disturbances (e.g. anxiety and depression) and sleep disturbances (e.g. difficulties initiating and maintaining sleep) are given less attention. Few clinicians include mood and sleep disturbances in their concussion assessment and management plan, therefore potentially placing individuals at risk for prolonged disturbances beyond recovery. **Purpose**: To examine the significance of relationships between sleep quality and the prevalence of mood disturbances in healthy young adults with and without a history of concussions. **Methods**: Two hundred fifty healthy young adults from 4 universities across the country completed a one-time, 15-20-minute anonymous survey administered via Qualtrics. Survey components consisted of demographic information, concussion history, two mental health questionnaires (State-Trait Anxiety Inventory and Beck Depression Inventory) and two sleep quality questionnaires (Pittsburgh Sleep Quality Index and Insomnia Severity Index). Exclusion criteria consisted of having suffered a concussion or traumatic brain injury within the past 9 months, history of cancerous brain tumors, and diagnosed with post-traumatic stress disorder, schizophrenia, or bipolar disorder. Structural equation modeling (SEM) was used as the primary statistical analysis. **Results**: Data collection is still in progress. Using SEM, we hypothesize that history of concussion may directly impact anxiety and depression, but sleep quality mediates this relationship. **Conclusion**: This study will provide foundational insight into the relationship of sleep quality, anxiety, and depression in healthy young adults with concussion history.

Understanding the relationship between these areas may help guide clinicians to better recognize and manage these prolonged sleep and mood disturbances that may continue well past recovery.

THE IMPACT OF SOCIAL MEDIA ON THE MENTAL HEALTH OF STUDENT-ATHLETES

Presenter	Brougham, Jessica Graduate, Kinesiology & Recreation
Mentor	Prof. Rebecca Achen

The purpose of this study was to identify the impact of social media on the mental health of student-athletes. Over 140 institutions across the 3 NCAA Divisions were invited to participate. In total, 9 schools sent the survey out to their student-athletes (5 Division I, 2 Division II and 2 Division III). The survey measured social media use including frequency, sites used, and a general social media use scale and various aspects of mental health including anxiety/depression, perceived stress, resilience, vitality, and self-esteem. It was completed by 94 student-athletes in its entirety. Additionally, the survey included a qualitative question that asked the respondents what impact they thought social media had on them. The results of this qualitative portion were split into 6 themes. The positive themes identified were increased communication, stress relief, and motivation. The negative themes identified included vulnerability, procrastination, and loss of sleep. Quantitative data from a multiple regression analysis indicated there were higher levels of depression/anxiety in the Division II and graduate student populations. Additionally, a negative relationship was identified between female student-athletes, self-esteem, and Facebook use. Negative relationships were identified between male student-athletes Instagram use and depression/anxiety, as well as athletic identity and YouTube. The findings of this exploratory research identify that social media does have some impacts

student-athlete mental health. Because of this finding, athletic departments should make an effort to educate themselves and student-athletes on the potential negative outcomes of using social media for stress relief. Future research should explore differences between social media use, and problematic social media use. At what point are student-athletes beginning to put themselves at-risk. Additional research should be completed on looking at student-athlete's motivations for social media use and how these impact their well-being and success.

BARRIERS TO PHYSICAL ACTIVITY IN UNIVERSITY STUDENTS REFERRED TO AN EIMOC PROGRAM

Presenter	DiSerio, Alexander Graduate, Kinesiology & Recreation
Mentor	Prof. Kristen Lagally
Authors	Alexander DiSerio; Kristen Lagally; Anthony Amorose; Anna Rinaldi-Miles

PURPOSE: The purpose was to describe barriers to being physically active based on reason for referral, gender identity, and incoming stage of change (SOC) for physical activity (PA) in university students referred to an Exercise is Medicine on Campus (EIMOC) program.

METHODS: Students referred by university health and counseling services completed a 20-item questionnaire, which included the "Barriers to Being Active" quiz, an assessment of SOC (e.g., precontemplation), and students' self-reported gender. Reason for referral, which was provided by a health practitioner, categorized as Obesity, Anxiety/Depression, General PA or Other.

RESULTS: Barrier mean scores by group are included below. A score over 5 is considered an important barrier. Overall, a Lack of Willpower was the most highly rated barrier followed by Lack of Energy. A series of MANOVAs revealed non-significant differences in the set of barriers across the three grouping variables. However, follow-up ANOVAs showed that those classified as being at the pre-preparation stage (identified as contemplation or precontemplation) were higher on Lack of Willpower relative to those at action or maintenance, and higher than action on Lack of Skill. Results also showed the that women reported a higher Lack of Skill compared to men.

Group	Lack of Time	Social Influence	Lack of Energy	Lack of Willpower	Fear of Injury	Lack of Skill	Lack of Resources
All (*n*=114)	4.3	4.9	5.6	7.2	1.2	3.0	2.0
Female (*n*=87)	4.4	4.7	5.8	7.0	1.1	2.7	1.9
Male (*n*=27)	4.0	5.4	5.0	7.9	1.8	3.9	2.5
Obesity (*n*=20)	4.3	5.1	5.0	6.5	1.0	2.6	1.8
Anxiety/Depression (*n*=26)	4.4	5.1	6.1	7.4	1.3	2.2	2.2
General PA (*n*=17)	4.6	4.7	6.2	7.1	1.1	1.7	1.7
Other Reason for referral (*n*=51)	4.2	4.7	5.4	7.5	1.4	2.1	2.1
Pre-preparation (*n*=23)	4.4	5.5	5.9	8.0	1.3	4.3	2.3
Preparation (*n*=62)	4.4	4.9	5.7	7.5	1.3	2.8	1.9
Action (*n*=12)	4.9	4.1	5.7	6.3	0.8	1.4	1.4
Maintenance (*n*=14)	3.9	4.2	5.2	6.1	1.4	3.0	2.6

CONCLUSION: Identifying client barriers is essential for promoting participation and adherence to physical activity for EIMOC. Lack of Energy and Lack of Willpower seem to be common, important barriers regardless of gender identity, reason for referral, or SOC.

BODY COMPOSITION CHANGES IN POLICE OFFICERS FOLLOWING NUTRITION AND FITNESS PROGRAMS

Group Leader	Hobson, Brandon Graduate, Kinesiology & Recreation
Group Members	Brooke Bossert, Undergraduate, Kinesiology & Recreation
Mentor	Prof. Kristen Lagally
Authors	Brandon Hobson; Brooke Bossert

Purpose: The purpose of this study was to examine changes in body composition following a weight loss and fitness program in a group of university police officers. Methods: Subjects consisted of 9 Illinois State University police officers who planned to participate in a fitness improvement and weight loss program during the spring semester of 2021. The subjects (8 men, 1 woman) were 43.6 ±12.2 years of age, with an average height of 70.6 ±3.8 inches, and an average weight of 216.3 ±30.7 lbs. Body composition was assessed prior to initiation of the program using an InBody bioelectrical impedance analyzer. Subjects were asked to follow a series of test preparation guidelines prior to participating in the InBody test. These guidelines prior to testing included: maintaining normal fluid intake the day before; removing any socks or pantyhose before the test; removing all heavy objects such a jewelry, watches, belts, wallets, and jackets; not eating or exercising for at least 3 hours; not consuming alcohol or excessive caffeine for at least 24 hours; and not using lotion on the hands or feet. Subjects are participating in a self-led fitness and weight loss regimen that differs from subject to subject. Results: Body composition will be assessed twice more over the course of the program, but initial body composition results indicated that the mean fat mass was 61.7 ±23.3 lbs, the mean fat free mass was 87.8 ± 16.7 lbs, and the mean body fat was 28.3 ± 9.6 %. It is hypothesized that fat mass and percent fat will decrease, and fat-free mass will increase as a result of the training program.

MOVEMENT ADAPTATIONS FOLLOWING UNEXPECTED ANKLE PERTURBATIONS DURING WALKING

Presenter	Krause, Jenny Graduate, Kinesiology & Recreation
Mentor	Prof. Adam Jagondinsky

Introduction: Numerous studies have been conducted to assess the biomechanical and neuromotor response to sudden ankle perturbation. The goal of such studies is often to explore the mechanisms that may contribute to ankle sprain prevention. However, when perturbations are invoked during walking, subsequent trials may be impacted by gait adaptations in response to the initial perturbation. Common gait strategy after experiencing a perturbation is a decrease in step length and an increase in step width. **Purpose:** Compare two drop conditions to determine if they elicit similar spatial-temporal adaptations, and if after repeated exposure adaptations return close to baseline. **Methods:** 12 healthy volunteers walked along a two-trapdoor walkway (6.10m in length & 0.25m tall) that elicited random, sudden inversion and inversion/plantarflexion drops. Participants performed trials of walking gait during normal walking (NW), inversion (ID), and inversion/plantarflexion (IPD) conditions. During all trials, subjects wore basketball vision blocking goggles to prevent them from seeing the walkway in front of them and were told to walk to a beat of 90bpm from a metronome. The means based on right and left heel strike and toe off were collected through motion capturing technology to determine spatial-temporal variables of step length, step width, and their respective standard deviations. Repeated ANOVAs were employed to assess differences across all three conditions during first and last wash trials in-regards-to step length, step width, and their respective standard deviations. **Results**: No significant differences were observed in spatial-temporal variables across conditions or time: Step Length ($F(2,9) = .290$, $p = .751$); Step Width ($F(2,9) = .140$, $p = .870$); Step Length Standard Deviation ($F(2,9) = .708$, $p = .504$); and Step Width Standard Deviation ($F(2,9) = .926$, $p = .411$). **Conclusion:** Due to the lack of significant differences found across all conditions, we can conclude both the inversion and inversion/plantarflexion drop elicited similar responses to gait strategy. Specifically, by examining the first and last wash trial per condition, it does not appear the perturbation influenced the gait characteristics during the subsequent trial or after several normalization trials. This confirms our experimental design of including six wash trials between each condition did not impact gait strategy. Alternatively, other spatial-temporal parameters (double-leg support time, swing phase, etc) that were not explored in the current study may have been impacted by the perturbations.

LOWER EXTREMITY MUSCLE FORCES DURING LOADED VERTICAL JUMPS AND THE POTENTIAL TRAINING IMPLICATIONS

Presenter	Salvadore, Abigail Graduate, Kinesiology & Recreation
Mentor	Prof. Michael Torry
Co-mentor	Prof. Adam Jagodinsky
Authors	Abigail Salvadore; Michael Torry; Adam Jagodinsky

Hexagonal barbell (HB) loaded jumps are often used in training to increase lower extremity power. The effect of external load on lower extremity kinematics and kinetics during jumping has been described, but how individual muscles accommodate to these loads has not. Given the importance of coordinated muscular effort in achieving maximal power output, an understanding of how the lower extremity musculature individually performs during loaded jumps would be advantageous.

The purpose of this study is to describe the effect of load on individual muscle forces during the concentric phase of loaded HB jumps.

10 male collegiate athletes (20.4 ± 2.4 y; 108.8 ± 14.0 kg) performed 5 maximal HB jumps at 0%, 20%, 40% and 60% of their HB deadlift 1-repetition maximum (216.6 ± 10.9 kg). Filtered Ground reaction forces (300 Hz) and 3D lower extremity marker trajectories (13 Hz) were input into a 23 DOF musculoskeletal model and muscle forces were estimated with static optimization. Peak muscle force (xBW) was calculated for the gluteus maximum (GMAX), biceps femoris – long head (BFL), rectus femoris (RF), vastus intermedius (VAST, gastrocnemius (GAS), and soleus (SOL). Analysis of variance and LSD post hoc comparisons were used for analysis ($p < 0.05$).

A significant increase in peak muscle force across loads existed for VAST (0%: 7.89 ± 0.24 xBW; 20%: 8.22 ± 0.28 xBW; 40%: 8.47 + 0.30 xBW; 60%: 8.64 ± 0.33 xBW), with significant differences between 0% and 40%, 0% and 60%, and 20% and 60% (all $p \leq 0.015$). Significant decreases were noted for RF (0%: 2.50 ± 0.13 xBW; 20%: 2.32 ± 0.17 xBW; 40%: 2.18 ± 0.11 xBW; 60%: 1.98 ± 0.20 xBW), with significant differences between 0% and all other conditions, and between 20% and 60% (all $p \leq 0.037$). Significant increases were found in GAS across loads (0%: 2.14 ± 0.10 xBW; 20%: 2.47 ± 0.14 xBW; 40%: 2.72 ± 0.12 xBW; 60%: 2.85 ± 0.14 xBW), with significance between each load (all $p \leq 0.038$). There was no significant difference in GMAX ($p = 0.325$), BFL ($p = 0.369$), or SOL ($p = 0.122$) across loads.

Increases in demand were not met with equally distributed increases in peak force output across the lower extremity musculature. The varied effect of load on force output from individual muscles is important information to understand when using loaded jumps as part of training for athletic performance.

Mathematics

THE EFFECT OF RESEARCH EXPERIENCES ON TEACHERS' BELIFES AND INSTRUCTION

Presenter	Azimi Asmaroud, Seyedehkhadijeh Graduate, Mathematics
Mentor	Prof. David Barker

Discovery learning is a common teaching method used in schools today (Kistian et al., 2017), and research has found many benefits to using this method in teaching mathematics (Herdiana et al., 2017). The question then becomes, how do we prepare teachers to use discovery learning? One potential avenue is to provide them opportunities to experience mathematical discovery themselves. The Conference Board of Mathematical Sciences stated that "teachers need opportunities for the full range of mathematical experience themselves: struggling with hard problems, discovering their own solutions, reasoning mathematically, modeling with mathematics, and developing mathematical habits of mind" (p. 54). Research has shown professional development influences teachers' beliefs (Polly et al., 2013), which in turn influences their instruction in the mathematics classroom (Hart, 2002). In fact, "significant transformations of teaching practice are unlikely to occur if related beliefs and theories about teaching and learning do not change" (Hawley & Valli, 2000, p. 4). This study analyzed the influence of a research experience for teachers on their beliefs and instruction. A qualitative approach was used to analyze the responses of 11 participants. This analysis revealed changes in the teachers' beliefs about teaching and doing mathematics but did not provide sufficient data to connect particular beliefs and subsequent changes in practice. The findings showed that this program changed teachers' beliefs about students' ability to do high-level mathematical tasks and their students' expectations. Also, participants stated that they used more explorations and discovery learning in their classroom after participation in this program.

SQUIGONOMETRY

Group Leader	Hatfield, Andrew Undergraduate, Mathematics
Group Members	Riley Klette, Undergraduate, Mathematics; Christopher Moore, Undergraduate, Mathematics; Beth Warden, Undergraduate, Mathematics
Mentor	Prof. Sunil Chebolu
Authors	Sunil Chebolu; Andrew Hatfield; Riley Klette; Christopher Moore; Beth Warden

Trigonometry is the study of circular functions - functions defined on the unit circle where distances are measured with respect to the Euclidean norm. In our research, we develop a parallel theory of trigonometric and inverse trigonometric functions for the p-norm. This is called squigonometry because the resulting functions are defined on a squircle. This approach leads to new transcendental periods, formulas, and identities. It also extends to exponential, hyperbolic, and logarithmic functions in the p-norm.

EXAMINING MIDDLE SCHOOL STUDENTS' METHODS OF JUSTIFICATION

Presenter	Reyes-Hernandez, Leslie Undergraduate, Mathematics
Mentor	Prof. Edward Mooney

Researching students' thinking is imperative to improving the education system throughout the world. From extensive research, it is noted that students are unaccustomed and struggle with providing valid mathematical justifications (e.g. Inglis & Alcock 2012). The National Council of Teachers of Mathematics (NCTM, 2000) and Common Core State Standards of Mathematics (CCSSM, 2010) suggest that students should have several opportunities to construct mathematical arguments across all grade levels. To take a closer look at this educational phenomenon, we prompt fifth to eighth-grade students with nine mathematical tasks. Within our research, we focus on tasks based on number properties, algebraic thinking, and geometric thinking. Furthermore, our research examines students' methods of justifications as well as the mathematical quality of the justifications. Overall, the research demonstrates that most students' justifications are not mathematically complete.

This research is of high value to educators, parents, school administrators, and students throughout the world as it provides a more beneficial method of student learning. Educational research is highly important as the future of the world lies within our classrooms today.

Philosophy

A GARDEN IN THE JUNGLE

Presenter	Harlovic, Tom
	Undergraduate, Philosophy
Mentor	Prof. Eric Godoy

Climate change, urbanization, and food insecurity are three interconnected phenomena shaping the world. Such multi-faceted issues require a similarly comprehensive solution. Urban gardening is an emerging practice that fosters both environmental sustainability and social equity. To understand why it is an effective solution, urban gardening must be connected to the issues at hand. First, while the city has long been posited as separate from nature, it can be alternately described as an inherently natural place and must be demonstrated as such for the purposes of this paper. From here, by analyzing historical examples, poverty in the inner-city can be connected to nature-based oppression, particularly in regard to food insecurity. Finally, urban gardening is proposed as a dynamic action that addresses these issues simultaneously, doing so in the following ways: It accentuates the natural qualities of cities; It acknowledges the presence of oppressive structures that are tied to the environment; and it empowers disenfranchised peoples to rise above these structures by reuniting them with the natural world.

Physics

MULTIDIMENSIONAL DIFFUSION IN CRYSTALLINE SOLIDS

Presenter	Alperstein, Hannah Undergraduate, Physics
Mentor	Prof. Matt Caplan

This study explored diffusion rates along a crystal lattice for multiple dimensions. We focused our attention on particle movement through a crystal lattice to determine how the diffusion rate for a crystalline solid depends on the number of spatial dimensions and the probability between diagonal and axis lattice site movement. We used a Monte Carlo approach to simulate the random walk of a particle confined to move between sites along a crystal lattice. The simulation predicted how the diffusion trajectory differed depending on dimensionality and movement probability. From the results obtained, we concluded that the largest diffusive growth for a particle occurred when the particle was confined to one dimension or to movement along the axis of the crystal lattice. During these conditions, the particle traveled the farthest final distance during the random walk.

GENETIC EVOLUTION AS A MEANS TO FIND PHYSICS FORMULAS

Presenter	Bellinger, Jack Undergraduate, Physics
Mentors	Prof. Q. Charles Su
Co-mentor	Prof. Rainer Grobe
Authors	Jack Bellinger; Q. Charles Su; Rainer Grobe

We examine machine learning techniques such as genetic evolution-based symbolic regression to construct exact and approximate differential equations and iterative maps for several dynamical systems. This method can recover the logistic map as well as the governing equations of motion for the Lorenz system from noisy chaotic time series. We also examine the continuous time limit of the logistic map. When symbolic regression is applied to numerical trajectories of nonlinear oscillators, it predicts a new iterative map for the orbits. It can also predict approximate differential equations of motion for the time dependence of the average position of an ensemble of nonlinear oscillators. Depending on the initial phase space density of the ensemble, the nonlinearity-induced dephasing mechanism can lead here to exponential, Gaussian or even non-monotonic decays of the average position.

This work has been supported by the NSF and Research Corporation.

DIRAC VACUUM CAN RESOLVE RAPIDLY CHIRPED EXTERNAL FIELDS

Presenter	Bryan, Jordan Undergraduate, Physics
Mentor	Prof. Q. Charles Su
Co-mentor	Prof. Rainer Grobe
Authors	Jordan Bryan; Chi Gong; Q. Charles Su; Rainer Grobe

We study the dynamical response of the Dirac vacuum state to a very strong time-dependent electric field pulse, whose frequency is chirped in time [1-3]. The resulting field-induced electron-positron pair creation process can be used to examine various proposals for time-dependent frequency spectra of the external field. It turns out that the Dirac vacuum can be used as sensitive probe that can respond to the instantaneous values of the frequency at each moment of time by producing electrons with the appropriate energy. This almost instantaneous response feature of the vacuum state permits us to introduce a new generalized rate-equation. It is based on the concept of a time-dependent decay rate and can provide semi-analytical solutions to predict the number of created electron-positron pairs during the interaction with arbitrary chirped electric field pulses.

This work has been supported by the NSF, Research Corporation, and the China Scholarship Council program.

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SYMBIOTIC VS. NON-SYMBIOTIC OPTIMIZATION FOR SPATIAL AND TEMPORAL DEGREES OF FREEDOM IN PAIR CREATION

Presenter	Bryan, Jordan Undergraduate, Physics
Mentors	Prof. Q. Charles Su; Prof. Rainer Grobe
Authors	Jordan Bryan; Q. Charles Su; Rainer Grobe

The field-induced decay of the quantum vacuum state associated with the creation of electron-positron pairs can be caused independently by either multi-photon transitions or by tunneling processes. The first mechanism is usually induced by appropriate temporal variations of the external field while the second (Schwinger-like) process occurs if a static but spatially dependent electric field is of supercritical strength. The ultimate goal is to construct an optimal space-time profile of an electromagnetic field that can maximize the creation of particle pairs. The simultaneous optimization of parameters that characterize the spatial and temporal features of both fields suggests that the optimal two-field configuration can be remarkably similar to that predicted from two independent optimizations for the spatial and temporal fields separately [1]. This work has been supported by the NSF and Research Corporation.

EXCITATION OF DARK MODE IN HIGH-INDEX SILICON OLIGOMER NANOSTRUCTURES USING CYLINDRICAL VECTOR BEAMS

Presenter	Coe, Brighton Undergraduate, Physics
Mentors	Prof. Mahua Biswas
Co-mentor	Prof. Uttam Manna
Authors	Brighton Coe; Mahua Biswas; Uttam Manna

Resonant optical excitation of high index dielectric nanoparticles offers unique opportunities for reduced dissipative (non-radiative) losses and large resonant enhancement of both the electric and magnetic near fields. However, they still suffer from radiative losses. One could possibly inhibit the radiative losses in dielectric nanostructures by excitation of dark modes. Here, we use Cylindrical Vector Beams with spatially variant polarization properties to excite dark modes in symmetric dielectric oligomers by breaking the symmetry of the nanostructures.

RESONANCE COUPLING BETWEEN OPTICAL ANAPOLES AND QUANTUM EMITTERS IN SILICON NANOSPHERE J-AGGREGATE HETEROSTRUCTURES

Presenter	Coe, Brighton Undergraduate, Physics
Mentors	Prof. Mahua Biswas
Co-mentor	Prof. Uttam Manna
Authors	Brighton Coe; Mahua Biswas; Uttam Manna

Resonant optical excitation of high index dielectric nanoparticles offers unique opportunities for reduced dissipative (non-radiative) losses and large resonant enhancement of both the electric and magnetic near fields. Previously we reported on the excitation of non-radiating anapole modes at optical frequencies in silicon nanospheres using beams with spatially variant polarization (Cylindrical Vector Beams). Here, we present Finite Difference Time Domain (FDTD) simulation results showing

coupling of optical anapoles with quantum emitters in Silicon nanosphere-J-aggregate heterostructures. The results showed that that instead of a quenching dip, a scattering peak is generated around the exciton transition frequency. The peak intensity increases with the increasing of the oscillator strength, and at the same time, the anapole mode of the Si disk splits into a pair of pronounced scattering dips. Our results can help to further our understanding of light-matter interactions at the strong coupling regime leading to future nanophotonic applications such as the information processing and sensing.

SIMULATED MULTIFRAGMENTATION OF ^{48}CA WITH ^{48}CA COLLISIONS

Presenter	Coe, Brighton Undergraduate, Physics
Mentors	Prof. Matt Caplan
Authors	Brighton Coe; Matthew Caplan

Nuclear collision simulations are a valuable tool for studying the distribution of fragmentation products but require significant processor time to simulate. Using a simple two-body interaction model that treats each nucleon as a point particle significantly reduces this time while maintaining a high level of accuracy. With this model, we report on collisions of ^{48}Ca with ^{48}Ca and present their resulting fragmentation distributions.

TIDES IN COLLIDING GALAXIES

Presenter	Diaz, Harold Undergraduate, Physics
Mentor	Prof. Matt Caplan

Galactic Mergers are some of the most dynamic events in the universe. Tidal forces begin to strip stars and gas out of a galaxy to form elegant tidal features. The main catalyst in effect here is simply gravitational forces.model galaxies as concentric rings of point particles interacting gravitationally with a central mass. We will consider the galactic center to be the center of mass in our model which will contain N number of bodies that orbit around the center of mass. Using these initial conditions, we evolve the system according to Newton's equations of motion with a velocity verlet algorithm. We then simulate a collision with a second massive body that also contains N-bodies that orbit it's center of mass and observe the warping effects of the N-bodies of both galaxies. A plot will show visual representation of Tides in Colliding Galaxies we see in observational studies.

THERMOELASTICITY OF NUCLEAR PASTA

Presenter	Forsman, Cal Undergraduate, Physics
Mentor	Prof. Matt Caplan

When a massive star's core turns to iron near the end of its life, a core-collapse supernova will occur, and a neutron star will take form in its place. A neutron star is that same star, but much more compact and thus much denser. At these high densities protons and neutrons rearrange into structures known as 'nuclear pasta' which are theorized to generate gravitational waves on neutron stars and is one of the strongest known materials in the universe. Using molecular dynamics simulations we obtain data to render 3D animated models to visualize stresses throughout the system as a small volume of pasta is deformed to large strains. Simulations of planar 'lasagna' with several topologies, proton fractions, and temperatures allow us to study the thermoelastic properties of pasta.

PRECISE DIFFUSION COEFFICIENTS FOR WHITE DWARF ASTROPHYSICS

Presenter	Freeman, Ian Undergraduate, Physics
Mentor	Prof. Matt Caplan

Observations of galactic white dwarfs with Gaia have allowed for unprecedented modeling of white dwarf cooling, resolving core crystallization and sedimentary heating from neutron rich nuclei. These cooling sequences are sensitive to the diffusion coefficients of nuclei in Coulomb plasmas which have order 10% uncertainty and are often not valid across coupling regimes. Using large scale molecular dynamics simulations, we calculate diffusion coefficients at high resolution in the regime relevant for white dwarf modeling. We present a physically motivated law for diffusion with a semi-empirical correction which is accurate at the percent level. Implemented along with linear mixing in stellar evolution codes, this law should reduce the error from diffusion coefficients by an order of magnitude.

SILICON BASED INORGANIC MATERIALS NANOPATTERNING FOR MICROELECTRONIC APPLICATIONS

Presenter	Korveziroska, Amelia Undergraduate, Physics
Mentor	Prof. Mahua Biswas
Authors	Amelia Korveziroska; Marcos Perez; Mahua Biswas

With the rise in emerging technologies in the field of microelectronics, optoelectronics, sensing and bioengineering exploring different patterning process for inorganic nanomaterial patterns with tunable size and spacing became imperative. Sequential infiltration synthesis (SIS) a vapor phase inorganic material deposition method has been established recently to make inorganic nanopatterns using polymer as a template. SIS enables the control of localized inorganic material growth in the targeted domains of polymers (such as in block copolymers). The effectiveness of the SIS process for advanced nanopattering has been demonstrated for oxide materials such as for aluminum and titanium oxides. Recently, nanopatterning of silicon-based materials is gaining attention in microelectronics industry as an insulating layer for several devices. Specifically, the silicon dioxide (SiO2) and silicon nitride (Si3N4) compounds are often used as insulating materials on the semiconductor devices because of their electrical resistivity, and high density. In our work, we are performing sub-20 nm dimension SiO2 and Si3N4 nanoapatterning using patterned polymeric films. We will evaluate the growth process and the material deposition using scanning electron microscopy, atomic force microscopy and quartz crystal microbalance, and will measure dielectric constant using ellipsometry. As a part of this project Brewer Science Inc., a technological company is collaborating with us to establish SiO2 and Si3N4 SIS process on their patterned polymeric films for microelectronic device applications.

NETWORK INFLUENCE ON NEURONAL ACTIVITY PREDICTION

Presenter	McGinnis, Cassie N Undergraduate, Physics
Mentor	Prof. Epaminondas Rosa
Co-mentor	Prof. Rosangela Follmann
Authors	Cassie N. McGinnis; Epaminondas Rosa; Rosangela Follmann

Neurons are capable of firing in multiple ways such as tonic, chaotic, and bursting. When focusing on the chaotic regime, it can be very difficult to predict how a neuron will fire in the future. Through the application of machine learning, three networks were tested to see their effectiveness at accurately predicting neuronal activity in the chaotic regime. The networks took multiple parameters into account such as the size of the reservoir, the probability of edges forming, the number of edges each node had, and the regularization constant to help with overfitting. Larger reservoir sizes allowed for more accurate results at the

cost of more CPU time. By taking into account the training error and predictive error created by these parameters in many different combinations, the conclusion was drawn that the Watts Strogatz network performed best at predicting neuronal activity.

MATHEMATICAL MODELLING OF TEMPERATURE EFFECTS ON THE AFD NEURON OF CAENORHABDITIS ELEGANS

Presenter	Mobille, Zachary Graduate, Mathematics
Mentor	Prof. Rosangela Follmann
Co-mentors	Prof. Andres Vidal-Gadea; Prof. Epaminondas Rosa
Authors	Zachary Mobille; Rosangela Follmann; Andres Vidal-Gadea; Epaminondas Rosa

Temperature fluctuations can affect neurological processes at a variety of levels, with the overall output that higher temperatures generally increase neuronal activity. Here we utilize computer simulations of a mathematical model for a Caenorhabditis elegans (C. elegans or simply, “the worm”) sensory neuron to investigate the dynamical properties of temperature sensation in the worm. Thermoreception is known to originate in the bilaterally symmetric pair of amphid neurons with finger-like ciliated endings (AFD) of C. elegans, to which we target our modeling efforts. We build upon a previously-developed deterministic model for salt-sensing in the chemosensitive ASER neuron of C. elegans by implementing temperature-dependent Arhennius factors. Multiple experimental results involving time series data of intracellular AFD calcium ion concentration in response to ambient temperature changes are reproduced using this model. Among other things, we find that our model neuron requires synchronous temperature and chemical stimuli to exhibit dynamics qualitatively similar to those of a real AFD neuron.

SILICON NANOPARTICLES FOR OPTICAL TWEEZING

Presenter	Perez, Marcos Undergraduate, Physics
Mentor	Prof. Mahua Biswas
Authors	Marcos Perez; Uttam Manna; Mahua Biswas

High Refractive Index dielectric (HRI) nanoparticles have arisen as competitive alternatives in nanophotonics research for their low loss compared to plasmonic (gold and silver) particles, and the possibility to generate Mie resonances of both electric and magnetic character, which can yield highly directional light scattering. One of the most celebrated and utilized method in the field of nanophotonics is optical tweezing method which is a contactless manipulation method of microscopic particles. In this regard, magnetic resonance based optical tweezing has not been explored before; hence fabrication and manipulation of Silicon (Si) nanoparticles with well-controlled size and shape will provide a novel platform for optical tweezing. In Applied Nanomaterials Lab at Illinois State University, we are using a high temperature fabrication method to obtain perfectly spherical and monodisperse Si nanoparticles of 150-200 nm dimension for tweezing purpose. The fabrication process begins with the high temperature (1500 ^{o}C) annealing of silicon monoxide (SiO) to obtain Si nanoparticles embedded in SiO2 matrix. At the end, the Si nanoparticles are liberated from SiO2 using hydrofluoric acid (HF) acid. We have imaged the particles using scanning electron microscopy, performed dynamic light scattering measurement to study particle size distribution, UV-VIS spectroscopy and single particles spectroscopy to characterize the scattering of the particles. In the next step, we are planning to perform optical tweezing experiment to trap these nanoparticles using a single beam laser source.

ELECTRON VORTEX BEAM COLLISIONS ARE SENSITIVE TO PROJECTILE MOMENTUM UNCERTAINTY

Presenter	Plumadore, Alexander Undergraduate, Physics
Mentor	Prof. Allison Harris
Authors	Alexander Plumadore; Allison Harris

Ionization collisions have important consequences in many physical phenomena, and the mechanism that leads to ionization is not universal. Understanding how and why electrons are removed from atoms and molecules is crucial to forming a complete picture of the physics. Double differential cross sections (DDCS) have been used for decades to examine the physical mechanisms that lead to ionization and two separate pathways have been identified depending on the energy of the ionized electron. At low energies, the DDCS feature a broad distribution as a function of ionization angle, while at high energies, a sharp peak is observed in the distributions. The width of the DDCS peak can be directly traced to the target electron's quantum mechanical momentum distribution and the results are well-known for plane wave projectiles. However, the recent development of sculpted particle wave packets introduces the opportunity to re-examine the mechanisms that lead to ionization. We present DDCS for (e,2e) ionization of atomic hydrogen for electron vortex projectiles and show that for vortex projectiles making close collisions with the target, the DDCS are sensitive to the projectile momentum uncertainty.

THE EXACT PREDICTABLE FUNCTIONS BY A SINGLE NEURON

Presenter	Rizo, Luis Undergraduate, Physics
Mentor	Prof. Matt Caplan
Authors	Luis Rizo; Xing Fang; Q. Charles Su; Rainer Grobe

Artificial neuro network (ANN) has demonstrated its powerful utility in many areas of research such as language parsing and image recognition. In this work we apply ANN technique to physics research [1]. In particular we are inspired by ANN's possible applications in summing diverging series obtained from analyzing the bound state of atoms and molecules as well as the computation of particle spatial density during the light-induced particle creation process where the precise definition of particle is difficult. We train a single neuron with inputs from data associated with the so-called exact predictable function (EPF) and demonstrate that their future output values from the neuron would be free of error. With the help of the sum and product rules, we show many more EPF can be recovered. The weights obtained in training the EPF may serve as better initial values to more completed ANN. This work has been supported by the NSF and Research Corporation.

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USING EVOLUTIONARY PRINCIPLES IN SYMBOLIC REGRESSION

Presenter	Sturino, Tom Undergraduate, Physics
Mentor	Prof. Q. Charles Su
Co-mentor	Prof. Rainer Grobe
Authors	Tom Sturino; Q. Charles Su; Rainer Grobe

Symbolic regression is a recently developed numerical technique to guess analytical mathematical expressions that best describe the relationship between numerically obtained or experimentally measured data sets. In symbolic regression mathematical

formulas are represented by inverted tree structures. We will review how the application of biological evolutionary mechanisms such as crossovers, mutations, and reproductions to an initially chosen random tree structures can aide the search process of finding the best fit mathematical expressions. This work has been supported by the NSF and Research Corporation.

MIE SCATTERING FROM SINGLE SILICON NANOPARTICLES

Presenter	Szcerba, Michal Undergraduate, Physics
Mentors	Prof. Uttam Manna
Authors	Michal Szcerba; Brighton Coe; Uttam Manna

The scattering from a plane wave onto a homogenous dielectric sphere was a was solved by Gustav Mie using a series approximation over a century ago. Modern day we have more resources to follow this purely computational pursuit. Using the FDTD method, we are able to calculate the total scattering spectra of different diameter Si molecules. By illuminating dielectric silicon nanospheres with a plane wave, we are able to collect transmission data from both H and E fields and use that to calculate the scattering cross section of the nano-sphere at the optical frequency range. The study of scattering from high-index dielectric nanoparticles is one with applications in many areas of optics including microscopy, solar cells as well as other areas where scattering efficiency is important.

PROPAGATING WAVES OF SYNCHRONIZATION IN THE BRAIN

Presenter	Urnikis, Scott Undergraduate, Physics
Mentors	Prof. Epaminondas Rosa
Co-mentor	Prof. Rosangela Follmann
Authors	Scott Urnikis; Epaminondas Rosa; Rosangela Follmann

Neurological disorders are characterized by changes in the electrical patterns produced by the neuronal networks inside the brain. Some of these patterns carry signatures that help with more accurate diagnoses and appropriate treatment. Biophysical simulations can be instrumental in developing techniques for identification of those signatures. This current research is aimed at reproducing electrical patterns that are related to epilepsy, a neurological disorder that is characterized by repeated seizures resulting from traveling waves of neuronal synchronization. Our preliminary results suggest that when changes are introduced into an otherwise homogenous neural network, the foci of the waves of synchronization begin to increase in number and move to other locations in the neural network over time. This result indicates that the foci of synchronous behaviors may be subject to dynamical features of their own.

Politics and Government

TOXIC RELATIONSHIP WITH ASSISTED HOUSING: ARE HEALTH AND SAFETY CONDITIONS INFLUENCING FACTORS IN LENGTH OF STAY?

Presenter	Ehlers, Haley
	Graduate, Politics and Government
Mentor	Prof. Michael Hendricks

As it becomes more difficult for families to join the growing waitlists for assisted housing, research and policy initiatives have focused on expanding housing resources through new construction and multi-unit zoning expansion. While the need to create more opportunities to move people in to assisted housing is clear, there has been little research related to people moving out. This research aims to answer the question: how do the health and safety conditions of assisted housing influence residents' length of stay?

The first strategic goal of the U.S. Department of Housing and Urban Development (HUD) is to encourage self-sufficiency and financial stability among residents living in assisted housing. Assisted housing refers to public housing properties and multifamily assisted housing properties that are owned, insured, or subsidized by HUD. The department recognizes the relationship between financial stability and a healthy living environment by including the removal of lead-based paint and other hazards from homes as an objective for this goal. But in reality, the percent of properties that failed their physical inspections have increased since 2014. The poor conditions present in many low-income housing units, like mold or allergens, can result in large economic costs for residents. The normative assumption is that individuals, especially those with low income and high risk of chronic health issues, would prefer to not live in poor-quality housing. But in many instances within assisted housing, it is economic factors related to this poor-quality housing that creates barriers to moving out and achieving financial self-sufficiency. Therefore, this research expects that the greater presence of poor-quality health and safety housing conditions, the greater likelihood that residents will have longer lengths of stay.

Utilizing merged HUD administrative datasets, this research will explore the statistical relationship between the quality level of housing and residents' length of stay with multivariate regression models. Due to public concern about the validity of physical inspections conducted and calculated by HUD, this statistical analysis will be supplemented with qualitative interviews and focus groups with residents. This research expects to find a negative correlation between the quality level of housing conditions and length of stay and some discrepancies between HUD reporting and the reality of residents.

THE IMPACT OF ONLINE BANKING ON FINANCIAL WELL-BEING

Presenter	Kraimer, Cassidy
	Graduate, Politics and Government
Mentor	Prof. Mike Hendricks

The influence of the internet can be found across all industries in the United States, and financial institutions are no exception to this. As the consumer banking industry shifts to an increasing online presence, research has largely ignored the impacts this might have on low- to moderate-income households. Online banking can be an effective and useful tool for managing finances; however, data indicates that access to the internet is not evenly distributed across income brackets. Additionally, lower-income households are more likely to complete bank transitions in-person. Does this gap in access to the internet and the differences in the use of online banking services translate into experienced differences in financial outcomes for low- to moderate-income households? If so, how? I hypothesize that as the level of access to online banking decreases for low- to moderate-income populations, the level of financial well-being will decrease.

I examine this concept through quantitative analyses using the 2018 National Financial Capability Study which provides state-by-state data regarding attributes of individuals' financial situations including savings, employment, financial confidence, online banking use, and more. This study is one of the first national surveys to employ the Consumer Finance Protection

Bureau's newly developed financial well-being score. The financial well-being score is not a measure of wealth or income, but a measure of choices in finance. An individual with a high income can have a low score and vice versa for low-income individuals. The financial well-being score provides a relatively new perspective to the contested idea of what financial outcomes are, and it is meant to capture an individual's social and economic environment which impacts their personality and attitudes, decision context, knowledge and skills, available opportunities, and behavior.

While the 2018 National Financial Capability Study data does not provide geographic information that would allow for calculating area median income, studies indicate 44% of adults who have household incomes of $30,000 a year or less do not have broadband service. I use this established measure for determining the individuals included in my dependent variable. My independent variable was created using a factor analysis of online banking variables. My findings from this quantitative study provide insight into policy creation and activities for financial institutions to better understand how to serve low- to moderate-income households and improve their financial outcomes.

EXCLUSIONS MAY APPLY: HOW INTERSECTIONALITY AFFECTS PARTICIPATION IN PROTESTS

Presenter	McGowens, Kenyetta
	Graduate, Politics and Government
Mentor	Prof. LJ Zigerell

Protests have been an accepted way for citizens to express dissent and fight for better treatment in America since the Boston Tea Party. Two of the biggest movements in recent history that have led to major legislative changes were the women's suffrage movement and the Civil Rights movement. Issues of women's rights and civil rights are still being fought for through movements and protests. With the resurgence of public interest in these movements, there are increasing dialogues within the communities about the unfair treatment of intersectional activists within these movements. Although intersection persons such as Black women, Hispanic women, and Indigenous women organize and lead protests, they are less likely to be given credit. The silencing of intersectional voices is a problem present in both the social movements of the past and current social movements which may discourage the participation of such individuals. This study uses large sample national data from the American National Election Studies 2016 Time Series Study to examine if intersectional individuals participated in protest at the same rate as other individuals, net of other factors.

Psychology

INVESTIGATING STUDENTS' ACADEMIC PERFORMANCE AND ORGANIZATION DURING REMOTE LEARNING

Presenter	Bartolone, Carolyn Undergraduate, Psychology
Mentor	Prof. Dawn McBride

Due to the coronavirus pandemic, college classes across the nation have been moved online and literature suggests that the sudden shift towards remote learning has been a difficult adjustment for college students (Tasso, Hisli Sahin, & San Roman, 2021). The purpose of this study is to first assess how remote learning is impacting student's academic performance and then determine if implementing a revised syllabus will improve students' academic performance and organization during online learning. 37 students in a research methods course completed a pretest containing 15 items about their academic habits during virtual learning for optional extra credit. After completing the pre-test, they created their own revised semester syllabus that contains all the due dates for tests/assignments set for 3 days in advance. At the end of the semester, they will complete a posttest containing the same 15 questions that they answered at the beginning of the semester and then an additional 5 questions about their use of the revised syllabus to rate its effectiveness. Students who refer to a revised syllabus that has important due dates set in advance will be more likely to remember assignments and avoid procrastination during online learning.

Keywords: COVID-19, remote learning, revised syllabi

EFFECTS OF DELAYS AND REMINDERS ON TIME-BASED PROSPECTIVE MEMORY

Group Leader	Black, Lauren Undergraduate, Psychology
Group Members	Mackenzie Kelleher, Undergraduate, Psychology
Mentor	Prof. Dawn McBride
Authors	Lauren Black; Mackenzie Kelleher

Recent research has focused on event- and time-based prospective memory (PM) studied in lab settings. The current study focuses on scarcely studied naturalistic time-based PM tasks. Time-based PM is defined as remembering to carry out a task at a specific time in the future (Einstein & McDaniel, 1990, 2005). Two experiments were performed to compare the effects of various delays and types of reminders on time-based PM. In the first experiment, participants underwent a time-based PM task at a 1-, 3-, or 6-day delay in a naturalistic setting. Half of the participants were asked to repeat the delay and half were not in order to examine whether requiring a second response would have an effect on time-based PM. In the second experiment, participants underwent a 1- or 6-day delay in a naturalistic setting and were given an explicit or an implicit reminder. Results of Experiment 1 showed that there was a significant decline in PM performance between the 1- and 6-day delays. When the delay periods were repeated, there was no effect on PM accuracy. The results of Experiment 1 indicate that a long delay decreases PM performance in naturalistic settings. In addition, it also appears that when PM tasks are repeated, there was no significant increase in PM accuracy. Data for Experiment 2 are currently being collected.

Keywords: prospective memory, delay, reminder, naturalistic tasks

IMPROVEMENTS IN CARDINAL, ORDINAL, AND SPATIAL LANGUAGE IN YOUNG CHILDREN

Group Leader	Bove, Rebecca Graduate, Psychology
Group Members	Lucy Okrasinski, Undergraduate, Psychology; Jacqueline Diaz, Undergraduate, Psychology; Ella Metzger, Undergraduate, Psychology; Olivia Mangini, Undergraduate, Communication Sciences and Disorders
Mentor	Prof. Alycia Hund
Authors	Rebecca Bove; Lucy Okrasinski; Jacqueline Diaz; Ella Metzger; Olivia Mangini; Alycia Hund

Language is an important aspect of child development. Cardinal number words such as one, two, and three emerge before ordinal number words such as first, second, and third, though both increase with age in early childhood (Colomé & Noel, 2012). Children first learn verbal lists of number words, then they are able to give those words meaning (Slusser, Ditta, & Sarnecka, 2013). The more number words children know, the greater their ordinal comprehension (Brannon & Van de Walle, 2001). When children are less familiar with ordinal labels, it can negatively impact problem solving (Miller, Marcovitch, Boseovski, & Lewowicz, 2015). Spatial language also improves from 3 to 5 years and helps with problem solving (Hund, Bianchi, Winner, & Hesson-Mcinnis, 2017; Simms & Genter, 2019). Our goal was to specify the developmental trajectory of cardinal, ordinal, and spatial language comprehension and production for 3- to 5- year old children. Children were randomly assigned to either the Tell Me or Give Me condition. In the Tell Me condition, children were asked to tell the researcher about an indicated car, testing language production; whereas, in the Give Me condition, children were asked to respond to our labels by putting the appropriate car(s) in the garage, testing language comprehension. All children completed cardinal, ordinal, and spatial trials in counterbalanced order. Cardinal trials included cardinal numeric words, such as one or three. Ordinal trials included sequential numeric words, such as first or third. Spatial trials probed locations, such as front, middle, or back. To date, 65 children have participated. Data collection has not been possible during the Covid-19 pandemic. As predicted, preliminary analyses revealed that there were significant improvements across development in cardinal, ordinal, and spatial language. Five-year-olds (M = .76, SE = .05) were significantly more accurate than were 4-year-olds (M = .59, SE = .03), who were significantly more accurate than 3-year-olds (M = .46, SE = .04). In addition, the Give Me group performed higher than the Tell Me group, suggesting comprehension may be easier than production. Children were significantly more accurate on cardinal trials (M = .87, SE = .03) than on spatial trials (M = .58, SE = .04) and on spatial trials than on ordinal trials (M = .36, SE = .04). Once completed, the results of this study may be helpful for understanding the ways in which complex language facilitates developmental success across domains.

MINDFULNESS-BASED STRESS REDUCTION (MBSR) FOR SCHOOL-BASED PROFESSIONALS

Presenter	Carley, Tessa Graduate, Psychology
Mentor	Prof. Adena Meyers

For many years, United States educators have been experiencing an increased amount of stress due to continuously changing education policies, increased school accountability, and additional personal life stressors (e.g., finances, illness, etc.). Increased levels of educator stress has been highly correlated to low job satisfaction ratings, high burn-out rates, and overall negative consequences for teachers, students and school climate (Reiser et al., 2016). Mindfulness-Based Stress Reduction (MBSR) intervention programs have exhibited promising results in reducing stress and increasing job satisfaction among a variety of populations (Reisner et al., 2016). This is a proposal outlining the implementation and effectiveness of an MBSR program for school-based professionals. This MBSR program is centered around, leading scientist and meditation practitioner, Jon Kabat-Zinn's working definition of mindfulness: an awareness that arises from, intentionally, paying attention to the present moment in a non-judgmental manor (Kabat-Zinn, 2019). The purpose of this program is to aid school-based professionals in

learning skills and attitudes that encourage greater present-moment awareness and overall intentionality to relationships and daily life experiences. This proposed program will include 8 weekly classes lasting approximately two hours, and on days that classes do not occur, participants are encouraged to dedicate 45 to 60 minutes to intentional mindfulness practice. In addition to teaching skills and attitudes related to mindfulness, another goal of this program is to reduce symptoms related to stress, anxiety, and depression, and increase job satisfaction and self-compassion. Effectiveness of this MBSR program will be measured through a pre- and post-test design utilizing the following measures: Job Satisfaction Survey, Depression, Anxiety and Stress Scale – 21 Items (DASS-21), Self-Compassion Scale, Self-Rated Physical Health Scale, 12 items (PROMIS-12), and the Mindful Attention Awareness Scale (MAAS).

ANXIETY LEVEL AS A FACTOR IN EMOTIONALLY EXPRESSIVE FACIAL RECOGNITION

Presenter	Devore, Amanda Graduate, Psychology
Mentor	Prof. Dawn McBride

Accurate recognition of the people we encounter is important for successful navigation of many aspects of life, as faces are often the primary source for social cues. Yet, research on emotionally expressive facial recognition memory in specific has revealed mixed results. Some studies have found that happy faces are more accurately recognized than angry faces, whereas others have found the opposite. Pazderski and McBride (2018) provided evidence of delay length contributing to a happy face recognition advantage in some past studies (i.e., longer delays) versus an angry face recognition advantage in others (i.e., shorter delays). However, the root of the differences in emotionally expressive face processing is still unclear. The current study examined the influence of current anxiety levels on the encoding of novel emotionally expressive faces in a within-subject design that tested recognition of happy and fearful faces at two delays (immediate and 10 min). The results demonstrated a significant interaction among current anxiety levels, test delay length, and emotional expression processing. The pattern found by Pazderski and McBride (2018) was replicated with fearful faces. These results provide a step toward generalizing results found previously with angry faces to fearful expressions and show that anxiety does play a role in face processing.

PARENTAL ROLES AND CULTURAL IDENTITY ON ACADEMIC RESILIENCY

Presenter	Diaz, Vanessa Undergraduate, Psychology
Mentor	Prof. Jordan Arellanes
Authors	Vanessa Diaz; Grace Martinez; Allie McLarty; Jordan Arellanes

This study looked into the impacts of parental roles and cultural identity on adolescent academic resiliency. Parents (mothers and fathers separately) who were less involved in a student's academic life as well as students who had lower levels of cultural identity demonstrated an overall lower level of academic resilience. This suggests that parent roles of students may vary by youths' cultural identity which impact students' academic resiliency. Data was collected from two sources, 1) a Qualtrics survey of Latino students who did not attend college and 2) a generalized population of ISU students through SONA data collection software for a total sample size of 587 (Ages=18-26). Both qualitative and quantitative questions were asked to participants regarding their culture, values, family structures and support on and off campus or lack thereof. For the variable of parental roles (mothers and fathers separately) qualitative reports were reviewed and coded by seven undergraduate and graduate researchers. Researchers coded the data on a 1-5 scale with 1=very negative to 5 very positive. The mean score of the seven researchers was utilized in this project. Academic Resilience was measured using the Academic Resilience scale (ARS-30). This scale has three subscales. The moderation model that will be used throughout this study will test each subscale independently. The moderation model that will be used throughout this study shows how parental roles and cultural identity affect youth's academic resilience. We look into Latino identity and college attendance to understand if there are differences between population groups. Preliminary findings suggest that cultural identity and parental roles did not differ by population groups. Yet there is evidence to suggest an indirect relationship of parental roles by cultural identity on academic resiliency.

DAILY CONFLICT, LIFE DEMANDS, AND AFFECTIVE WELL-BEING: EXAMINATION OF THE FAMILY UNIT

Presenter	Fischer, Natalie Graduate, Psychology
Mentor	Prof. Laura Finan
Authors	Natalie Fischer; Laura Finan

Adolescence is a developmental stage marked by considerable social, physical, and cognitive change. These normative changes afford opportunities to experience stressful demands. Importantly, adolescents' experiences within the family can support or exacerbate these stressful demands, and therefore impact adjustment. Although past research has examined the effects of individual family members on adolescents' well-being, studies often ignore important social influences and use aggregate measures which do not fully capture adolescents lived experience. Therefore, the goal of this study was to investigate the additive impact of positive and negative experiences with family members and stressful demands on adolescents' affective well-being.

Adolescents (N=53; Mage=17.40; SD=0.79; 62% female) completed a 7-day daily diary study which asked about daily experiences with mothers, fathers, and a sibling, experiences of stressful life demands, and positive and negative affect. A total of 349 assessments were collected. Analyses were conducted via linear multilevel modeling in order to examine additive influences of conflict and reports of family member harmony and life demands on adolescent affect. Relationship indicators and daily demands were group mean centered to explore within person effects. Gender and age of the adolescent, gender of sibling, and birth order were controlled in analyses.

Results demonstrated that only conflict with mothers was negatively associated with positive mood (b=-0.15. p<.05) and positively associated with negative mood (b=0.38, p<.001) at the daily level. Demands showed the same pattern, but only reached marginal significance (p<.09). Conversely, for positive interactions, only getting along with mothers (b=-0.34, p<.001) and stressful demands (b=0.10, p<.05) were associated with negative mood. Turning to additive impacts, conflict with mothers and daily demands (b=.18, p<.01) and getting along with mothers and daily demands interacted to predict negative mood (b=-.24, p<.001). Simple slope analyses were used to further analyze this interaction, and the data indicated a positive relationship between daily demands and negative affect for those experiencing greater conflict with mothers (b=.21, p<.01), but not those experiencing lower levels of conflict (b=-.064, p=.38). Further, the positive relationship between daily demands and negative affect was observed for adolescents reporting lower positive interactions with mothers (b=.28, p<.001), but not those experiencing more positive interactions (b=-.08, p=.25). This study highlights the impact of daily conflict with mothers and stressful demands on adolescents' negative affect. We suggest future research must continue research with adolescents on a daily level in order to understand these situational processes.

BEST PRACTICES FOR TEACHERS OF YOUTH RELATIONSHIP EDUCATION PROGRAMS

Presenter	Foreman, Mikayla Undergraduate, Psychology
Mentor	Prof. Daniel Lannin
Authors	Mikalya Foreman; Christina Michaels; Jacqueline Bible; Luke Russell; Daniel G. Lannin; Ani Yazedjian; Keeley Hynes; Alex Horton

This study examined best teaching practices in supplementary education programs, such as those that educate adolescents on healthy relationships, job-readiness skills, and financial literacy. Using focus groups, conducted over 5 years, this study found effective relationship education facilitation centers around the importance of course content, teacher characteristics, and teacher-student connection.

EXAMINING THE RELATIONSHIPS AMONG HANDEDNESS AND NEUROMOTOR FUNCTIONING IN CHILDREN'S WRITTEN LANGUAGE AND HANDWRITING OUTCOMES

Presenter	Glick, Haleigh Graduate, Psychology
Mentor	Prof. Gary Cates
Co-Mentor	Prof. Julie Campbell
Authors	Haleigh Glick; Brian Klein; Julie Campbell; Gary Cates

Handedness and language are lateralized functions of the brain with an almost linear relationship (Knechet et al., 2000). The relationship between handedness and written expression is not clear. The purpose of this poster is to determine if the degree of handedness (a lateralized fine motor skill) is associated with written language outcomes among second grade students. Handwriting was also observed as a measure of neuromotor functioning (Klein, 2020). Neuromotor functioning may have implications for the speed at which a child can write. A second purpose of this research is to determine if neuromotor skill is associated with transcriptional fluency rates.

DOES SUBJECTIVE TIME COST EXPLAIN COGNITIVE TASK CHOICES?

Presenter	Isaacs, Raina Graduate, Psychology
Mentor	Prof. Dawn McBride

Previous research (Potts et al., 2018; Rosenbaum & Bui, 2019) suggests that participants' time estimates for completing tasks is the primary predictive factor of task choice. However, these past studies have only compared a perceptual-motor task with a cognitive task. The current study compares cognitive tasks with other cognitive tasks in an attempt to more broadly generalize these findings. Thus, the purpose of the current study was to investigate subjective time as a predictive factor in cognitive task choices. Participants were given instructions on the three tasks (number-sorting, item generation, and addition/subtraction problems) that varied in difficulty level (low, medium, and high), and then made an estimate of how long each task would take them to complete at the medium difficulty level. Participants were then presented with trials on which two of the three tasks were shown at one of the three difficulty levels and were asked to choose to complete one of the tasks. Results indicated that participants' subjective time estimates were not a predictor of task choices among these cognitive tasks. However, choice data did indicate that participants preferred the number sorting task to the other tasks at the medium and high difficulty levels. Future research should further investigate difficulty level and other possible factors that influence task choice because subjective time estimates was not shown to be predictive of task choices in these results.

PHONOLOGICAL AND SEMANTIC FALSE MEMORIES ACROSS MEMORY SYSTEMS

Presenter	Marsh, Elizabeth Graduate, Psychology
Mentor	Prof. Dawn McBride
Authors	Elizabeth Marsh; Dawn McBride; Jen Coane

This study aimed to compare false memories in short and long-term tests for semantic and phonological lists. The purpose of this study was to replicate our previous results with shorter lists in the short-term memory condition. Both the past and current study used 36 DeeseRoediger-McDermott (DRM, Roediger & McDermott, 1995) lists for the creation of simple false memories.

The lists varied in their association to a nonstudied critical lure item: There were 18 semantic and 18 phonological lists. The first study used 6-item DRM lists, whereas the current study used 4-item DRM lists to ensure list length did not exceed working memory capacity. Both studies included recognition tests at short (less than 1 second delay) and long (after all lists had been presented) delays. In the short-term condition, lists were presented one at a time followed by an immediate one-item recognition test. In the LTM condition, after all lists were presented, there was a 1-minute break before a recognition test that tested all lists. The current study replicated the results of the first study, with almost identical mean proportions of false alarms. Results showed a dissociation in false alarm rates, such that in short-term tests there were more false alarms in phonological than sematic lists, whereas in long-term tests there were more false alarms for semantic than phonological lists. Successfully replicating the findings of the previous 6-item study, with the current 4-item study suggests that the results were not due to exceeding working memory capacity. At the short-term, phonological coding appears to drive errors and increases false alarms for phonological lists compared to semantic lists. After a delay the effect reverses, and semantically driven errors increase. Overall, the results suggest distinct processes are involved in the production of false memories in STM compared to LTM.

Keywords: DRM, false memory, short-term, long-term, list type, semantic, phonological

LATINO/A PARENTAL ROLES AND IMMIGRATION ON ACADEMIC RESILIENCY

Presenter	Martinez, Grace Undergraduate, Psychology
Mentor	Prof. Jordan Arellanes
Authors	Grace Martinez; Vanessa Diaz; Allie McLarty; Jordan Arellanes

The present study focused on the subsample of Latinx youth who did not go to college to further their education. This study found that participants whose lives were impacted by immigration and had low involvement from parents towards academic success demonstrated lower academic resilience. This suggests that immigration impacts and parental rolls play major roles in Latinx youth achieving academic resilience. The sample focused on 373 total participants between the ages of 18-24 and did not attend college. Data was collected through Qualtrics software and were asked both qualitative and quantitative questions related to their culture, citizenship, family life, and educational experiences and values. Regarding the variable of immigration, participants were asked whether they or their parents are US citizens. For the variable of parental roles (mothers and fathers separately) qualitative reports were reviewed and coded by 7 undergraduate and graduate researchers. Researchers coded the data on a 1-5 scale with 1=very negative to 5 very positive. The mean score of the seven researchers was utilized in this project. Academic Resilience was measured using the Academic Resilience scale (ARS-30). This scale has three subscales. The moderation model that will be used throughout this study will test each subscale independently. The model supports how the impacts of immigration and parental roles affect the outcome of academic resilience within Latinx adolescents. Implications will suggest that immigration indirectly affects students' academic resiliency through the role of each parent.

TAKE A DEEP BREATH: COPING AND THE COGNITIVE CONSEQUENCES OF RACIAL MICROAGGRESSION

Presenter	McGrath, Kaylie Graduate, Psychology
Mentor	Prof. Brea Banks
Author	Brea Banks

As part of the current study, researchers sought to determine if exposure to interpersonal racial microaggression (i.e., subtle insults based on stereotypes) would lead to cognitive depletion among Black college women, as prior research suggests that there exist multiple consequences associated with exposure to racial microaggressions (Murphy et al., 2012; Salvatore & Shelton, 2007). Researchers were also interested in examining the role of coping as a resiliency factor, as research suggests that Black women engage in varied coping strategies to deal with exposure to these indignities (Lewis et al., 2013).

As such, using an experimental research design, 61 participants were randomly assigned to one of four conditions: (1) microaggression with coping, (2) microaggression without coping, (3) control with coping, and (4) control without coping. In the microaggression conditions, participants were exposed to racial microaggressions from a White research assistant, while those in the control condition heard a script that was similar but non-mircroaggressive. In the coping condition, participants were promoted to engage in a deep breathing exercise after hearing the mircroaggressive or control scripts, while those in the no coping conditions were promoted to wait patiently while the researcher left the room.

The hypotheses were supported, as Black college women who were exposed to racial microaggressions in the no coping conditions experienced the greater amount of cognitive depletion, as measured by Stroop (1935) color-naming task, while those in the microaggression coping condition performed similarly to those in the control conditions on the cognitive task. Thus, findings from the current study support current literature, suggesting that when individuals holding marginalized identities, specifically Black women, are exposed racial microaggressions there is a significantly increased risk of detrimental consequences on their overall cognitive functioning, but that deep breathing may mitigate the effects of the racial microaggressions for Black women.

Key words: microaggression, racial centrality, cognitive depletion, marginalized identities

DO LATERALIZED MOTOR BEHAVIORS PREDICT LANGUAGE DEVELOPMENT ACROSS INFANCY?

Presenter	Mercado-Ramos, Danieli Graduate, Psychology
Mentor	Prof. Julie Campbell
Authors	Danieli M. Mercado-Ramos; Julie M. Campbell

Throughout our development, we form lateralized biases (Goodwin & Michel, 1981), from selecting an object with one hand to complex role-differentiated bimanual actions. Handedness is an easily observable lateralized behavior and involves the consistent use of one hand when performing manual tasks. These manual actions concern the motor cortex's dominant effect on the body's contralateral side (Prieur, 2018). The asymmetric tonic neck reflex (ATNR) is a behavior in which neonates turn and hold their head to one side. Simultaneously, the ipsilateral arm stretches outward. The contralateral arm bends at the elbow. This position affords the opportunity for the infant to reinforce spatial mapping between the ipsilateral hand and the opposite brain hemisphere. The ATNR can be observed repeatedly to gain an approximation of an infant's head orientation preference, which has been related to the development of hand preference. This connection has been implicated in the development of hand preference (Goodwin & Michel, 1981), and hand preference has been related to the development of language (Nelson, Campbell, & Michel, 2014). Specifically, infants with an early right-hand preference scored higher on a standard language assessment at two years of age than infants with a late right or left-hand preference. This project extends this line of research by examining the relation between head orientation preference, hand preference, and language.

Twelve infants were observed at 4, 8, and 12 weeks of age for their head orientation preference. At 12 and 16 weeks, and at 6, 7.5, 9, and 11 months, infants' hand preferences were observed. The hand preference assessment was performed at 12 and 16 weeks by hanging objects in the visual midline, while the infant was in a semi-reclined position. The hand that reached towards the objects was then recorded. Similarly, at later months, the infant was seated at a table, and a researcher presented objects on the table surface at the midline of the infant.

These observations were recorded and later coded for lateralized reaching behaviors. Finally, the project seeks to relate these lateralized behaviors to language by conducting a language assessment on each child. It is expected, based on previous research by Nelson et al. (2014), that infants with early right-lateralized behaviors will show higher language scores than infants with later developing lateralized behaviors or those with a weak lateralized preference. Examining the relation between lateralized motor behaviors and language helps us determine the relation between these behaviors.

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YOUTH MAY PROTECT THEMSELVES BY SEEKING LESS COMMITTED RELATIONSHIPS, WHICH THEY DESCRIBE AS "TALKING."

Presenter	Michaels, Christina Undergraduate, Psychology
Mentor	Prof. Daniel Lannin
Co-mentor	Prof. Jacqueline Bible
Authors	Mikayla Foreman; Jacqueline Bible; Luke Russell; Daniel Lannin; Ani Yazedjian; Keeley Hynes; Alex Horton

The way that youth label their romantic relationships may provide important insight into interpersonal and intrapersonal processes that influence how they navigate their first romantic encounters. The present study found that “talking” relationships involved less exclusivity, different modes of and amounts of communication, and served different purposes than romantic relationships.

DANGEROUS OR MISUNDERSTOOD?: ATTRIBUTES ASCRIBED TO INDIVIDUALS WITH MENTAL ILLNESS AND THEIR EFFECTS ON PERCEIVED DANGEROUSNESS

Presenter	Neal, Sydni Graduate, Psychology
Mentor	Prof. Laura Finan

Individuals with mental illness may be considered rather common within the United States—as of 2017 roughly 1 in 5 U.S. adults experienced a mental illness and 1 in 25 experienced a severe mental illness (NAMI, 2019). Despite these prevalence rates, there are many misconceptions about individuals with mental illness. For example individuals with mental illness are perceived as dangerous (Angermeyer & Matschinger, 2003), unpredictable (Magliano et al., 2004), and aggressive (Adewuya & Makanjuola, 2008), despite research that suggests they are not more likely to be violent and/or dangerous (Monahan et al., 2017). These negative perceptions can lead to higher unemployment rates among individuals with mental illness, social rejection from the public, and decreased help-seeking behaviors. Although research has explored the role environmental (Stuart & Arboleda-Flórez, 2012), training (Crowe & Averett, 2015) and personal experience (Corrigan et al., 2001) in understandings the public’s perception of individuals with mental illness, little is known about how attributes ascribed to these individuals affects perceptions of dangerousness. Therefore, this study aims to investigate how the personal attributes of perceived unpredictability and aggression influence the relationship between perceptions mental illness and dangerousness for the disorders of schizophrenia and substance use disorder. To address this question, I will recruit 200 Illinois State University undergraduate students (aged 18-23) to complete an online survey. Participants will read through three vignettes depicting an

individual with schizophrenia and three vignettes depicting an individual with substance use disorder. First, participants will be asked how likely it is that the individual in the vignette is suffering from a mental illness, then ascribe attributes to that individual, including unpredictable and aggressive. After reading through all six vignettes and ascribing attributes to the characters, participants will complete the Beliefs Toward Mental Illness scale. I hypothesize that participants will rate the vignette characters as having a mental illness; that perceived attributes of unpredictability and aggressiveness will mediate the relationship between mental illness and perceived dangerousness; and that participants will rate vignette characters with schizophrenia as more dangerous, unpredictable, and aggressive. Understanding the role of perceived unpredictability and aggressiveness in the relationship between mental illness and perceived dangerousness can improve previously ineffective anti-stigma efforts, decrease the public's desired social distance from individuals with mental illness, and, overall, improve the quality of life for individuals with mental illness.

A COMPREHENSIVE LITERATURE REVIEW OF INSTRUCTIONAL CONSULTATION WITHIN SCHOOLS SETTINGS

Group Leader	Orlando, Nina Undergraduate, Psychology
Group Members	Berenice Contreras, Graduate, Psychology
Mentor	Prof. Shengtian Wu
Authors	Nina Orlando; Shengtian Wu; Berenice Contreras

Instructional Consultation (IC) is a collaborative stage-based process that focuses on academic and behavioral concerns from an ecological perspective (Rosenfield, 2002). School psychologist and teachers work together to assess the academic and behavioral concerns of children. Addressing these concerns allow for new learning conditions to be developed, thus allowing academic achievement to be improved within the classroom. Knotek et al. (2003) indicated that by understanding student's problems asa result of the environment rather than an internal problem is a main goal within IC to alter how teachers view student's school problems. The present study aims to systematically discover IC studies to understand the gap of insufficient research and inform the directions of future research. Specifically, the present review systematically identifies and analyzes the development of IC literature.

Four data bases were examined using "instructional consultation" and "academic consultation" as key words. Further, the identified resources were limited to peer-reviewed, school-based, and empirical studies published in English. Initially, 254 articles were discovered. Of them, 99 articles were peer-reviewed. When including "school-based" as one of the criteria, 75 results were found. After each article was examined, 33 were found that focused on IC. Researchers removed seventeen non-empirical studies, which led to a result of 15 studies that meet the study criteria. Within the 17studies, one study examined the communication approaches within IC as well as the transcription and coding involved (Barrett et. al., 2019); one examined the use of curriculum-based measurements at each stage of the problem-solving consultation perspective (Green & Shinn; 1990); one reported the influence of school interpreters on the process of IC (Lopez, 2000); one examined the seven dimensions of IC and the consultation behaviors of participants (Mckenna et. al., 2009); three reported the effects of students and teachers when implementing IC teams within the classroom (Berger et. Al., 2014; Gravois & Rosenfield 2006; Vu et. al., 2013); three studies reported teachers' development of skills and student achievement when IC approaches are used (Fuchs et. al., 1991; Gravois et. al., 2009; Mesquita & Zollman; 1995); two examined the RTI system within the IC model (Newman et. al., 2014; William & Staulters, 2014); three studies examined interaction and development skills of consultants and consultees while using IC (Benn et. al., 2008; Knotek et. al., 2003; Newman et. al., 2017); and two examined the use of problem-solving processes to support IC (Bartels & Mortenson 2008; & Knotek, 2012).

TECHNOLOGY IN THE CLASSROOM

Presenter	Phillis, Ellie Graduate, Psychology
Mentor	Prof. Laura Finan
Authors	Ellie Phillis; Laura Finan

Due to the COVID-19 pandemic, traditionally in-person courses were forced to make the difficult decision to transition to an online format. Thankfully, there have been significant improvements in online technology platforms and programs that advance the virtual learning experience. For example, technologies like Flipgrid, Kahoot, Nearpod, and Zoom are widely available to enhance the learning environment for students and teachers alike.

Extant research on online learning has resulted in mixed reviews. For example, Glenn (2018) points out that students who may not normally participate in an in-person learning environment can no longer blend into the back of the classroom, as participation is incredibly important to advance in the e-learning environment. Further, students may feel intimidated when it comes to reaching out to professors when they are not able to meet with them in person. Conversely, and perhaps more positively, Glenn highlights that e-learning, asynchronous options make it possible to complete schooling with a job and family demands. Further, Yamagata-Lynch (2015) found that, in her graduate level online course, that students felt the online environment gave them the chance to be a more active learner and student.

Given the ubiquity of online learning and the use of programs and technologies in the classroom, it is essential to understand students' experiences and perspectives in these digital environments to ensure pedagogical practices align with the needs of learners. As such, we sought to explore students' experiences with technology in the classroom to advance this area of research. Specifically, we will systematically examine students' experiences using multiple programs and technologies during a 300-level class. We will use an embedded mixed methods design to obtain survey data on students' preferences and barriers using Nearpod, Flipgrid, Zoom, and ReggieNet. We will also assess their perceptions of whether these programs or technologies advanced their learning throughout the semester. These technologies will be used synchronously and asynchronously throughout the semester. The class is comprised of 24 (21 female) junior and senior undergraduate students majoring in psychology. The students will receive class credit for completing the surveys.

In this ever-changing and unsure time in education, it is crucial we understand how online education aids or hinders students' learning and for those students to get the chance to reflect on their experiences in real time. This study will contribute to the literature on undergraduate college students' experiences with technology in the classroom and seeks to inform future pedagogical practice.

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A FORMATIVE EVALUATION OF MTSS AT A MIDWESTERN ELEMENTARY SCHOOL

Presenter	Sherman, Valerie Graduate, Psychology
Mentor	Prof. Mark Swerdlik

A formative program evaluation model for an MTSS/RTI organizational framework was initiated at a Midwestern elementary school. The program evaluation included analysis of 2.5 years of reading/writing and 1.5 years of math student outcome data. Evaluation results along with the methods of student outcome data analysis will be discussed. Finally, perceived strengths, areas for improvement, relevant recommendations, and overall conclusions will be presented.

FELT ENERGY MAY MEDIATE THE RESTRICTED AND BINGE EATING LINK

Presenter	Shilney, Nicholas
	Graduate, Psychology
Mentor	Prof. Suejung Han

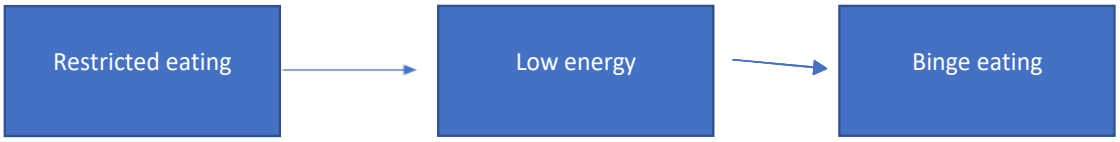
A. Problem: The dual pathways model of binge eating (Stice, Nemeroff, & Shaw, 1996) suggests that restricted eating could lead to disinhibited binge eating as a rebound. This premise has received mixed empirical support (e.g., de Luz et al., 2015). Similarly, the energy depletion model (Baumeister, 2002) proposes that self-regulatory efforts (e.g., restricted eating) would deplete psychological energy, resulting in the failure of subsequent self-regulation (e.g., binge eating). To the authors' knowledge, this mediating role of depleted energy in the link between restricted eating and binge eating has not been examined directly. It is partly because the nature of psychological energy has not been clearly defined or directly measured. This study operationally defined psychological energy as felt energy for regulating oneself (O'Connor, 2004; Thayer, 1988) and created a self-report measure. Then, we tested a path model wherein restricted eating was associated with binge eating indirectly through low felt energy.

B. Procedure: A total of 210 college students enrolled in a large Midwestern university (35 cismen, 172 ciswomen, 3 others, mean age=19.90) participated in an online survey. It included a felt energy measure developed for this study, the Short-Form Health Survey Vitality subscale (Ware & Sherbourne, 1992), the Binge Eating Scale (Gormally et al., 1982), and the Dutch Eating Behavior Scale (van Strien et al., 1986). A path analysis was conducted using SPSS PROCESS v3.5 (Hayes, 2018).

C. Results: The felt energy measure scores were positively correlated with the Vitality subscale scores, supporting the concurrent validity of the measure. The path analysis revealed that restricted eating was negatively associated with felt energy (β=-.27, p=.04), which in turn was associated negatively with binge eating (β =-.22, p=.07). Restricted eating was also directly associated with binge eating (β =.38, p=.002). The bootstrapping analysis revealed that the indirect effect was not significant, however, β=.06, CI=-.01, .15.

D. Conclusions and Implications: The proposed indirect paths were significant as predicted, although the indirect effect was not significant possibly due to the small sample size. With a larger sample from the incoming data, a complete result would be presented at the conference. This study potentially clarifies a conceptual issue regarding the nature of psychological energy as an intervening mechanism for self-regulation failure such as binge eating. This study also potentially clarifies the meaning of current mixed findings on the link between restricted eating and binge eating by directly testing the intervening role of felt energy.

Based on the dual pathways model of binge eating and resource depletion model, this study examined whether low felt energy mediated the association between restricted eating and binge eating. A path analysis revealed significant path coefficients in the expected direction, but the indirect effect of felt energy was not significant.



PREDICTORS OF COVID-19 RELATED HEALTH BEHAVIORS OF U.S. COLLEGE STUDENTS

Group Leader	Shilney, Nicholas Graduate, Psychology
Group Members	Emily Aument, Undergraduate, Psychology
Mentor	Prof. Suejung Han
Authors	Nicholas Shilney; Emily Aument; Patrick Linebrink; Taylor Leach Emily McLaughlin

A. Problem: Opening college campuses in Fall 2020 during the continued Covid-19 pandemic relied upon college students' adherence to safety guidelines on and off campus. The theory of planned behaviors (Ajzen, 1991) suggests that following safety guidelines would be determined by students' beliefs about the guidelines themselves (i.e., positive attitudes, subjective norms—perception of others' expectations, behavioral control—perception of one's capability). Also, college students feel pandemic-related emotional distress (Son et al., 2020), with their psychological needs for relatedness and autonomy frustrated (Deci & Ryan, 2000) due to limited social contacts and imposed changes on college life (Lederer et al., 2020), which may discourage their cooperation. Self-determination theory also predicts better safety measure adherence when students identify with its value (i.e., identified regulation) than when they feel forced to do so (i.e., introjected or external regulation). Thus, this study examined health guideline beliefs, felt threat, frustrated needs for relatedness and autonomy and regulatory motivations as predictors of both college students' intentions and enactment of the four safety measures (i.e., washing hands, limiting travels, avoiding social contacts, and physical distancing; Vansteenkiste, n.d.).

B. Procedure: College students (mean age=19.72) in a U.S. Midwestern university (47 cismen, 189 ciswomen) participated in the online survey that included the Feeling of Threat Scale (Chen et al., 2015), Need Frustration Scale (Chen, Vansteenkiste, et al., 2015), Adherence to Safety Measures (Vansteenkiste, n.d.), Motivations to Adhere to the Measures (Soenens et al., 2009), and an adapted Theory of Planned Behavior measure (Ajzen, 1991). Eight hierarchical regression analyses were conducted with four behavioral intentions and enactments as dependent variables. Felt threat and frustrated needs were entered in Step 1; positive attitude, subjective norms, and perceived control in Step 2; and identified, introjected, and external regulation in Step 3.

C. Results: The model predicted intention to engage in covid-safety behaviors significantly, $R=.64$, $R2=.41$, $F(10,124)=8.44$, $p<.001$. In Step1, feeling of threat predicted intention positively, $\beta=.22$, $p=.01$.In Step2, subjective norms predicted intention positively, $\beta=.41$, $p<.001$. In Step 3, subjective norms, $\beta=.38$, $p=.005$, identified regulation, $\beta=.24$,$p=.05$, and introjectedregulation, $\beta=.23$,$p=.03$, predicted intention positively. The model predicted behavioral engagement significantly, $R=.56$, $R2=.32$, $F(10,12)=5.61$, $p<.001$. In both Steps2 and 3, only subjective norms predicted intention positively, $\beta=.47$, $p<.001$ in Step2; $\beta=.38$, $p=.001$.

D. Implications: University professionals may promote identified motivation for safety measures while finding ways to support autonomy and establish peer norms on campus to enhance safety adherence among college students.

This study examined health beliefs, regulatory motivations, and frustrated psychological needs as predictors for adherence to covid-19 related safety measures among U.S. college students. Results showed that subjective norms (i.e., perception of others' expectations), identified regulation (i.e., identifying with the value), and frustrated need for autonomy (negative prediction) contributed significantly. predicted both intention and enactment of safety measures (i.e., washing hands, limiting travels, avoiding social contacts, and physical distancing).

EFFECTS OF ATTENTION AT ENCODING AND RETRIEVAL ON SHORT AND LONG-TERM FALSE MEMORIES FOR EMOTIONAL STIMULI

Group Leader	Shine, Grace Undergraduate, Psychology
Group Members	Elizabeth Marsh, Graduate, Psychology
Mentor	Prof. Dawn McBride
Authors	Elizabeth Marsh; Grace Shine

The proposed study will examine the effects of attention at encoding and retrieval on short- and long-term false memory for emotional stimuli using the Desse–Roediger–McDermott (DRM, Roediger & McDermott, 1995) paradigm. DRM research has shown that there are differences in false memory for stimuli that are emotionally valenced and that emotional information is often better recalled than neutral information. Prior research has also shown different effects of attention on emotional stimuli and suggests that negatively valenced stimuli are processed differently than positive and neutral stimuli. In the present study, this phenomenon is further investigated across two experiments; attention is manipulated at encoding (Experiment 1) and at retrieval (Experiment 2). Attention will be manipulated with a concurrent number memory task. Both experiments will use the same emotionally valenced DRM word lists from Zhang et al. (2017): 4 positive, 4 negative, and 4 neutral, with immediate and delayed recognition tests. The results of this study will allow us to draw conclusions about the effects of attention at encoding and retrieval across the two experiments. The results are expected to provide additional support for previous findings on attention's role in false memories for emotionally valenced stimuli, while adding to our knowledge by comparing the effects of attention on false memories at both short and long-term with a modified short-term procedure. The study will also us to draw conclusions about the differences in the processing of emotional compared to neutral stimuli.

Keywords: DRM paradigm, attention, false memory, emotion, retrieval, encoding

SCHOLARLY WORKS OF SCHOOL PSYCHOLOGY FACULTY: HOW MUCH OF OUR FIELD'S CURRENT PUBLICATIONS FOCUS ON RACISM AND ANTI-RACISM?

Group Leader	Twanow, Laine Graduate, Psychology
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In the summer of 2020, following heightened attention on instances of police brutality, racist violence, and Black lives lost at the hands of police, the school psychology community came together to reaffirm their commitment as anti-racist agents of change (García-Vázquez et al., 2020). School psychology faculty and their publications can be a key force in moving these efforts forward. Their works train future school psychologists and guide best practice, and can demonstrate current activity, focus, and expertise within the field. With these potential impacts of scholarly works in mind, work that identifies and describes racism specifically is productive because it addresses racism without softening language in fear of white fragility, or other sensitivity or defensiveness. Work specific to anti-racism is important because it demonstrates a practice beyond being non-racist, one that is an active practice of challenging racism and the values, structures, and behaviors that perpetuate it (Kendi, 2019; Nelson, 2015). Thus, this in progress study seeks to identify existing scholarly publications that focus on racism and antiracism from among all school psychology publications.

The research team identified 906 professors from 213 American Psychological Association (APA) accredited and National Association of School Psychologists (NASP) approved school psychology programs and examined a sample of 11,262 publications conducted by 510 professors from 130 programs looking for content relating to the field of school psychology. Accredited programs were found through APA and NASP websites, while each professor's name was listed on their university's website. An initial publication search was conducted using each professor's name within Education Resource Information Center (ERIC), APA

PsycInfo, and APA PsycArticles. Upon close inspection, 3,351 publications were found containing research in school psychology. A small sample of 284 publications were categorized yielding to 2.46 percent publications relating to racism and 0.70 percent relating to antiracism. The remaining 96.8 percent related to other categories within school psychology. Considering the impact of the field's scholarly publications on current and future school psychologists, the field needs an increase in articles focusing on racism and anti-racism to cultivate our skills as school psychologists and to demonstrate our field's growth in building expertise and focus on these important efforts over time. Some limitations of the current study, including difficulty identifying professors and each of their publications, will be listed within our poster.

THE INTERACTION BETWEEN MOOD, MUSIC, AND FALSE SHORT-TERM MEMORIES

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Mentor	Prof. Dawn McBride
Authors	Hannah Westphal; Amanda Martin

The implications of memory and its capacities are far reaching. Our memory is a recollection of facts, events, experiences, and an awareness of our surroundings in an attempt to make sense of our world. Memory and its validity in particular is especially useful in court-room and clinical settings. However, our memory is prone to human error and often times we experience the phenomenon of false memories as a result of the information overload we subject ourselves to on a daily basis. The purpose of the present study was to investigate the relationship between induced moods, list types, and the overall effect these variables have on false memory in the short term. Participants were instructed to listen to pieces of classical music and were then designated to complete a memory task through the DRM paradigm that experimentally creates simple false memories for words Past studies (e.g., McBride et al., 2019) have shown that at short-term delays, false memories are more frequent for phonological than semantic lists. In addition, it has been found that participants in a positive mood had higher rates of false memories than participants with a negative mood, and the present study aimed to replicate these results. Through our procedure, we hypothesized that participants in a more positive mood would have higher levels of false recognition rates while studying phonological word lists than participants in a negative mood but expected no difference in false memories in for semantic lists due to the inferiority of semantic information stored for short delays.

REDEFINING CREATIVITY: A NEW APPROACH TO UNDERSTANDING DIVERGENT AND CONVERGENT THINKING AND PERSONALITY

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Researchers and practitioners have long been interested in understanding creativity and related aspects of thinking. For example, studies have focused on the ways in which convergent and divergent thinking and personality factors relate to creativity (Guilford, 1950). Traditionally, convergent thinking involves finding the correct answer to a problem; in contrast,

divergent thinking involves generating a creative response through spontaneous exploration of different ideas, perhaps via associative processes (Guilford, 1950). Past research shows that divergent thinking and openness to experience, an aspect of personality that involves imagination and exploration, are related (e.g., Chamorro-Premuzic, 2008; MacKinnon, 1962, 1965; Silvia et al., 2009). The goal of our study is to further explore the relations between various measures of convergent and divergent thinking and openness to experience. Participants will be 100 ISU students 18 years or older recruited through the Department of Psychology online sign-up system. They will complete our measures via an online survey methodology that will include the Remote Associates Test (RAT), the Unusual Uses Test, a vocabulary test, the 10-item TIPI Personality questionnaire, and a demographic survey. The RAT is a well-known test of convergent thinking, where three unrelated words are shown, and participants must relate the fourth word. The Unusual Uses Test is a popular test of divergent thinking, where participants must come up with creative and uncommon uses for an object. But, according to Gabora (2019), the RAT may be more suitably classified as a divergent thinking test, especially when insight is involved. If the RAT relies on divergent thinking, then we would expect to observe strong, positive correlations between the RAT and Unusual Uses Test and openness to experience measures from the personality questionnaire. However, we would expect to observe no correlations with vocabulary, a convergent thinking measure. These results would provide a better understanding of creativity processes.

Sociology/Anthropology

“NEVER AGAIN IS NOW” USE OF CULTURAL FRAMES IN A SOCIAL MOVEMENT ORGANIZATION

Presenter	Carlson, Erik Graduate, Sociology/Anthropology
Mentor	Prof. Maura Toro-Morn

The immigrant rights movement is a social movement that has been active in the United States for many decades and adopted as well as changed focus over time. There are many social movement organizations working within this social movement but one of great interest to my research is Never Again Action (NAA). NAA is a national Jewish protest group, which has called for the end to all deportations and the abolition of Immigration and Customs Enforcement (ICE). NAA is primarily working from a position of an ally to migrants in a social movement with the aim to further rights for this group. What is unique about this case is NAA’s use of cultural frames to mobilize their social movement organization which juxtaposes the plight of immigrants in the United States with that of Jews in the Holocaust. Cultural frames are a theoretical understanding of social movement mobilization which focuses on how organizations utilize cultural frames, or broadly belief systems, to mobilize individuals into action to support a social movement (Snow and Benford 1986). From my initial research I see NAA heavily utilizing a specific culture frame called the Holocaust Framework, which is a frame that uses the Holocaust as a metaphor, usually juxtaposing current events with that of the Holocaust (Stein 1998). NAA’s own rhetoric points to use of a Holocaust Frame, specifically their use of metaphor creating, calling ICE ‘detention centers’ concentration camps, and the use of Never Again as their name, which is a common phrase in American Jewish communities. My research asks the following questions: what are the motivating factor for individuals to join NAA, how does NAA use cultural frames to motivate individuals to join their organization, How does NAA and individuals negotiate their roles as allies to a wider immigration rights movement, and how is NAA participating in social movement action in the midst of the COVID-19 crisis? I plan on answering these questions through a qualitative study, which will utilize participant observation, interviews, and analysis of materials, specifically their social media accounts. My research is in the beginning phase however, there seems to be evidence which shows significant use of a Holocaust frame from NAA’s rhetoric. This research will further the study of social movement and understanding of how and why individuals mobilize into action.

LET'S TALK ABOUT SEX (WORK), BABY: WOMEN COLLEGE STUDENTS AND ONLINE SEX WORK

Presenter	Ebersole, Courtney Graduate, Sociology/Anthropology
Mentor	Prof. Jason Whitesel

INTRODUCTION: Online sex work is becoming an increasingly popular avenue for young women to raise capital. I propose to study the motivations of women-identified undergraduate students who engage in self-produced sex work online, in which they are both privileged and subjugated due to intersecting identities. In particular, this study will examine how college women turned to the online platform, OnlyFans, which evolved from a relatively niche website into a mainstream adult entertainment platform that has allowed many college women to earn an income, especially during the ongoing COVID-19 pandemic, by posting explicit pictures and videos on the OnlyFans platform to fund their university costs. **LITERATURE REVIEW**: A review of the existing literature on sex work led me to discover that women college students are an understudied demographic of participants in sex work despite their unique positionality. **OBJECTIVE OF THE STUDY:** The aim of this study is to identify interpretative narratives employed by undergraduate women concerning their motivations for producing online sex work. **THEORETICAL FRAMEWORK**: The study moves away from the dichotomy of the conflicting paradigms of “empowerment” and “oppression” within sociological and feminist literature on how sex work is conceptualized. **METHOD**: I propose to conduct this study through Internet and online social research methods, collecting fieldnote data and semi-structured interviews of industry participants. **PRELIMINARY FINDINGS**: Women college students financially profit from sex work; to achieve this end, some

women act on agency; other women become victims of an inherently patriarchal system; still others are positioned somewhere in between on the continuum. **CONCLUSION AND CONTRIBUTIONS**: The results of this study on female college students participating in sex work will add to contemporary feminist literature which seeks to place sex workers on this continuum between agency and exploitation.

SEWAGESCAPES: URBAN GROWTH AND TOPOGRAPHY OF SEWAGE DISTRICTS IN CENTRAL ILLINOIS

Presenter	Ervin, Anastasia Undergraduate, Sociology/Anthropology
Mentor	Prof. Kathryn Sampeck

Sewage districts are important municipalities that facilitate urban growth within cities and heavily impact communities. Research regarding the sewage districts is scarce in the modern contexts and focuses on the biological and chemical processes involved in sanitizing wastewater. This study focuses on districts in Central Illinois and uses the technique of landscape archaeology combined with archival analysis to analyze the economic factors in various parts of the cities and the topography of the districts. The findings of this paper showed that residents with low economic status were pushed toward industrial areas within the cities, where the sewage districts were also placed. Additionally, the districts used the landscape to elevate themselves from the “dirt” of sewage to positively impact public opinion. This study is a beginning to open academic discussion about sewage districts and their importance in shaping cities.

COPS VS. COPS: HOW DOES COMMUNITY-ORIENTED POLICING COEXIST WITH CRIME-FIGHTING POLICING

Presenter	Gaines, Kian Graduate, Sociology/ Anthropology
Mentor	Prof. Jason Whitesel

INTRODUCTION: Community-Oriented Policing Services (COPS) emerged in response to longstanding criticisms revolving around police accountability and effectiveness. It emphasizes civilian participation in crime-prevention and problem-solving efforts to build trust between the police and minoritized communities with whom they have had an antagonistic relationship. Traditional policing is reactive in nature, with officers acting only after crime has been committed or a call for service has been made; it enforces the law; "legitimizes" use of violence; and emulates military structure and tactics. In this study I describe it as “crime-fighting policing.” COPS programs are embedded within this structure. Unlike traditional policing, COPS is characterized by four dimensions: philosophical, strategic, tactical, and organizational (Cordner 1999). **LITERATURE REVIEW**: Kennedy and Moore (1995) argue that the proper unit of analysis is not the program, but the police organization and its capacity to be flexible, innovative, and collaborative. However, there is a lack of research that (1) focuses on community-oriented policing programs and (2) examines how they are embedded within police departments and communities. **OBJECTIVE OF THE STUDY**: Research questions include: What are the attitudes of traditional crime-fighting police toward community policing? In what ways (if any) do these attitudes affect members of community policing programs or their goals? What are the goals of community policing versus the goals of crime-fighting police? How are community police officers and crime-fighting police trained? **METHOD**: A combination of in-depth interviews and observations of Chicago Police officers, both CAPS (Chicago Alternative Policing Strategy) and “regular” police officers, will be used to address these questions. **THEORETICAL FRAMEWORK**: A theoretical framework of organizational hypocrisy, referring to organizations acting in ways that are contrary to their stated goals, will be used to analyze the data. **PRELIMINARY FINDINGS**: Observations of CPD artifacts revealed that eight of Chicago’s twenty-five districts currently do not have any community events planned for the near future. Some of the remaining districts have scheduled “beat meetings” between community members and CAPS officers organized around “beats” (small geographic patrols) and meetings revolve around more specific issues (domestic violence, faith, and seniors) or committees.

RADIOCARBON DATING THE WHEELER SITE

Presenter	Graves, Colt
	Undergraduate, Sociology/Anthropology
Mentor	Prof. Logan Miller

In archaeology, it is essential to first understand *when* events transpired prior to evaluating *why* events unfolded the way they did. The best method to determine the timing of archaeological events is Accelerator Mass Spectrometry radiocarbon dating. This project, funded by an Undergraduate Research Support Program grant, covers the radiocarbon dating of the Wheeler site. Dating this site will not only provide further understanding of this place but will help in the understanding of Hopewell on a regional scale.

Between 2,000 and 1,500 years ago a cultural movement that archaeologists call Hopewell spread in the eastern US. Hopewell groups shared common symbols formed from minerals traded over long distances along with similar ways of building mounds to bury their dead. There is a great deal of variation related to time and place that archaeologists must understand about Hopewell. As a result, work needs to be conducted to understand individual sites before big questions of Hopewell can be resolved.

Wheeler is located in the lower Illinois River Valley and is a “ritual staging area.” where preparations for ritualistic activities associated with Hopewell mounds occurred. Artifacts from Wheeler and the Montezuma Mounds indicate that the Hopewell people, who used these sites, had access to trade networks that stretched across the American continent. A radiocarbon date from the Montezuma Mound indicates that it was used sometime between 50 – 200 AD, and a similar date range was expected from Wheeler.

At the Wheeler site, a stream bed that was recently excavated is full items used for ceremonies. Many of the piece still have charred bits of food residue, making these perfect for radiocarbon dating to determine when the site was used. Archaeologist Ken Farnsworth hypothesizes that the inhabitants of Wheeler first filled in the stream bed closest to the river with artifacts closer to the bluff, and the source of the spring, are more recent in time. Thus, two hypotheses about Wheeler need to be evaluated through radiocarbon dating. 1) Do radiocarbon dates from Wheeler indicate that it was used at the same time as the Montezuma Mounds? 2) Are radiocarbon dates from samples closer to the river older than radiocarbon dates from samples closer to the bluffs? The answer is yes. The hypotheses put forward are directly supported by the radiocarbon dates that were found. The radiocarbon dates from samples closer to the river are indeed older.

THERE ARE NO SUCH THINGS AS MORAL ACTS: CONCEPTUALIZING A NEW MORAL FRAMEWORK FOR THE OPPRESSED

Presenter	Park, Dani
	Graduate, Sociology/Anthropology
Mentor	Prof. Mike Hendricks

Both deontological and consequentialist notions of ethics have been duly criticized, the former due to the problem of universal maxims that ignore the delicate intricacies of situations that demand contextual understanding and the latter for ignoring the various moral processes that precede actions. This disillusionment has led some feminists to adopt the ethics of care as a way to subvert patriarchal tones and dehumanizing themes in moral discourse as well a moral relativism that has often been categorized as the ethics of the postmodern age. Yet all normative moral theories, including the ethics of care and moral relativism, posit that the individual is necessarily at the center of any moral equation, as she is the source of all actions of moral consideration. However, I will argue that current debates surrounding morality continue to enforce dehumanizing notions of ethics insofar as the insistence that moral acts and actors are separate foci of interest. Rather than elucidating the complexities of moral discourse and thereby revealing hidden ideological underpinnings, ethical matters continue to obfuscate power relations by maintaining the chasm between acts and their actors. In doing so, moral acts become disembodied, in a sense, and detached from its actor in an alienating relationship that emphasizes neither care nor respect for personhood. In this manner, I will argue that moral acts can never be “separated” from their actors, for in doing so morality becomes external to actors, and

therefore subject to abuses of power that reinforce a process of ideological dehumanization. There are therefore no such things as moral “acts”. It is only by understanding the inseparability of acts and actors that a morality of and for the oppressed can materialize through the actualization of the truly unified moral actor.

EMOTIVE HISTORIOGRAPHY: TOOL FOR THE OPPRESSED

Presenter	Park, Dani
	Graduate, Sociology/Anthropology
Mentor	Prof. Mike Hendricks

History is often portrayed as an "objective" science, in which the dispassionate historian is more akin to a detective than a storyteller. In this sense, history is the succession of events in a linear narrative. However, in the pursuit of objectivity in history, there exists a necessary externalization of the narrative, in which one is forced to adopt a perspective outside of oneself in viewing and interpreting history. In doing so, history necessarily separates events from figures within those events, thereby also preventing an emotional and subjective connection with those who have suffered in the past. In doing so, all models of historiography alienate the powerless in the current age by preventing them from connecting emotionally with similar peoples of the past: the past selves can never connect with the modern consciousness. Thus objectivity, far from being unbiased in historical assessments, always sides with those with power, and current historical narratives emphasize "strongmen" and the fetish of power exemplifies historical trends. Even historiographies that seek to change this narrative- particularly Marxist historiography- fall victim to it due to the acceptance of the logic of objectivity in history. The only way to reconfigure historiography as a tool for the oppressed is to introduce a new conceptual framework that humanizes the oppressed throughout historical accounts. Thus, I will argue that history, rather than discard personal accounts as unreliable and biased, should embrace the emotional and purely subjective humanness imbued in such stories. This can only happen if historical events are deemphasized in favor of the figures within those events. In this manner, events instigated by the powerful are separated and prevented from subsuming the oppressed within those events. This framework, called emotive historiography, seeks to ensure that division between events and figures, ensuring that narratives of ideology are always curtailed and emotional connections can always be had between the oppressed of today and those of the past.

A STUDY ON THE IMPACT OF COVID-19 ON LATINX COLLEGE STUDENTS IN THE MIDWEST

Presenter	Ricci, Molly
	Graduate, Sociology/Anthropology
Mentor	Prof. Maura Toro-Morn

This study proposes to examine how Latinx Illinois State college students who were enrolled in the Spring, 2020 semester experienced the transition to online learning after the onset of the worldwide Coronavirus pandemic. We are interested in investigating how they were affected by the pandemic and how they coped with it in the aftermath of college closures and movement to online learning. We draw on qualitative data which will be collected through a series of 30 total interviews collected in a snowball sample with various starting points. We anticipate that the pandemic affected the students’ learning and college experiences. Given what we know about racial differences in the impact of COVID-19 more broadly, we anticipated that Latinx students were differentially impacted in both the transition to online learning and their college experiences. We anticipate that our research will contribute to existing research by giving voice to the unique experience of Latinx students. We also want to examine the student’s perception of the university’s response. This study will contribute to the growing body of work that is emerging about the impact of the 2020 pandemic in college campuses across the nation.

Teaching and Learning

THE EFFECTS OF DUAL LANGUAGE PROGRAM ENROLLMENT ON STUDENT SOCIAL COMPETENCE

Presenter	Halperin, Kaytlin Undergraduate, Teaching and Learning
Mentor	Prof. Miranda Lin

In presenting my research, I will explain the method, results, and conclusion of my research on the effect of enrollment in Dual Language Programs on student social competence. Dual Language Programs exist to help native English-speaking students and those that speak another specified language, French, Spanish, Mandarin, work together to learn their non-native tongue in the same classroom. This is facilitated either by one teacher that is fluent in both languages or two different teachers, each fluent in one of the two languages. These programs invite students who speak another native language to develop their literacy skills in that language, making it easier to eventually transfer these skills to English. Alternatively, students who speak English natively are exposed to a second language that they will be able to speak fluently by the end of their career in the Dual Language Program. To ensure that all students can benefit from the development of a second language, these classes have a half-and-half configuration, with half the students being native English speakers and half speaking the other language.

I interviewed five Dual Language teachers from schools across central Illinois to understand the structure of their unique programs and the changes they have seen in their student's social interactions. All interviews took approximately forty-five minutes. The findings of this research indicate that no one component of a dual language program leads to higher social competence. Instead, there are many contributors that can help students improve upon themselves and their relationships. Among these factors are teachers that are aware and understanding of different cultures, single strands of classes so that students are continuously together, a variety of cultures and backgrounds represented in the classroom that extend into instruction, and supportive families that are open to the cultures of others. While all these factors exist in mainstream classrooms, they are not as apparent and therefore do not result in as much positive change in a students' social competence. Moreover, students are better able to maintain their home cultures at school as assimilation is not the goal.

The findings of my research support the existing literature about the academic benefits of Dual Language Program enrollment, in addition to supplementing it with information about the social benefits of such programs. Therefore, it fulfills its purpose to give parents and schools more well-rounded information when deciding whether to include such programs in schools.

DIGITAL DIVIDED: LITERATURE REVIEW

Presenter	Hentrich, Jill Undergraduate, Teaching and Learning
Mentor	Prof. Miranda Lin

One social inequality issue in education today is the digital divide. The digital divide is an unfortunate reality in schools today, and it describes the gap between those who have access to technology and the internet and those who do not. This gap has a particular effect on students since there are implications regarding student opportunity and achievement. With technology being a permanent part of society that will continue to grow, the digital divide is an area of concern that will also likely grow. Therefore, this issue must be a priority to teachers, the community, and the world. In my research, I review articles that present research and discourse on the topic of the digital divide. Korupp and Szydlik (2005) argue that human capital, social capital, and family context play a role in what causes the division between technology access. Further, the digital divide may have a particular effect on students from low socioeconomic status families. These effects include less exposure to learning opportunities and critical thinking, lower levels of social and academic achievement, and a lack of digital literacy skills (Rowsell et al., 2017). In this presentation, I will present research and the findings of discourses on the digital divide. More specifically, the focus will be on how the digital divide evolved and why it is an issue. Additionally, recommendations for teachers and school leaders to bridge the digital divide gap will also be discussed in my presentation.

RETURNING TO LEARNING DURING A PANDEMIC

Presenter	Shindley, Jessica Graduate, Teaching and Learning
Mentor	Prof. Jay Percell
Authors	Jay Percell; Jessica Shindley

When schools across the nation were shut down due to the COVID-19 pandemic in March 2020, parents were faced with many challenges regarding their children's education. After months of being shut down, school districts were tasked with navigating the restrictions and guidelines put in place by the CDC and state and local health agencies in order to make a decision about how the 2020-2021 school year would look for their students. After school districts made decisions regarding a return-to-learning plan, some parents had to decide whether or not to send their children to school during a pandemic. This study was designed to investigate socio-economic factors that contributed to parents' decisions to send their children to school remotely or in-person for the 2020-2021 school year. Surveys were deployed to parents of children in grades Kindergarten through 8th asking for feedback about their experience with remote learning at the end of the 2019-2020 school year and about their decisions regarding their children's academic setting for the 2020-2021 school year. Data is currently being collected; this presentation will convey initial findings from the emergent data of this research in progress.

Technology

EXPLORATORY STRUCTURAL EQUATION MODELING OF INFLUENCING FACTORS FOR CONCRETE CURING

Presenter	Awaitey, John Graduate, Technology
Mentor	Prof. Haiyan Xie
Co-Mentor	Prof. Prashoo Solanki
Authors	John Awaitey; Prashoo Solanki; Haiyan Xie; Tejaswi Katangur

Concrete curing is a comprehensive construction activity that varies in duration and is critical to the quality and strength of the material when it hardens. An essential challenge of this activity is to choose the appropriate curing and testing methods for a wide assortment of concrete designs because the material is affected by multiple factors (e.g., temperature and moisture) and requires the collaboration of workers, engineers, and inspectors. This research proposes to explore the influencing factors and create a data model to describe the relationships of the factors, which can help project teams to understand the key elements of concrete curing and enhance the quality control of the construction activity. In this research, a questionnaire survey was designed, reviewed, and approved to collect the information from the departments of transportation in the U.S. and Canada with the purpose to understand the current curing practice of on-site concrete. The survey was delivered and managed using an online tool called Qualtrics and the received data was analyzed using an exploratory structural equation modeling (SEM) method. The analysis will reveal the underlying factors that cause patterns and also study indicators or actors to explain these factors. Next, a SEM will be built to assess the latent variables that cannot be observed but rather inferred based on prevailing factors and group these factors into sections based on their characteristics. After the model formation, the research will examine Cronbach's alpha to estimate the internal consistency of the identified factors and generalize the results.

ECONOMIC FEASIBILITY OF A SOLAR PHOTOVOLTAIC SYSTEM ON TOP OF THE BONE STUDENT CENTER AT ILLINOIS STATE UNIVERSITY

Group Leader	Briggs, Mitchell Undergraduate, Technology
Group Members	Thomas Langbein, Undergraduate, Technology
Mentor	Prof. Jin Jo

With Illinois aiming for 100% renewable energy by 2050, implementing renewable energy and sustainability systems at educational institutions is vital to Illinois' transition to a more sustainable energy path. The purpose of this study is to evaluate the economic feasibility of installing a solar photovoltaic (PV) system on top of the Bone Student Center at Illinois State University. Here we suggest different solar PV array configurations that explore the cost of a system versus its efficiency. These configurations are based on solar PV modeling software, and interviews with professionals in the field, which provides the information necessary to conduct an economic assessment of these configurations. Technical analysis information allowed us to create SAM and Microsoft Excel based models for Power Purchasing Agreement (PPA) and ownership financing plans. The results of this study can provide other public institutions, within the state of Illinois, an example of the economic feasibility of installing a solar PV array system on campus.

INFLUENCE OF FIELD-CURING CONDITIONS ON STRENGTH OF CONCRETE TEST SPECIMENS

Presenter	Katangur, Tejaswi Reddy Graduate, Technology
Group Members	John Awaitey, Graduate, Technology; Juhi Patil, Graduate, Technology
Mentor	Prof. Pranshoo Solanki
Co-mentor	Prof. Xie Haiyan
Authors	Pranshoo Solanki; Xie Haiyan; Tejaswi Reddy Katangur; John Awaitey

Illinois Department of Transportation (IDOT) follow Illinois modified AASHTO T23 test method for making and curing concrete test specimens in the field. This provides the information when to remove form/falsework and open pavement to traffic. However, there is a lack of comparison of field-cured specimen strength with the strength of the actual in-place concrete item. The objective of this research is to build up the understanding of the current state of practice for field-curing methods.

To achieve this objective, a comprehensive literature review was conducted to identify the field-curing methods used by various highway agencies. A total of 36 highway agencies (34 US highway agencies and 2 Canadian provinces) were reviewed using literature collected from the Transportation Research Information Service (TRIS) and standard specifications from DOTs' webpages. It was found that majority of the transportation agencies use the field-curing cylinders (28 out of 36, 78%) followed by the maturity method (16 out of 36, 44%) to decide when to open pavement to traffic or removal of form/falsework. Only 12 out of 36 (33%) of transportation agencies use beams for determining field-strength. Further, 45% of the DOTs' use field-curing cylinders more than beams for opening pavement to traffic. Both 100 mm x 200 mm (4 inch x 8 inch) and 150 mm x 300 mm (6 inch x 12 inch) were the commonly used sizes for cylinders. For beams, DOTs' commonly use 150 mm x 150 mm x 500 mm (6 inch x 6 inch x 20 inch) specimen size. The commonly used field-curing methods for cylinders were casted in the same manner as concrete, field-cured in an insulated box such as cooler or under burlap/insulation near the concrete item. Whereas beams were commonly field cured in a damped sandpit or under burlap/ insulation near the concrete item.

PREDICTING THE MORTALITY RISK IN COVID-19 WITH CLINICAL CHARACTERISTICS AND LABORATORY OUTCOME CHARACTERISTICS USING DATA MINING METHODS

Presenter	Mohammadhasanshirazi, Neda Graduate, Technology
Mentor	Prof. Haiyan Xie

Background: Coronavirus disease 2019 (COVID-19) which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was declared as a pandemic. We aimed to predict death outcome of COVID-19 using data mining methods.

Material and Methods: 72390 laboratory-confirmed case were included to the study during February 10, 2020 to August 17, 2020, according to the Centers for Disease Control and Prevention (CDC) data. . In order to be able to find important and influential variables in predicting the mortality of COVID-19 among our variables including demographical, and clinical factors, we used the random forest method. The prediction of death outcome was done using logistic regression with all variables and selected variables.

Results: Through all patients, 2150 (2.97%) cases experienced the death outcome. The association between disease outcome (survivor and deceased) and variables including age, gender, US worker, developed, race, all sign and symptoms, abnormal chest

X-ray, ARDS, hospitalization, ICU admission, and intubation was significant (p-value<0.01). The median value of mean decrease accuracy was 42.10 and variables including age group, ARDS, fever, sex, cough, race, subjective fever, abnormal chest X-ray, diarrhea, intubation, dyspnea, and Myalgia were selected as the important factors for prediction of death outcome. Logistic regression with all variables and selected variables had the AUC of 0.96. Other performance criteria were slightly different between two models.

Conclusion: Using data mining models, the death of patients with COVID-19 can be predicted with high accuracy.

LIGHTING THE WAY TO SOLAR: A GUIDE ON RESIDENTIAL SOLAR INCENTIVES FOR THOSE WHO CALL NORMAL, IL HOME

Group Leader	Phillips, Jessica Undergraduate, Technology
Group Members	Ryan Hand, Undergraduate, Technology; Kevin Ellis, Undergraduate, Technology
Mentor	Prof. Jin Jo

The path to installing a solar photovoltaic (PV) system on one's own roof can be both confusing and expensive. Although the cost of solar is declining, it remains a barrier to many potential adopters. To combat this and promote clean energy, the government at both state and federal levels offer incentives including personal tax credits, direct cash payments, loan programs and solar renewable energy credits. This research study pertains to single family homeowners serviced by the Ameren utility company in Normal, IL. However, the framework of this study may be applicable to other residents within the United States who want to understand what incentive structures are available to them. After explaining the incentives that are available, this study works to match the most compatible incentives with single-family homeowners. These groups are then used as representatives in our System Advisor Models (SAM) which are generated for each group paired with each incentive with all other parameters equal at a specified standard. Through comparative analysis, financial feasibility is determined based on the incentives impact on initial costs of installation and simple payback period. The significance of this study is to show residents what the available options are, along with the benefits in hopes of increasing the rate of residential solar adoption in Normal, IL.

TECHNICAL AND ECONOMIC FEASIBILITY STUDY OF UTILITY-SCALE SOLAR PHOTOVOLTAIC AND ENERGY STORAGE SYSTEMS AT ILLINOIS STATE UNIVERSITY

Group Leader	Plucinski, Ryan Undergraduate, Technology
Group Members	Rafael Rivera, Undergraduate, Technology; Dalton Starkey Undergraduate, Technology
Mentor	Prof. Jin Jo
Authors	Ryan Plucinski; Rafael Rivera; Dalton Starkey

Solar energy has come a long way since the turn of the century and has been proven to be a useful source of renewable energy from both an environmental, economic and educational standpoint. The advancement of energy storage technology has opened more doors to the capabilities of production for these systems. This study shows expected outcomes of potential locations on Illinois State University's (ISU) campus. While there have been several studies conducted on solar photovoltaic (PV) systems on campus none have analyzed the implementation of energy storage. We will use Google Earth Pro and Helioscope to conduct site analysis for a majority of the locations within campus for optimal placement of PV array systems. System Advisory Model will provide financial estimates and energy analysis that will cover the data collected through other tools. These methods give feedback and forecasts to the University. This study seeks to provide information as to how a combination of the two systems can lower demand during high demand hours ISU.

IMPROVEMENT OF WORK SAFETY USING VEHICLE-COLLISION WARNING SYSTEM AND DEEP LEARNING APPROACH

Presenter	Shi, Tianfang Undergraduate, Technology
Mentor	Prof. Haiyan Xie

Construction workers are affected by high hazard factors on job sites and should be protected from fatalities and injuries. With the advent of artificial intelligence (AI) and Virtual and Augmented Reality (VR/AR), machine vision has become essential in avoiding collision safety accidents during construction. This research aims at collision prevention between workers and machines (i.e., trucks) in excavation site construction by an intelligent evaluation and simulation system to reflect worker–machine safety status. The system included: (1) simulation of the key factors affecting the safety of the interactive operation between workers and machines based on literature review and documented cases; (2) assessment of the safety state of a monitored object using a gaming environment. A case study of concrete site construction is presented to illustrate and verify the entire process of safety assessment using the proposed method. This study develops an innovative simulation system and comes up with prospective research works, which can connect with VR/AR. It is envisioned that the outcomes of this research could assist both researchers and industrial practitioners with improved safety management.

FEASIBILITY ANALYSIS OF RETROFITTING CENTRAL ILLINOIS REGIONAL AIRPORT WITH SOLAR PHOTOVOLTAIC ARRAYS

Group Leader	Shook, Evan Undergraduate, Technology
Group Members	Jackson Brummel, Undergraduate, Technology; Kevin Healy Undergraduate, Technology
Mentor	Prof. Jin Jo

With the current decline of fossil fuel production, there is a growing political push towards a more environmentally sustainable way to harness clean energy. To address this issue, we aim to create a construction bid, where solar photovoltaic is implemented on unused land at Central Illinois Regional Airport. Many Municipal airports, often as a consequence of the public bidding domain, where the lowest and most responsible bidder is awarded the project, properties are left with an abundance of unused land that could be utilized for profit maximization. In order to provide a more descriptive framework for a change in energy management, we decided that a bid proposal is the best option because it is implemented in actual solar construction projects. The following construction bid encompasses the elements of a bid proposal to include financial analysis, satellite mapping and array layout, estimation, fulfillment of FAA regulations, and safety mitigation procedures. This research aims to be an economic and environmentally driven framework for institutions should they be interested in proposing a photovoltaic retrofit of their own.

UNIVERSITY OF NEBRASKA-LINCOLN DISTRICT SOLAR PHOTOVOLTAIC TECHNICAL AND ECONOMIC FEASIBILITY ANALYSIS

Group Leader	Weber, Brittany Undergraduate, Technology
Group Members	Katrina Keller, Undergraduate, Technology; Katelyn Dunnagan Undergraduate, Technology; Oliver Wuebbels, Undergraduate, Technology
Mentor	Prof. Jin Jo
Authors	Brittany Weber; Katrina Keller; Katelyn Dunnagan; Oliver Wuebbels

This research evaluates the installation of a variety of photovoltaic systems throughout the University of Nebraska-Lincoln to offset the energy consumption of the campus. These systems include roof-mount, ground-mount, carport and agrivoltaic structures. Previous studies have been performed for the feasibility of commercial solar, but they have lacked focus on campus-wide integrations that can be replicated. Using this research other universities, colleges, or campus-based businesses can follow this process to achieve their own sustainability goals. The University of Nebraska-Lincoln has a master plan to achieve net zero energy for the campus as well as providing educational opportunities to students, faculty, and the community. We conducted design and site analyses to determine which buildings on campus would offset the most energy while being financially enticing to investors. To accomplish this, we look to achieve an internal rate of return of at least 10% and have all the systems be completely covered by power purchase agreements to eliminate the upfront equipment investment from the university. Additionally, we evaluated the legitimacy of our system designs by performing a distribution analysis. A battery storage solution is designed and evaluated for the roof mount system proposed to be installed on the Animal Science building which will store 30% of the system's energy production. Our results are expected to show the benefits of integrating several solar photovoltaic solutions throughout a college campus or large district. It will not only offset the energy cost of the university, but also serve as an educational opportunity for replicable solutions and inspiration within the commercial solar industry.

Theatre and Dance

GENDER AND SEXUALITY WITHIN POSTWAR GERMAN CINEMA

Presenter	Goffard, Kevin Graduate, Theatre and Dance
Mentor	Prof. Kee-Yoon Nahm

Following World War II, Germany was suffering on many fronts. Besides the economic and political toll and fallout that the country had just endured due to the results of the war, Germany culture was also changing. Like many countries, women were able to escape their traditional gender roles during the war, and throughout that period, they gained more authority as well. When German male soldiers returned home, they had to confront this new authority and gender roles that the woman had possessed. This coupled with the feminization of the German males for being on the 'losing' side of the war helped lead to what is known as "The Crisis of Masculinity". During this time, many in Germany responded by advocating for a new type of German masculinity which would link traditional gender roles and traditional notions regarding sexuality in a complex way to national pride and nationality. The 1957 German film, Different from You & Me by Veit Harlan helps to illustrate this period and the anxiety that surrounded postwar Germany. Using clips from the film as visual aid, this presentation will explore The Crisis of Masculinity, Sexuality, and Gendered Roles and their connection to Postwar German life.

INTIMACY COORDINATORS: A MUCH NEEDED CHANGE

Presenter	Phillips, Laura Graduate, Theatre and Dance
Mentor	Prof. Kee-Yoon Nahm

The call for change that swept the film, television, and theatre industries in the wake of the #MeToo and #TimesUp movements has led to the emergence of a new role in stage and screen productions: intimacy coordinators. Much like with staging fight scenes, intimacy coordinators are responsible for working with the director, actors, and other crew members to carefully choreograph intimate moments in a way that everyone involved is comfortable with, while still serving the story being told. In this paper, I will examine the methodology used by Intimacy Directors International (IDI) and the positive impact it has on the production process. Using examples from classic Shakespeare works, I will demonstrate how an intimacy coordinator's work could impact specific scenes, providing the actors, director, and even the audience with a better theatre experience. Finally, I will argue that intimacy coordinators are beneficial to any production involving even mildly intimate scenes or gestures and should become a staple of the film and theatre industries.

MORE THAN THE LABEL: REPRESENTING NON-BINARY SEXUALITY IN TELEVISION PROGRAMMING

Presenter	Skym, Wesley Graduate, Theatre and Dance
Mentor	Prof. Kee-Yoon Nahm

At the 2020 Primetime Emmy Awards, the Canadian comedy show Schitt's Creek broke records with their number of wins for the night. Not only was this a win for Canadian television and comedy shows in general, it was a win for the Pansexual Community due to Daniel Levy's award for his portrayal of David, a pansexual character. Levy took home the Emmy for Outstanding Supporting Actor in a Comedy Series, marking the first time that an actor has won this award for their portrayal of a character that is pansexual. This is a historic win for the representation of pansexual, bisexual, and non-binary sexual identities in television, which are considerably scarce compared to their binary counterparts of heterosexuality and homosexuality, and the integration of such characters in mainstream media. In this paper, I will explore the importance of the representation of these identities in a variety of television mediums from Comedy to Family and Drama to Youth and Animation, specifically looking at the programs *Schitt's Creek* on CBC/POP, This *Is Us* on NBC, and *The Owl House* on Disney Channel.

ORAL PRESENTATIONS

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DEPARTMENT OF PHYSICS

April 10

Undergraduate Zoom Oral Sessions (meeting ID # 91481681464)
Faculty mentors: Dr. Mahua Biswas, Dr. Matthew Caplan, Dr. Xing Fang, Dr. Rosangela Follman, Dr. Rainer Grobe, Dr. Uttam Manna, Dr. Epaminondas Rosa Jr., Dr. Andres Vidal-Gadea, and Dr. Q. Charles Su

****

Session 1

8:00-8:15 a.m.
Cassie McGinnis (Rosa, Follmann)
NETWORK INFLUENCE ON NEURONAL ACTIVITY PREDICTION

8:15-8:30
Zachary Mobille (Follmann, Vidal-Gadea, Rosa)
MATHEMATICAL MODELLING OF TEMPERATURE EFFECTS ON THE AFD NEURON OF CAENORHABDITIS ELEGANS

8:30-8:45
Jordan Bryan (Grobe, Su)
DIRAC VACUUM CAN RESOLVE RAPIDLY CHIRPED EXTERNAL FIELDS

8:45-9:00
Tom Sturino (Grobe, Su)
USING EVOLUTIONARY PRINCIPLES IN SYMBOLIC REGRESSION

9:00-9:15
Marcos Perez (Biswas)
SILICON NANOPARTICLES FOR OPTICAL TWEEZING

9:15-9:30
Amelia Korveziroska (Biswas)
SILICON BASED INORGANIC MATERIALS NANOPATTERNING FOR MICROELECTRONIC APPLICATIONS

9:30-9:45
Ian Freeman (Caplan)
PRECISE DIFFUSION COEFFICIENTS FOR WHITE DWARF ASTROPHYSICS

9:45-10:00
Luis Rizo (Fang, Grobe, Su)
THE EXACT PREDICTABLE FUNCTIONS BY A SINGLE NEURON

10:00 – 10:15 a.m.
Break

Session 2:

10:15-10:30
Jordan Bryan (Grobe, Su)
SYMBIOTIC VS. NON-SYMBIOTIC OPTIMIZATION FOR SPATIAL AND TEMPORAL DEGREES OF FREEDOM IN PAIR CREATION

10:30-10:45
Cal Forsman (Caplan)
THERMOELASTICITY OF NUCLEAR PASTA

10:45-11:00
Brighton Coe (Caplan)
SIMULATED MULTIFRAGMENTATION OF ^{48}CA WITH ^{48}CA COLLISIONS

11:00-11:15
Brighton Coe (Biswas, Manna)
RESONANCE COUPLING BETWEEN OPTICAL ANAPOLES AND QUANTUM EMITTERS IN SILICON NANOSPHERE J-AGGREGATE HETEROSTRUCTURES

11:15-11:30
Brighton Coe (Manna, Biswas)
EXCITATION OF DARK MODE IN HIGH-INDEX SILICON OLIGOMER NANOSTRUCTURES USING CYLINDRICAL VECTOR BEAMS

11:30-11:45
Michal Szcerba (Manna)
MIE SCATTERING FROM SINGLE SILICON NANOPARTICLES

11:45-12:00 p.m.
Scott Urnikis (Rosa, Follmann)
PROPAGATING WAVES OF SYNCHRONIZATION IN THE BRAIN

12:00-12:15
Jack Bellinger (Grobe, Su)
GENETIC EVOLUTION AS A MEANS TO FIND PHYSICS FORMULAS

12:15-12:30
Harold Diaz (Caplan)
TIDES IN COLLIDING GALAXIES

12:30 p.m.
The End of the Physics Zoom Oral Sessions

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SCHOOL OF THEATRE & DANCE

Oral Presentations

Organized by Dr. Kee-Yoon Nahm

Zoom link: https://illinoisstate.zoom.us/j/2269344477

April 15, 2021

3:00 - 4:30 p.m.

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Kevin Goffard (Master's in Theatre Studies)

"Gender & Sexuality within Postwar German Cinema"

Shahrbanoo Hamzeh (MFA in Painting, Wonsook Kim School of Art)

"Welcoming in the Front Door"

Laura Phillips (Master's in Theatre Studies)

"Intimacy Coordinators: A Much Needed Change"

Wesley Skym (Master's in Theatre Studies)

"More Than the Label: Representing Non-Binary Sexualities in Television Programming"

ALPHABETICAL LIST OF PRESENTERS

A				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Allen	Brooke	8	Biological Sciences	Alysia Vrailas-Mortimer
Allen	Tae'lor	8	Biological Sciences	Rebekka Darner
Alperstein	Hannah	52	Physics	Matt Caplan
Aument	Emily	72	Psychology	Suejung Han
Awaitey	John	82	Technology	Haiyan Xie
Awaitey	John	83	Technology	Pranshoo Solanki
Awe	'Tope	9	Biological Sciences	Andres Vidal-Gadea
Azimi Asmaroud	Seyedehkhadijeh	49	Mathematics	David Barker
B				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Barrack	Jessica	45	Kinesiology & Recreation	Nikki Hoffman
Bartolone	Carolyn	61	Psychology	Dawn McBride
Bellinger	Jack	52	Physics	Q. Charles Su
Benefiel	RJ	44	Information Technology	Pruthikrai Mahatanankoon
Black	Lauren	61	Psychology	Dawn McBride
Bossert	Brooke	47	Kinesiology & Recreation	Kristen Lagally
Bove	Rebecca	62	Psychology	Alycia Hund
Breit	Jake	42	History	Amy Wood
Briggs	Mitchell	82	Technology	Jin Jo
Brokaw	Jim	43	Information Technology	Qi Zhang
Brougham	Jessica	45	Kinesiology & Recreation	Rebecca Achen
Brummel	Jackson	85	Technology	Jin Jo
Bruner	Sam	25	Creative Technologies	Kristin Carlson
Bryan	Jordan	52	Physics	Q. Charles Su
Bryan	Jordan	53	Physics	

Burkhart	Jessica	9	Biological Sciences	Alysia Mortimer

C

Presenter Last Name	*Presenter First Name*	*Page Number*	*Department/School*	*Faculty Mentor*
Carley	Tessa	62	Psychology	Adena Meyers
Carlson	Erik	76	Sociology/Anthropology	Maura Toro-Morn
Carroll	Rowan	41	Health Sciences	LC Yang
Chambers	Emmi	36	Geography, Geology, and the Environment	Matthew Himley
Coe	Brighton	53	Physics	Mahua Biswas
Coe	Brighton	53	Physics	Matthew Caplan
Coe	Brighton	54	Physics	
Conley	Ethan	36	Geography, Geology, and the Environment	Eric Peterson
Contreras	Berenice	69	Psychology	Shengtian Wu
Cossio	Ethan	25	Creative Technologies	Sercan Sengun

D

Presenter Last Name	*Presenter First Name*	*Page Number*	*Department/School*	*Faculty Mentor*
DeMaegd	Margaret	9	Biological Sciences	Wolfgang Stein
DeVore	Amanda	63	Psychology	Dawn McBride
Diaz	Jacqueline	62	Psychology	Alycia Hund
Diaz	Harold	54	Physics	Matthew Caplan
Diaz	Vanessa	63	Psychology	Jordan Arellanes
DiSerio	Alexander	46	Kinesiology & Recreation	Kristen Lagally
Dumas	Ashley	10	Biological Sciences	Rebekka Darner
Dunnagan	Katelyn	86	Technology	Jin Jo

E

Presenter Last Name	*Presenter First Name*	*Page Number*	*Department/School*	*Faculty Mentor*
Ebersole	Courtney	76	Sociology/Anthropology	Jason Whitesel

Ehlers	Haley	59	Politics and Government	Michael Hendricks
Ellis	Kevin	84	Technology	Jin Jo
Ervin	Anastasia	77	Sociology/Anthropology	Kathryn Sampeck
F				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Farchmin	Paige	10	Biological Sciences	Scott Sakaluk
Fasawe	Ayoola	11	Biological Sciences	Martin Engelke
Fatemi	Maryam Alsadat	30	Economics	George Waters
Fischer	Natalie	64	Psychology	Laura Finan
Foreman	Mikayla	64	Psychology	Daniel Lannin
Forsman	Cal	54	Physics	Matthew Caplan
Freeman	Ian	55	Physics	Matthew Caplan
G				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Gaines	Kian	77	Sociology/Anthropology	Jason Whitesel
Gardner	Asher	11	Biological Sciences	Victoria Borowicz
Garduno	Caesar	30	Economics	Susan Chen
Glick	Haleigh	65	Psychology	Gary Cates
Goffard	Kevin	87	Theatre and Dance	Kee-Yoon Nahm
Gonzalez	Josselyn	12	Biological Sciences	Wolfgang Stein
Graves	Colt	78	Sociology/Anthropology	Logan Miller
Gray	Melissa	27	Criminal Justice Sciences	Jessie Krienert
Green	Whitney	14	Biological Sciences	Laura Vogel
Green	Alyssa	20	Communication	John Baldwin
Green	Alyssa	20	Communication	Lance Lippert

H				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Halperin	Kaytlin	80	Teaching and Learning	Miranda Lin
Hamzeh	Shahrbanoo	7	Art	Elisabeth Friedman
Hand	Ryan	84	Technology	Jin Jo
Harlovic	Tom	51	Philosophy	Eric Godoy
Harm	Alena	27	Criminal Justice Sciences	Michael Gizzi
Hatfield	Andrew	49	Mathematics	Sunil Chebolu
Hazzard	Evan	44	Information Technology	Pruthikrai Mahatanankoon
Healy	Kevin	85	Technology	Jin Jo
Heath	Abigail	37	Geography, Geology, and the Environment	Eric Peterson
Hentrich	Jill	80	Teaching and Learning	Miranda Lin
Heyen	Ellis	74	Psychology	Alycia Hund
Hobson	Brandon	47	Kinesiology & Recreation	Kristen Lagally
Hughes	Kiley	13	Biological Sciences	Andrez Vidal-Gadea
I				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Irannezhad	Zahra	26	Creative Technologies	Kristin Carlson
Irwin	Samuel	13	Biological Sciences	Martin Engelke
Isaacs	Raina	65	Psychology	Dawn McBride
J				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Jahraus	Ella	25	Creative Technologies	Kristin Carlson
Jasinski	Lucas	74	Psychology	Alycia Hund
K				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Katangur	Tejaswi Reddy	83	Technology	Pranshoo Solanki
Kelleher	Mackenzie	61	Psychology	Dawn McBride

Keller	Katrina	86	Technology	Jin Jo
Kelly	Breanna	23	Communication Sciences and Disorders	Taeok Park
Klette	Riley	49	Mathematics	Sunil Chebolu
Korveziroska	Amelia	55	Physics	Mahua Biswas
Kraimer	Cassidy	59	Politics and Government	Michael Hendricks
Krause	Jenny	47	Kinesiology & Recreation	Adam Jagondinsky

L

Presenter Last Name	*Presenter First Name*	*Page Number*	*Department/School*	*Faculty Mentor*
Lagunas	Karen	28	Criminal Justice Sciences	Charles Bell
Langbein	Thomas	82	Technology	Jin Jo
Lemp	Haley	41	Health Sciences	Jacqueline Lanier
Lopez	Elizabeth	19	Chemistry	Lisa Szczepura
Lusk	Elliot	14	Biological Sciences	Joseph Casto
Luu	Truong (Jack)	43	Information Technology	Rosangela Follman

M

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Main	Natalie	74	Psychology	Alycia Hund
Mangini	Olivia	62	Communication Sciences and Disorders	Alycia Hund
Marsh	Elizabeth	73	Psychology	Dawn McBride
Marsh	Elizabeth	65	Psychology	Dawn McBride
Martin	Amanda	74	Psychology	Jordan Arellanes
Martinez	Grace	66	Psychology	Jordan Arellanes
McGinnis	Cassie	55	Physics	Epaminondas Rosa
McGowens	Kenyetta	60	Politics and Government	LJ Zigerell
McGrath	Kaylie	66	Psychology	Brea Banks
Mensah	Dylis-Judith	34	Family and Consumer Sciences	Erol Sozen
Mercado-Ramos	Danieli	67	Psychology	Julie Campbell

Metzger	Ella	62	Psychology	Alycia Hund
Michaels	Christina	68	Psychology	Daniel Lannin
Mobille	Zachary	56	Physics	Rosangela Follmann
Mohammadhasanshirazi	Neda	83	Technology	Haiyan Xie
Mool	Allison	14	Biological Sciences	Laura Vogel
Moore	Christopher	49	Mathematics	Sunil Chebolu
Morgan	Allison	15	Biological Sciences	Victoria Borowicz
Murarus	Alexandra	15	Biological Sciences	Martin Engelke
N				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Neal	Sydni	68	Psychology	Laura Finan
Noseworthy	Caitlin	37	Geography, Geology, and the Environment	Catherine O'Reilly
Nowlin	Preston	44	Information Technology	Pruthikrai Mahatanankoon
O				
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Okrasinski	Lucy	62	Psychology	Alycia Hund
Olson	Alexander	38	Geography, Geology, and the Environment	Alec Olson
Orlando	Nina	69	Psychology	Shengtian Wu
Ornelas	Gabriela	41	Health Sciences	LC Yang
Oyedokun	Olaoluwa	26	Creative Technologies	Kristin Carlson
P				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Park	Dani	78	Sociology/Anthropology	Michael Hendricks
Park	Dani	79	Sociology/Anthropology	Michael Hendricks
Parks	Haley	34	Family and Consumer Sciences	Ui-Jeen Yu
Patil	Juhi	83	Technology	Pranshoo Solanki
Paton	Hanna	14	Biological Sciences	Laura Vogel
Peebles	Meredith	23	Communication Sciences and Disorders	Ciera Lorio

Perez	Marcos	56	Physics	Mahua Biswas
Perkins	Chelsea	28	Criminal Justice Sciences	Ashley Farmer
Persico	Geno	38	Geography, Geology, and the Environment	Wondwosen Seyoum
Pham	Duy	21	Communication	Kevin Meyer
Phillips	Jessica	84	Technology	Jin Jo
Phillips	Laura	87	Theatre and Dance	Kee-Yoon Nahm
Phillis	Ellie	70	Psychology	Laura Finan
Plucinski	Ryan	84	Technology	Jin Jo
Plumadore	Alexander	57	Physics	Allison Harris
R				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Regez	Amanda	23	Communication Sciences and Disorders	Ciera Lorio
Rettig	Ryan	28	Criminal Justice Sciences	Ashley Farmer
Reyes	Christian	29	Criminal Justice Sciences	Mike Rossler
Reyes- Hernandez	Leslie	50	Mathematics	Edward Mooney
Ricci	Molly	79	Sociology/Anthropology	Maura Toro-Morn
Riedel	Jake	39	Geography, Geology, and the Environment	Eric Peterson
Rivera	Rafael	84	Technology	Jin Jo
Rizo	Luis	57	Physics	Xing Fang
Robinson	Calli	4	Agriculture	Maria Boerngen
Roy	Rajit	16	Biological Sciences	Wolfgang Stein
S				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Sahad	Alhassan	39	Geography, Geology, and the Environment	Eric Peterson
Salvadore	Abigail	48	Kinesiology & Recreation	Michael Torry
Samsami	Ian	30	Economics	Susan Chen
Schukow	Elijah	40	Geography, Geology, and the Environment	Eric Peterson

Shaull	Marissa	73	Psychology	Shengtian Wu
Sherman	Valerie	70	Psychology	Mark Swerdlik
Shi	Tianyuan	44	Information Technology	Haiyan Xie
Shi	Tianfang	85	Technology	Haiyan
Shilney	Nicholas	71	Psychology	Suejung Han
Shilney	Nicholas	72	Psychology	Suejung Han
Shindley	Jessica	81	Teaching and Learning	Jay Percell
Shine	Grace	73	Psychology	Dawn McBride
Shook	Evan	85	Technology	Jin Jo
Skym	Wesley	87	Theatre and Dance	Kee-Yoon Nahm
Starkey	Dalton	84	Technology	Jin Jo
Sturino	Tom	57	Physics	Q. Charles Su
Sullivan	Kaitlyn	22	Communication	John Baldwin
Supanichrattana	Tanaporn	32	Educational Administration & Foundations	John Rugutt
Suprunowski	Coy	20	Communication	John Baldwin
Szcerba	Michal	58	Physics	Uttam Manna

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Presenter Last Name	*Presenter First Name*	*Page Number*	*Department/School*	*Faculty Mentor*
Tamrazi	Monica	17	Biological Sciences	Andres Vidal-Gadea
Tauber	Ashley	17	Biological Sciences	Charles Thompson
Thedorf	Erianne	21	Communication	John Baldwin
Theleritis	Maesyn	23	Communication Sciences and Disorders	Ciera Lorio
Thomas	Rachel	74	Biological Sciences	Alycia Hund
Tidmarsh	Bryanna	33	English	Mary Moran
Todd	Marissa	23	Communication Sciences and Disorders	Taeok Park
Trice	Nathan	74	Psychology	Alycia Hund

Twanow	Laine	73	Psychology	Shengtian Wu
U				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Urnikis	Scott	58	Physics	Epaminondas Rosa
V				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Vaez	Sara	31	Economics	George Waters
Vink-Lainas	Liisi	18	Biological Sciences	Wolfgang Stein
W				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Walsh	Meara	35	Family and Consumer Sciences	Ui-Jeen Yu
Walton	Aidan	4	Agriculture	Aslihan Spaulding
Warden	Beth	49	Mathematics	Sunil Chebolu
Wassik	Jack	40	Geography, Geology, and the Environment	Eric Peterson
Weber	Brittany	86	Technology	Jin Jo
Westphal	Hannah	74	Psychology	Dawn McBride
Wohrley	Bethany	5	Agriculture	Nicholas Heller
Wuebbels	Oliver	86	Technology	Jin Jo
Y				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Yeboah	Benjamin	5	Agriculture	Iuliia Tetteh
Z				
Presenter Last Name	***Presenter First Name***	***Page Number***	***Department/School***	***Faculty Mentor***
Zinke	Lauryn	74	Psychology	Alycia Hund
Zinke	Maya	6	Agriculture	Drew Lugar