SUNY New Paltz

SRS

Student Research Symposium

May 2nd, 2025

Sojourner Truth Library

300 Hawk Drive
Library Main Floor
4:00 - 6:30 PM

Sponsored by the Research, Scholarship and Creative Activities (RSCA) Office

31st ANNUAL SUNY NEW PALTZ STUDENT RESEARCH SYMPOSIUM

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Editors: Gage Dubraski, Kenneth Nystrom
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The 2025 Student Research Symposium

This year marks the 31st consecutive installment of the SRS, our annual celebration of student-faculty scholarship at SUNY New Paltz.

Symposium Schedule Friday, May 2nd

- 3:45 pm - 4:15 pm: Check-in and hors d'oevres
- 4:15 pm - 4:30 pm: Welcome remarks and awards
- 4:30 pm - 6:30 pm: Poster Presentations

Acknowledgments

We heartily thank:

- the Office of Academic Affairs for its support of the RSCA, including generous funding for this SRS, our AYURE and SURE grants, and Travel funds;

- the SUNY New Paltz Foundation and donors Michele Di Palo-Williams '77 (Sociology) and Graeme Williams for creating our new Student Opportunity Grant;

- Campus Auxiliary Services and Sodexo for funding and serving the hors d'oeuvres, respectively;

- the Sojourner Truth Library for hosting this year's SRS.

RSCA Advisory Board: Li Gao (Business), Judith Halasz (Sociology), Richard Halpern (Physics & Astronomy), Ken Nystrom (RSCA Director, Anthropology), Pamela St. John (Chemistry), Andrea Varga (Theatre Arts), Christine Woodcock (Literacy Education), Sarah Wyman (English)

Administrative Assistant: Gage Dubraski

Welcome to the 2025 Student Research Symposium!

Message from the Provost and Vice President of Academic Affairs

Congratulations on the impressive accomplishments and demanding work reflected in these pages and projects. We are proud to celebrate the dedication, curiosity, creativity, mentorship, and innovation reflected here. Your work demonstrates your engagement in primary research and original inquiry, as well as your commitment to seeking answers to questions that matter across many disciplines and activities. This work reflects the deep intellectual engagement that lies at the heart of academic scholarship. You have now become part of the scholarly pursuit in your field of study and have contributed to our collective understanding of the world.

Each project featured within these pages is the result of sustained investigation supported by the invaluable guidance of faculty mentors. I know you will join me in extending great appreciation for the support and work of your mentors, the RSCA Advisory Board, and the RSCA director, Dr. Ken Nystrom. Their leadership and dedication make this program possible.

Thank you for being part of this collaboration and supplementing the richness of the learning community at SUNY New Paltz. We look forward to hearing about the many experiences and successes you have as you take the knowledge, skills, and understandings gleaned in these experiences into your future educational, professional, and civic lives.

Once again, congratulations!

William McClure
Provost and Vice President for Academic Affairs

Message from the RSCA Director

This year's Student Research Symposium marks the end of my first year as Director of the Research, Scholarship, and Creative Activities program. Back in 2006 when I joined the faculty at New Paltz, I benefited from RSCA support, and through its mission I was able to mentor many different students as they pursued research projects. Admittedly, my focus was on my students and how best to help and guide them. Being the director of the program has granted me the opportunity to focus on helping a much bigger pool of students. The position carries with it the unique privilege of being able to see the diversity of creative work that our students and faculty engage in.

Projects funded by the RSCA run the gamut from contributing to our basic understanding of the natural world, to projects that seek solutions for issues facing our society; from exploring new techniques and new materials in artistic expression, to art that seeks to influence how we see the world. Each type of project is of equal value and worthy of support. At a time when there is growing concern about academic freedom and the encouragement of diversity in thought and perspective, the projects presented at the Student Research Symposium, as well as the other events that mark our campus' Minds@Work celebration, are an affirmation of the reason we are all here.

With that, I want to thank the students for truly engaging with their education and to the faculty for helping guide them through this experience.

Dr. Ken Nystrom
RSCA Director
Professor of Anthropology

Research, Scholarship and Creative Activities Program

National studies show numerous benefits for students who collaborate with faculty on projects outside of the classroom. The RSCA supports those collaborations at SUNY New Paltz through grants, scholarships, and presentation opportunities.

We offer three grants to students and encourage students to apply for them next year:

AYURE GRANTS

The Academic Year Undergraduate Research Experience (AYURE) program supports student-faculty collaborations during the Fall and Spring semesters. It provides funds to cover the project's expenses during the semester.

SURE GRANTS

The Summer Undergraduate Research Experience (SURE) program encourages intensive student participation in an aspect of faculty scholarship. Like the AYURE program, it provides funds to cover the project's expenses. Additionally, students are supported with a stipend for the 8-week summer project so that they can devote themselves full-time to the project. Faculty mentors are also provided a small stipend during this period.

STUDENT OPPORTUNITY GRANTS

The Opportunity Grant is funded by donors Michele Di Palo-Williams '77 (Sociology) and her husband Graeme Williams. It provides up to $500 during the semester to support students engaging in research or other creative activities that advance their professional development in their field.

Congratulations to all award recipients (see page 59)

Faculty Mentor of the Year Award

This award honors a faculty mentor who has made extraordinary efforts to support undergraduates' intellectual growth and professional development through research, scholarship, and/or creative experiences outside of the classroom setting.

To Be Announced at SRS!

Abstracts of SRS Presentations

Art Department

Seeding Sustainable Futures in the Eco Art Lab and Natural Dye Garden - Poster #1

Student Authors: Carolann Paszek
Faculty Mentors: Emily Puthoff, Kelly McGrath

In the Eco Art Lab and Natural Dye Garden, we are seeding sustainable futures. These living learning labs, located on campus next to the Sculpture Studio, foster interdisciplinary collaboration and engage both the campus community and the public in eco-conscious stewardship. Through the integration of sustainability and the arts, the Eco Art Lab and Natural Dye Garden serve as spaces for cultivating art materials like natural dyes, paper, and fibers. These labs also provide opportunities to explore pollinators and biodiverse relationships through art and ecological engagement. By actively involving students, educators, and community members in the gardens' cultivation, we inspire a lasting commitment to ecosystem care and stewardship. With the mentorship of Prof. Emily Puthoff, I collaborated to design and implement community engagement events to seed the Natural Dye Garden and cultivated volunteers for the Eco Art Lab planting. Inspired by Robin Wall Kimmerer, we embraced principles of reciprocity and mutual growth to foster a vibrant, engaged community of stewards. We applied permaculture methods and sustainable infrastructure research to design efficient watering systems for the gardens. We found that integrating fun, familiar aesthetics into our event designs and providing nourishment sparked community interest in important ecological discussions. This project shows that small actions—like planting a seed—can inspire lasting change and nurture a culture of sustainability.

Biology Department

Metagenomic Analysis of Soil Bacteria after a Wildfire - Poster #58

Student Authors: Lola Allen
Faculty Mentors: Maureen Morrow

The increased risk for wildfires has become a growing concern throughout the globe, stemming from factors including extreme temperatures, drier landscapes, and limited water availability. Bacteria may play a key role in a forest's ability to recover from the devastating effects of wildfires. Understanding their role in promoting the regrowth of plants is essential for supporting recovery. Minnewaska State Park was the site of a wildfire in late August of 2022. To understand the process of wildfire recovery, we sought to identify the bacteria using DNA sequence analysis. Soil samples were retrieved from an area identified as a site of intense fire and an unaffected nearby area. DNA was extracted and sequenced and analyzed using Knowledgebase (KBase), a bioinformatic research platform provided by the Department of Energy. We ran an app to assess the quality of these sequences (FastQC) and apps that assigned a taxonomy to the reads (Kaiju/GOTTCHA2). The short-read sequences were assembled into bins (metaBAT2) which were used to generate Metagenome-assembled Genomes (MAGs). These genomes were annotated and used for additional analysis. Taxonomic analysis revealed differences in the most prevalent types of bacteria and viruses at the two sites. The MAG analysis revealed the presence of two previously unidentified Mycobacterium species in the burned soil. Our next step is to analyze this site annually to understand the recovery the bacterial growth in these devastated areas.

pH-enomena of Putative Novel Paramecium Species and Bacteria Relationships - Poster #59

Student Authors: Lola Allen, Daniel Nicholas, Sara Pastor
Faculty Mentors: Lydia Bright

The ciliate Paramecium is a single celled organism that lives in freshwater, feeding from available bacteria. After experiencing decades of acid rain, Lake Awosting currently has a pH of ~4.5-5, lower than what is typical for bodies of

freshwater. In our sampling, we have found Paramecium thriving in this unusual habitat. By using PCR amplification, genotyping, and BLAST homology searches, we have identified either a putative new or rare Paramecium species. We used ITS primers to sequence DNA samples from isolated cells and assembled trees to compare our data with known sequences. BLAST revealed the closest related match to be P. duboscqui, with ~85% identity. After using F783/RGD2 primers to sequence our samples, a percent identity of around 99% matched with P. buetschlii, however this was the only primer where this match has been made.
Microscopy of this unidentified species taken directly from the lake revealed an epibiotic relationship between our collected samples and various bacterial species. After isolating and sequencing these bacteria with 16S rRNA gene primers, we found one particular type of bacteria, those from the genus Burkholderia. Interestingly, investigation into the characteristics of Burkholderia revealed insight into adaptations and co-evolutionary traits of the unidentified Paramecium species. These findings warrant further investigation into potential co-evolutionary adaptations and overarching relationships between protists and bacteria.

Investigating the role of IPL1 in zygote formation in budding yeast - Poster #60

Student Authors: Michelle Altamirano, Genna Clancy, Mahima Ghosh
Faculty Mentors: Patricia Melloy

Ipl1p is part of the Aurora kinase family and is known to play a role in chromosomal segregation during mitosis and meiosis in a wildtype Saccharomyces cerevisiae strain. Ipl1p senses the tension in spindle fiber when the microtubule binds to the kinetochore of a chromosome. The temperature-sensitive ipl1-321 mutant delays chromosomal segregation, specifically in spindle fiber disassembly. When two haploid yeast cells (mat a and mat α) meet to form a diploid (mat a/α), some of the same proteins involved in cell division help to form the yeast zygote. This study aims to observe the role of Ipl1 in zygote formation during yeast mating. We first confirmed the temperature-sensitive phenotype of the mutant ipl1-321 using a serial dilution assay to observe yeast growth of the wild-type and mutant strains at different temperatures based off previous research. Our lab has been

conducting a pilot study involving the use of different media (YPD and SD) to observe potential differences in yeast mating results using a wildtype and mutant strain. We are concurrently imaging the wildtype and mutant yeast zygote formation at various temperatures based on the results of the serial dilution assay. The yeast mating results comparing the wildtype and mutant strains are quantified using ImageJ for both the differing media and different temperature conditions.

Evaluation of the Anti-Microbial Activity of Beta-Lactam Compounds - Poster #55

Student Authors: Jenna Degano, Ella Barclay, Shannon Seymour, Alexis Madden
Faculty Mentors: Maureen Morrow, Preeti Dhar

The goal of our research is to determine the antibacterial activity of various synthesized beta-lactam compounds on 3 different types of bacteria, Gram-positive, Gram-negative, and Mycobacteria. Mycobacterium tuberculosis, the causative agent of tuberculosis, has been the world's leading cause of death from a single infectious agent, until SARS CoV2. Mycobacteria have a distinct cell wall and natural resistance to antibiotics and thus tuberculosis is difficult to treat. We used Mycobacterium phlei because it lacks the virulence factors that allow pathogenic species such as M. tuberculosis to cause disease in humans, making it a safer model organism to use in the lab. The compounds we are testing were synthesized in Dr. Dhar's lab (Chemistry). They all contain beta-lactam bonds, similar to clinically used antibiotics that inhibit the formation of the peptidoglycan layer of bacterial cell walls. We used the disk diffusion procedure to determine the amount of bacterial growth inhibition for each compound. Statistical analysis of the inhibition zones of the compounds vs. solvent was performed.The inhibition assay was successful. All the compounds inhibited the growth of at least some of the bacteria tested. Mycobacteria appeared to have the greatest sensitivity to several of the compounds. Our research has the potential to inform the development of anti-mycobacterial compounds.

Effects of climate change on lake ice coverage and thickness - Poster #63

Student Authors: Sierra DePry, Brinda Bhalla, Anthony Gramse
Faculty Mentors: David Richardson

Long-term lake ice records have shown increased variation in ice coverage and thickness due to climate change. Change in lake ice plays a crucial role in the biological activity of lakes, such as Mohonk Lake. Mohonk Lake is a local mountain lake ~8 miles away from SUNY New Paltz. Mountain lakes surrounded by forests are valuable to study because, in the absence of watershed effects, they reflect what is occurring in the atmosphere, such as global climate change. We investigated how ice coverage and thickness related to the air temperature on global and local scales and determined if climate change has led to a shorter ice season. Ice thickness and estimated ice coverage were measured every week from 2021 to 2025. Annual and winter global air temperatures were downloaded from NOAA for global scaling and from the Mohonk Preserve weather database for local scaling. We identified relationships between ice measurements and yearly global air temperature, global winter air temperature, and local air temperature. Our data shows that recently, Mohonk Lake has experienced extremely short or intermittent ice seasons that are related to warmer air temperatures at both the regional and global scales.
Climate-induced changes to ice coverage and thickness likely affect biological lake activity and lake water quality.

Microsatellite-based Exploration of Genetic Diversity Within and Among Populations of Daphnia - Poster #57

Student Authors: Laura Edwards, Rowan Conners, Becky Montoya, Rida Akhlaq
Faculty Mentors: Alyssa Liguori

Zooplankton are diverse aquatic animals that are abundant in most American lakes. As primary grazers of algae and food sources of fish and other predatory species, they are important to the function of aquatic food webs and overall lake health. Studying genetic diversity within and between populations can help form hypotheses about local adaptations and help us predict responses to changing environments. Daphnia is an abundant planktonic crustacean in the local freshwater habitats examined here: Lake Minnewaska and Mohonk Lake.

We analyzed microsatellites, which are repetitive DNA sequences that typically have high mutation rates, which make them ideal for studying genetic divergence among populations. The goal of this research was to develop successful microsatellite methods to examine our local populations. DNA was extracted from hundreds of collected individuals, and the mitochondrial gene cytochrome c oxidase was sequenced to confirm species identities. Primers for 12 microsatellite loci were tested for polymerase chain reaction amplification success, which was confirmed using agarose gel electrophoresis. Out of the 12 primer sets, 11 successfully amplified microsatellite sequences. These primers are now being used to conduct an ongoing population genetic study. The methods developed from this research will be used to track and quantify genetic changes in Daphnia populations over time and can be expanded to analyze diversity in different lakes in the region.

Preserving the peaks: how does off-trail hiking impact montane birds in the Catskills region? - Poster #53

Student Authors: Christopher Gabelman
Faculty Mentors: Kara Belinsky

The Catskills region in New York State has been a popular hiking destination for decades, and there has been a recent uptick in post-pandemic years with the rising popularity of mobile hiking applications such as Strava, All Trails, Gaia, etc. Additionally, many of these hiking applications are conducive to off-trail hiking. Off-trail hiking brings potential harmful impacts on ground-nesting birds, as nests can be disturbed or trampled on. The Catskills high peaks offer a specialized habitat for many breeding birds. The highest peaks in the Catskills function as sky-islands with unique balsam fir-hemlock tree communities that support a variety of neotropical migrants such as Bicknell's Thrush (Catharus bicknelli), Blackpoll Warbler (Setophaga striata), Magnolia Warbler (Setophaga magnolia), many of which nest on or near the ground. We asked if off-trail hiking has a detrimental effect on breeding montane birds in the high peaks of the Catskills Mountain range. We conducted point counts at dawn during the early summer months of 2023 and 2024 to gather our data. We completed these point counts in various locations of official and unofficial trails, with high or low visitation. Our data revealed that overall species abundance and focal species abundance are negatively correlated with high human visitation. Based on this data, we can make suggestions about establishing formal trails to address high levels of visitor-use in both official and unofficial trails.

How does tree community composition vary across the landscape of Mill Brook Preserve? - Poster #54

Student Authors: Christopher Gabelman, David Paschal
Faculty Mentors: Eric Keeling, Laura Wyeth

The Mill Brook Preserve is a local preserve in the village of New Paltz, about an hour and a half north of New York City. The preserve hosts of variety of plant and animal life and is a vital green space in a largely suburbanized area. This site is of special interest as it provides an opportunity to study how tree community composition is affected by prior land uses. The goal for the project was to measure the relative abundances of the tree species in the Mill Brook Preserve and see how this information is connected to past last use. Management zones were mapped out based on vegetation and topography. The management zones are composed of Blue South, Blue North, Green, and Yellow. In each management zone, circular plots were conducted to measure the relative tree species abundances. Each tree species was identified within the plot, and the stem diameter (>2.5 cm) was measured using DBH tape. Using these data, we were able to analyze parameters such as importance, stems per Ha, and basal area per Ha. There were many signs of past agricultural land use, such as large trees in lines, old irrigation systems, and old fences. There were also many invasive species such as Barberry, Stilt grass, and Burning Bush that indicate a highly disturbed past. This project aims to serve as a baseline for establishing forest type zones and eventually serve as information for forest management and protection plans.

Modulating Feeding Behavior in Drosophila melanogaster Larvae via Manipulation of Light-Activated Channelrhodopsin Optogenetics - Poster #52

Student Authors: Ari Kleiner, Olivia O'Blaney
Faculty Mentors: Aaron Haselton

We used optogenetic techniques to investigate the neural regulation of mouth hook movements in third instar Drosophila melanogaster larvae. Transgenic fly larvae expressing light-activated Channelrhodopsin-2 ion channels in neuropeptide-F-expressing central nervous system neurons were exposed to bursts of 465 nm light and then video-recorded under a stereomicroscope.

Mouth hook movements within a 30 second post-light-exposure window were compared with movements recorded in unstimulated flies. Larval mouth hook movements are a key component of feeding behavior in these animals, and understanding the neural/neurohormonal control of these behaviors will improve our broader understanding of the neural basis of animal motivation and behavior.

The Electrophysiological Response of Gut Tissue to Neuromodulators in the Vinegar Fly, Drosophila melanogaster - Poster #56

Student Authors: Jennifer Libretto, Alisha Mokal
Faculty Mentors: Aaron Haselton

In this study, we characterized the electrophysiological effect of relevant neuromodulators on the enteric neuromuscular system in Drosophila melanogaster. In situ larval preparations were perfused with neuromodulator-containing saline solutions while gut tissue field potentials were measured using a differential suction electrode. Bioelectrical responses of gut tissue to neuromodulatory solutions were analyzed and compared.

Effects of Neurosignaling on Fruit Fly Olfactory Response - Poster #61

Student Authors: Olivia Louden, Nicole Dunne
Faculty Mentors: Aaron Haselton

Neuropeptide-F (NPF) and Adipokinetic hormone (AKH) are neuromodulators that have been shown to facilitate a variety of behaviors in the fly, Drosophila melanogaster. The effects of induced NPF and AKH signaling on olfactory-mediated locomotor behaviors was investigated. Transgenic flies were activated using optogenetic techniques to manipulate NPF and AKH signaling in real time. Light-activated (465 nm) third instar larvae were assayed using a larval two-choice dish assay, and light-activated adult flies were assayed using a Y-tube olfactometer assay. Results will be presented.

Supporting suburban cavity-nesting birds: Utilizing strategic nest box placement to promote native species while deterring invasives - Poster #67

Student Authors: Zoe Marks, Cara Schombs, Hannah Doak, Nika Midgette
Faculty Mentors: Kara Belinsky

Cavity-nesting birds rely on large and old trees, which are often removed. Bird nest boxes are intended to support native birds, but in urbanized areas in North America, invasive house sparrows (Passer domesticus) are known to dominate them. We asked whether it is possible to place nest boxes in a suburban area in a way that supports native bird species while discouraging invasive bird species. We predicted that nest boxes placed closer to buildings would be dominated by invasive house sparrows, while nest boxes placed inside forests would be used by native species. We installed a network of sixty-six standard bluebird nest boxes in and around the suburban forest of the Millbrook Preserve, New Paltz, NY, USA. We monitored the nest boxes through spring and summer in 2023 and 2024. The nest boxes were placed in three groups determined by their distance from the nearest building outside of The Preserve. Eighteen of the nest boxes were placed outside of The Preserve in suburban yards and at the elementary school, all less than 40m from the nearest building. We found that house sparrows only nested in boxes outside of The Preserve, while several native species nested both in and out of The Preserve bounds. In addition, we measured canopy cover at each location outside of the Preserve and found that house sparrows nested in locations with an average canopy cover of 20%, while native species nested in locations with an average canopy cover of 60%. In order to support native bird species, we recommend that nest boxes be placed only in suburban yards with moderate to high canopy cover. Nest boxes placed in forests are generally resistant to house sparrows and encourage successful reproduction and fledging in native bird species.

Evolving Aptamers Against Peptide Sequences – Poster #65

Student Authors: Thomas McInerney
Faculty Mentors: Jeffrey Reinking

Aptamers are short single-stranded nucleic acid molecules that can fold into a novel three-dimensional shape to form a binding pocket with high affinity for specific ligands. Aptamers can thus be considered the nucleic acid analogs of monoclonal antibodies, with applications such as diagnostic biosensors, drug delivery, and target inhibitors. Aptamers can be created in vitro through a process known as the Systematic Evolution of Ligands by Exponential Enrichment (SELEX). Here, we design a SELEX protocol to evolve DNA aptamers against short peptide sequence components at the N-terminus of larger polypeptides. A random library of ssDNA is subjected to negative selection of a given His-tagged polypeptide immobilized on Nickel Beads, then subjected to positive selection using a similar polypeptide with two extra N-terminal amino acids (Pro-Pro). The immobilized components of the library were amplified using asymmetric PCR, recovering single-stranded sense strands. Results of this and potential subsequent rounds of additional selection will be presented.

Soapy, or No? An assay to Determine the Cilantro Aversion Allele – Poster #66

Student Authors: Thomas McInerney, Nya Sanchez, Abigail Aginsky, Derek Kannenburg
Faculty Mentors: Jeffrey Reinking

Cilantro (coriander) is an ingredient in many foods and is highly polarizing; people generally love it while to others it tastes like soap. Several Single Nucleotide Polymorphisms (SNPs), in the vicinity of a cluster of olfactory genes on chromosome 11 have been correlated to cilantro aversion through a Genome-Wide Association Study, including the SNP rs2741762. Here, we develop an assay to allow rapid identification of an individual's genotype for rs2741762 in a teaching lab environment, using Polymerase Chain Reaction followed by Restriction Fragment Length Polymorphism analysis (PCR-RFLP). When results are visualized by a gel, genotypes can be readily determined.

Maintaining migratory birds: How preserving local lands can support bird populations – Poster #62

Student Authors: Sam Mustafa, Victoria Bucci
Faculty Mentors: Kara Belinsky

Birds are important providers of ecosystem services such as pollination, seed dispersal, and insect control. As such, they are good indicators of ecosystem health, and the steep decline of bird populations in recent decades reflects the habitat destruction they have experienced. Particularly, neotropical migrants indicate widespread losses, as they use broader ranges of habitat for stopover and breeding. Bird banding programs such as MAPS (Monitoring Avian Productivity and Survivorship) provide a good measurement of bird populations and habitat quality. We analyzed three years of data from three banding stations located near New Paltz that have varying levels of urbanization and habitat loss. We aimed to investigate how land use and modification impact bird populations. We measured the area of undisturbed forest, agricultural land, and urbanized land in a 2000 m radius around each station. We predicted that the site with the lowest habitat disturbance would have the greatest bird diversity. In alignment with this prediction, the site with the largest intact forest area had significantly higher abundance and richness of neotropical migrants and overall bird species, as well as the highest productivity. While the more disturbed sites had lower diversity and productivity, many vulnerable neotropical migrants were still banded in these locations. These results indicate that preserving undisturbed forest habitat should be the priority for bird conservation.

Effects of Declining Calcium Concentrations on the Development and Reproduction of Daphnia pulicaria – Poster #64

Student Authors: Tianna Yu
Faculty Mentors: Alyssa Liguori

Declining calcium (Ca) concentrations in lakes, a legacy of anthropogenic factors such as acid deposition and logging, have been shown to negatively impact aquatic organisms. Zooplankton serve an important ecological role since they feed on primary producers and are the major food source for fish and invertebrate predators. Studying their population dynamics is critical for understanding lake health overall as human activities continue to cause rapid

environmental change. Lake Mohonk is a glacial lake located on the Shawangunk Ridge that is admired by visitors and locals alike for its ecological, cultural, and historical significance. Here, we focus on the lake's population of the cladoceran Daphnia pulicaria, which may be particularly vulnerable to changing calcium concentrations, due to its higher need for calcium during the formation of its exoskeleton, relative to other arthropod taxa. We collected D. pulicaria and isolated multiple genetic lines for multigenerational laboratory culture, to test whether responses to calcium vary by genotype. We exposed each genetic line to three Ca treatments (0.5, 1.0, and 10 mg/L), and quantified development and reproduction. At low Ca levels, we hypothesize that growth and reproductive rates of D. pulicaria will decline. Results are currently under analysis and will be presented in the final version of the study. This work will inform future research on the impact of anthropogenic factors on lake ecology in the Hudson Valley.

Chemistry Department

Towards Syntheses of New Chiral Receptors – Poster #48

Student Authors: Maxwell Brooks, Alexander Loveday, Jesse Racsko
Faculty Mentors: Frantz Folmer-Andersen

We describe efforts to incorporate trans-1,2-diaminocyclohexane (DACH) and 1,1'-bi-2-naphthol (BINOL) into new molecular receptors that may be useful as selectors for enantioselective sensing, catalysis, and separation. We hope this work will enable the precise tuning of steric and chiral environments about reactive DACH subunits, and for the creation of shape-persistent macrocyclic motifs. Towards these aims, we are pursuing two synthetic strategies: First, we have extended a known diastereoselective reaction of methyllithium and simple DACH-derived diimines to include 1o, 2o and 3o alkyl lithium reagents. Our modifications required significant changes in solvent, temperature, and reaction time; and proceed with virtually complete and consistent stereoselectivity (confirmed in 2 of the 3 new cases by X-ray crystallography). We have also explored substrate scope with respect to the diimine, including additions to macrocyclic diimines. Our second methodology involves creation of BINOL-derived diimines linked through 6,6' positions. This approach relies on a previously reported regiospecific bromination of BINOL by electrophilic aromatic substitution, which we envision will provide access to rigid, BINOL-containing macrocyclic dimines.

Quantifying Bisphenol A (BPA) in Regenerating Planaria – Poster #49

Student Authors: Morgan Keuhn
Faculty Mentors: Pamela St. John

BPA is a synthetic compound commonly used by chemical companies to alter polymer characteristics. Due to its ubiquitous uses in various industries, it has entered the environment as a contaminant, and recently there have been concerns regarding its potential adverse health effects. To understand how BPA can affect organisms in the environment, we have exposed regenerating planaria, a freshwater flatworm that can regrow/repair itself following transection, to specific concentrations of a deuterated form of BPA (d8BPA) where the eight

non-exchangeable hydrogen atoms on the two aromatic rings have been replaced with deuterium, to distinguish BPA, the contaminant, from that used for controlled exposure studies.

High-performance liquid chromatography (HPLC) was used to characterize the extracts from the d8BPA-exposed planaria. The intrinsic fluorescence from BPA and the altered retention time for the deuterated form were used to help quantify the amount of d8BPA in planaria exposed to controlled amounts of the substance in solution. Fluorescence signals were normalized to both an internal standard and the dry mass of planaria for accurate quantification. Planaria retained measurable amounts of d8BPA over their regeneration cycle of 14 days and showed decreased regenerative ability, implying that d8BPA is detrimental to the health of planaria and its release into the environment should be more widely regulated.

Antimicrobial Potential of Synthesized MONO/BIS Lactams - Poster #43

Student Authors: Alexis Madden, Jenna Degano, Ella Barclay
Faculty Mentors: Preeti Dhar, Maureen Morrow

Antibiotic resistance is becoming a critical threat to human health, making the synthesis of novel antibiotics invaluable. β-lactams are a class of 4-membered cyclic amides that display significant antimicrobial activity. They acylate essential serine residues in the cell walls of bacteria, leading to cell lysis and death. The objective of this research was to treat various alkenes with chlorosulfonyl isocyanate (CSI) to form N-sulfonyl chloride β-lactams and then reduce them to their corresponding β-lactam. Products were purified using recrystallization and/or column chromatography then analyzed using spectroscopic methods. Several β-lactams were synthesized, and disc diffusion bioassays were conducted on gram-positive (M. phlei, Staph. aureus, Strep. faecalis) and gram-negative (E. coli, Ps. fluorescens) bacteria to evaluate their antimicrobial potential. Results of the syntheses and bioassays will be presented.

Evaluating the Potential of Saussurea lappa as a Natural Insecticide - Poster #44

Student Authors: Alisha Mokal
Faculty Mentors: Preeti Dhar, Aaron Haselton

Widespread concern over mounting pesticide usage has impelled investigation into plant-derived insecticides. Saussurea lappa, a plant indigenous to the Himalayan regions of India, Pakistan, and China, is a perennial herb of the family Asteraceae. For centuries, the root powder of S. lappa has been employed in the protection of crops and woolens from pests. Recent research has found it to be efficacious in causing mortality of houseflies and caterpillars, a property attributed to its two terpene derivatives: costunolide and dehydrocostus lactone. In this study, we conducted several assays to develop a multi-dimensional profile of S. lappa's insecticidal activity.

Phytochemical analyses of the crude ethanolic S. lappa extract revealed the presence of carbohydrates, flavonoids, alkaloids, and terpenoids, which have been implicated in neuromuscular dysfunction. We found a strong dose-dependent correlation between S. lappa consumption and mortality of Drosophila melanogaster larvae (two days) and adults (fifteen days). In phago-deterrent studies, we observed retarded movements in flies exposed to 20% extract. To determine whether a dose-dependent correlation exists between consumption of S. lappa and locomotion, we recorded how many times D. melanogaster crossed the midpoint of a closed tube with S. lappa-perfused diet of varying concentrations. This may elucidate the physiological mechanism through which S. lappa exerts its effects. Results will be discussed.

Inhibition of Bdellovibrio Bacteriovorus Predatory Ability by Type A Proanthocyanidins - Poster #45

Student Authors: Alyssa Morano, Tianna Yu
Faculty Mentors: Megan Ferguson

Bdellovibrio bacteriovorus, a gram-negative predatory bacterium, uses its Type IV pili to adhere to its prey which are other gram-negative bacteria. Cranberry juice can prevent the attachment of various types of bacterial pili, and the active component in cranberry juice has been documented as type A

proanthocyanidins. Using optical density and plaque forming unit assays (PFUs), we investigate how neutralized cranberry juice affects B. bacteriovorus predation of E. coli. PFUs quantify viable B. bacteriovorus cells, whereas optical density reflects changes in growth and predation of E. coli, but both techniques rely on the larger E. coli cells scattering visible light while the smaller B. bacteriovorus cells do not scatter light effectively. We show that addition of cranberry juice prevents predation and explore how long this inhibitory effect lasts after removing the proanthocyanidins from solution.

Comparative Reactivity Studies of Styrene and 1, 1-diphenylethylene with Chlorosulfonyl Isocyanate and Antimicrobial Evaluation of the Resulting Products - Poster #51

Student Authors: Shannon Seymour
Faculty Mentors: Preeti Dhar, Maureen Morrow

This project addresses synthesizing β-lactam antibiotics using chlorosulfonyl isocyanate (CSI) with styrene and 1,1-diphenylethylene. Reactions were monitored via TLC, purified by recrystallization and chromatography, and analyzed by NMR and IR. Styrene produced the expected β-lactam, whereas 1,1-diphenylethylene yielded multiple unexpected products. Bioassays indicated modest antibacterial activity for selected compounds against gram-positive (Mycobacterium phlei, Staphylococcus aureus, Streptococcus faecalis) and gram-negative bacteria (Escherichia coli, Pseudomonas fluorescens). These results highlight the impact of alkene substitution on CSI cycloaddition outcomes, potentially guiding the synthesis of novel antibacterial agents and improving understanding of structure–reactivity relationships.

Poison or Promise: Synthesis and Characterization of Arsenic-Based Iridium Pincer Catalysts - Poster #47

Student Authors: Julian Simek, Caz Wood, Lucia Speranza
Faculty Mentors: Miles Wilklow-Marnell

Iridium complexes of di-phosphine substituted pincer ligands bearing a central pnictogen group have demonstrated excellent activity in the catalytic dehydrogenation of alkanes. Previous work by the Goldman Group has shown improved reactivity as the central pnictogen is substituted down group 15. To

investigate this trend, bis(2-di-t-butylphosphinophenyl)arsine was synthesized with limited yield. A refined synthetic route was developed through increased control of the reaction environment and quenching methods, improving yield from 9% in early trials to 23.20% using the improved procedure. During synthesis NMR spectroscopy was used to investigate the identity structure of key intermediates at each stage helping to indicate the di-substitution of the phosphinophenyl group as the main factor limiting yield. These observations provide a foundation for further optimization of the synthetic route which will allow for the future characterization of the compound's catalytic cycle, which will be discussed.

Characterizing Aggregates of Varying Lengths of DNA with CTAB using Atomic Force Microscopy - Poster #50

Student Authors: Samuel Turner
Faculty Mentors: Pamela St. John

DNA can form aggregates when in solution with the cationic surfactant cetyltrimethylammonium bromide (CTAB), but the structure of these aggregates and how they depend on DNA length is unclear. We investigated the morphology of DNA-CTAB aggregates formed from single-stranded DNA (ssDNA) of varying lengths—40, 60, and 100 nucleotides—to assess how DNA length influences aggregate structure. Solutions were prepared at a 10:1 molar ratio of CTAB to nucleotide in sodium phosphate buffer, deposited on single crystal silicon surfaces, and allowed to dry before being rehydrated in water for imaging. Atomic force microscopy (AFM) revealed that groups of aggregates made from all three DNA lengths formed web-like, fractal-like ring structures, with smaller rings nested within larger ones. While this overall morphology was conserved across lengths, ring size scaled with nucleotide count. 100-mers exhibited large rings from 1–3 μm in diameter, with smaller rings averaging ~500 nm. 60-mers showed rings around 2 μm in diameter and smaller ones averaging ~200 nm. 40-mers resulted in ~1 μm rings and ~100 nm small rings. These results suggest that length affects how aggregates come together in groups and this could potentially be linked to the persistence length and flexibility of ssDNA.

Investigating DNA Aggregation with Fluorescence Polarization – Poster #46

Student Authors: Caz Wood
Faculty Mentors: Pamela St. John

The objective of this research was to study the binding between DNA and surfactant molecules to better understand the stability of the resultant aggregates that form between single strands of synthetic DNA and cationic detergents. Fluorophore labeled oligonucleotides of varying length were used to study the DNA aggregation process in the presence of alkyl ammonium halide salts using fluorescence polarization. Previous studies included the effects of surfactant length and structure on aggregation. The impact of an aprotic solvent (acetonitrile) and salt concentration on binding strength were the focus of this specific research project. Binding curves were fit to the Hill equation to obtain association constants, and these were compared to better understand the factors that affect the stability of the DNA-surfactant aggregates.

Communication Disorders Department

Gluten-Free Casein-Free Diet for Children with Autism: Communication Impact and Parent Beliefs - Poster #11

Student Authors: Morgan Hammell
Faculty Mentors: Dana Arthur

Recently dietary interventions have gained more attention in the popular press as treatments for Autism Spectrum Disorders (ASD) around the world. Currently in the literature, there have been mixed results on the outcomes of dietary interventions. This study investigates the impacts that the gluten-free casein-free (GFCF) diet has on verbal communication in children with ASD. In addition, it explores the impact caregiver/parent opinions have about the diet. A systematic review yielded nine peer reviewed research articles that met inclusion criteria. Controls, results, and parent opinion were compared across articles. It was found that while the GFCF diet has positive impacts on communication it is not any more effective than control conditions. Parents of children with ASD were found to give more positive observations of their child's communication when they knew the diet was being used, possibly showing the impact of the placebo effect. These results have potential impacts on clinical practice in the area of ASD.

Games to Gains: Exploring Play as Therapy for Aphasia Treatment - Poster #9

Student Authors: Katarina Xie
Faculty Mentors: Dana Arthur

Although play and game-based therapy is widely used in language intervention for children, games are an emerging therapeutic treatment used in speech therapy for adults (National Literacy Trust, 2024). Post-stroke aphasia is a language disorder that impacts an individual's communication in expressive speech and receptive comprehension based on the location of their stroke

(Johns Hopkins Medicine, 2022). The current study investigates the effectiveness of game and play-based therapy for adults with aphasia. A systematized review yielded ten peer-reviewed studies that met the inclusion criteria. Studies were analyzed according to participant characteristics, game modification, level of control, outcomes, and effectiveness. The combination of group control studies and single-subject designs demonstrates that incorporating language games can have positive impacts on expressive language post-stroke. By maximizing the impact of expressive language intervention, play and game-based therapy can potentially improve outcomes for clients with post-stroke aphasia.

Perception of Wind Turbine Noise - Poster #10

Student Authors: Michelle Lee
Faculty Mentors: Anne Balant, Heather Lai

This pilot study addresses the perception of Wind Turbine Noise (WTN), which can cause disturbances to residents as far away as 3 km. The purpose is to determine which types of wind farm noises are perceived as more annoying than others. Two psychoacoustic methods were employed to assess the annoyance of WTN samples: magnitude estimation and paired comparison. The WTN samples were representative of different types of wind farm noise, which had been classified via machine learning. Some sounds had amplitude modulation, and others did not. They also differed in the amount of low frequency versus high frequency sound in their spectra. Because loudness is a major contributor to annoyance, the WTN samples were adjusted to have the same computed loudness in sones. The success of this equalization was assessed by measuring loudness via magnitude estimation. The participants were undergraduate students who passed a hearing screening. The results will be discussed with a view towards helping engineers determine which sounds are perceived as most annoying, which may be beneficial in designing new turbines and/or creating new regulations.

Disaster & Mental Health (Benjamin Center)

Multiple First Responder Roles and Mental Health: NYS First Responders Mental Health Needs Assessment - Poster #8

Student Authors: Morgan Atwater
Faculty Mentors: Robin Jacobowitz

Many first responders hold multiple first responder roles. This places them at significant risk of being regularly exposed to high-stress situations and traumatic events, perpetuating the risk of developing mental health conditions. This report analyzes first responder role overlap and the stressors and mental health impacts of first responder work. Stressors Hypothesis: First responders with multiple roles will be more likely to experience stressors that come with the job. Impacts Hypothesis: First responders with multiple roles will be more likely to experience mental health issues and concerns as a result of their first responder work. This work derives from the NYS First Responder Needs Assessment, representative, statewide web survey of first responders, with a final sample of 6,003, weighted by NYS region accounting for representation. All issues are explored for the first responder community as a whole, by occupation and number of roles. Results indicate first responders with multiple roles report stressors from: critical incidents, social challenges, practical aspects, workplace challenges, and negative impacts of stress on personal life, at higher rates than respondents with only one role. First responders with multiple roles reported mental health challenges, symptoms, and conditions, at higher rates than first responders with only one role. There's a strong need among first responders who hold multiple roles to address mental health issues and concerns.

Understanding Disaster Preparedness in Vulnerable Populations in Orange County, NY - Poster #7

Student Authors: Megan Mooney, Daria Rudyk
Faculty Mentors: Anastasia Shown, Robin Jacobowitz

This purpose of this study is to evaluate how well disaster plans and preparedness address the unique needs of vulnerable populations such as the elderly, people with disabilities, non-native English speakers, farm workers, and the unhoused in Orange County. By focusing on these groups, the research study aims to identify and examine potential gaps in emergency preparedness so that agencies, community-based organizations, and local municipalities can revise their plans so that they can adequately address the needs of vulnerable populations. Our study aims to provide groundwork for the communities to gain a deeper understanding of and how these disasters affect the vulnerable populations, hoping to encourage conversation and collaboration across organizations that serve vulnerable populations. A team of two researchers used a qualitative approach conducting semi-structured, virtual interviews of leaders of organizations that serve vulnerable populations in Orange County. A survey was distributed to those who were not available for an interview. Preliminary results indicate that there are many vulnerable populations that have been affected by disasters in Orange County, including from flooding, wildfires, and COVID-19. Data suggest impacts from change in political climate that has affected vulnerable populations receiving proper access to care and preparedness in the face of a disaster. Additional data analysis will further inform results for the final report presentation.

Engineering Programs

Patient Behavioral Adoption in Self Correcting Prosthetics via Deep Reinforced Learning: Case of LUROX D - Poster #41

Student Authors: Taheemuddin Ahmed
Faculty Mentors: Wafi Danesh

The current project introduces LUROX D, an affordable and intelligent self-learning prosthetic arm prototype for amputees suffering from severe neurological disorders that render motor neurons inactive. LUROX D stands for Learning, Understanding, Reasoning, and Observational Execution based Dynamic movement algorithm. In essence, LUROX D operates as an end-to-end artificial intelligence (AI) system that combines three sensory phenomena: vision using object detection, speech using speech recognition and thoughts using through recognition, via a deep reinforcement learning (DRL) algorithm to derive intent. By deciphering intent, LUROX D can determine the behavioral pattern of a patient and incorporate it into the prosthetic arm to deliver the correct arm movement action. LUROX D operates as a feedback-based system, where each piece of sensory information: vision, speech and thought, provides the necessary feedback required for learning using DRL. At present, an initial prototype prosthetic arm has been developed that is undergoing extensive training based on both public and private datasets. Preliminary results show a drastic reduction of 70% in error for object, speech and thought recognition. A corresponding increase of 75% has been observed in determining the correct movement pattern of the DRL algorithm. The expectation is that with more specific training data, LUROX D should be able to adapt to the unique behavioral pattern of the patient and forego training completely.

Mechanical Integrity of 3D-printed Stainless-steel Structures Characterized by Ultrasonic Fatigue Testing - Poster #39

Student Authors: Noelle Boruta
Faculty Mentors: Ping-Chuan Wang

3D-printing, or additive manufacturing (AM), has been employed to fabricate engineering structures in recent years. This technology offers advantages in fast prototyping and creating complex designs that cannot be achieved by traditional manufacturing. However, it is well known that the mechanical integrity of AM parts suffers from defects associated with AM process, including surface roughness and lack of complete densification. It is thus important to study how AM process parameters affect the mechanical properties. This research project aims to develop a methodology to characterize the mechanical integrity of AM stainless steel, focusing on fatigue failure mechanisms. The ultimate objective is to determine how printing direction and surface defects influence fatigue lifetime. We develop an ultrasonic test system and methodology to characterize fatigue behavior of AM stainless steel structures, comprising a pair of printed specimens sandwiching a pressure transducer that is coupled to an ultrasonic generator with built-in phase-locked loop, and a data acquisition algorithm to extract the fatigue behavior during testing. In this presentation, we demonstrate the feasibility of this test system by studying the heat generation through ultrasonic excitation and how it affects the resonance frequency of the test specimens. Plans for future study will also be discussed, including characterizing the mechanical anisotropy of AM stainless steel and the fatigue failure mechanism.

Quantifying and Optimizing Carbon Dioxide Sequestration in Hempcrete Using a Controlled Chamber - Poster #37

Student Authors: Jennifer Callan, Julio Aguirre
Faculty Mentors: Rachmadian Wulandana

Hempcrete, a bio-composite material composed of hemp hurd mixed with a lime-based binder and water, offers significant potential for carbon sequestration in construction materials. Hemp hurds possess a highly porous structure which enhances their ability to absorb liquids and gases. This

sustainable material sequesters carbon dioxide through both the photosynthesis process during hemp growth (approximately 4.05-6.07 tons of CO_2 per acre during a 3-4 month cycle) and the carbonation of lime binder, where atmospheric CO_2 reacts with calcium hydroxide to form stable calcium carbonate. This research involves an experimental chamber design to quantify and optimize the CO_2 sequestration capacity of hempcrete under controlled conditions. The system consists of a static chamber and CO_2 and humidity sensors to monitor concentration and moisture changes during carbonation. This experimental setup enables systematic analysis of how varying pressure, humidity, and temperature conditions influence the rate and extent of CO_2 uptake in hempcrete samples. The findings will establish optimized parameters for CO_2 sequestration, providing valuable data that enhances hempcrete's carbon sequestration potential and advances its application in sustainable construction. Furthermore, this research contributes to the development of carbon-negative building materials that can help mitigate climate change.

Integrated Wind Turbine Blade Design Education Research - Poster #33

Student Authors: Brandon Gardner
Faculty Mentors: Rachmadian Wulandana

This study investigates the impact of blade geometry on small-scale wind turbine performance, testing the hypotheses that blade design significantly affects efficiency and that computational tools can reliably predict this relationship. Custom blades were designed in Rhino CAD using airfoil profiles from industry databases, then 3D printed in RGDA 8425-DM material for optimal strength and flexibility. The experimental methodology involved comparative testing between manufactured and custom blades under controlled conditions, measuring power output, torque, and efficiency while systematically varying pitch and yaw angles. Results confirmed both hypotheses, demonstrating that blade geometry substantially influences performance and that open-source QBlade software effectively predicts turbine behavior. Beyond its technical contributions to renewable energy optimization, this project provided valuable undergraduate research experience, bridging theoretical concepts from fluid mechanics and thermodynamics with practical engineering design while establishing a reproducible experimental framework for future investigations in sustainable energy systems.

Water level control system using an ESP32 microcontroller's capacitive touch sensing capabilities for microplastic filtering applications - Poster #42

Student Authors: William Hamling
Faculty Mentors: Kevin Shanley

This research presents the development and implementation of a water level control system using an ESP32 microcontroller's capacitive touch sensing capabilities for microplastic filtering applications. The system combines capacitive sensing with an automatic valve control mechanism to maintain constant water pressure for consistent microplastic filtration trials. By maintaining a precise water level above a bottom outlet, the system achieves steady-state flow conditions. Through iterative testing and refinement, including hardware optimizations to minimize parasitic capacitance, the system achieved a measurement accuracy of ±5 centimeters and stable flow conditions for experimental trials. The study details the challenges encountered during implementation, solutions developed, and proposes further improvements to enhance system accuracy and reliability.

Strengthening 3D-Prints Through the Anisotropy of ADM Materials - Poster #38

Student Authors: Marco Hermida, Coltrane Fracalossi-Lail
Faculty Mentors: Ping-Chuan Wang

Through the emulation of tree's use of anisotropy 3D-printed forms can be strengthened. Tree fibers tend to run parallel to the highest stresses in the trunk and branches conducting stress down the fibers. This same principle can be utilized in 3D-printing through the tuning of filament direction in each layer. This technique can help strengthen traditionally difficult 3D-printed forms such as those in which maximum stresses change direction based on location. Finite element analysis (FEA) is used to evaluate stress distributions across a prototype model. This data, including stress magnitudes and directions in the x and y directions, along with spatial coordinates, is exported from ANSYS and compiled into an Excel file. A grid-based mapping system is developed from this data, with each node representing the average stress vector of the surrounding elements acting on the specimen. This is used to construct a vector

field representing the internal stress flow within the structure. The principal stress directions from this field are then mapped onto the 3D-printed model to optimize the filament orientations in each layer relative to the internal stress paths. This has significant potential to establish guidelines for optimizing layer orientations in 3D-printed objects, particularly those with complex geometries. Allowing for the fabrication of more resilient products with complex structural requirements through the leveraging of the anisotropic properties of ADM materials.

Simulating IC Chips with Hotspots through Metal-Ceramic Integration - Poster #35

Student Authors: Chelsea Lavelle
Faculty Mentors: Ping-Chuan Wang, Bryan Czibesz

As the technology of integrated circuit (IC) chips advances, a major roadblock in increasing their computation power is thermal management. One point of interest in thermal management is the case of non-uniform heating across the IC chip, which presents a unique challenge in heat removal. To explore effective heat removal strategies, custom-designed ceramic heaters with embedded heating wire are contemplated to simulate non-uniform heat distribution across IC chips. Fabricating a ceramic heater requires investigation and characterization of integrating metal wire into ceramic disks, taking into consideration the resulting electrical, thermal, and mechanical properties of the heaters. For this project, we explore the design space in both the mixture of ceramic materials and the sintering condition. The ceramic materials comprise alumina (Al2O3), silica (SiO2), and ferro frit which is a ground glass typically used for ceramic glazes and can be used to adjust the firing temperature. The sintering condition includes the peak temperature and its duration. Figure of merit for judging sample quality includes mechanical integrity and heating efficiency of the heaters. The selected sample recipe for heater fabrication will have optimal mechanical properties and uniform heat distribution while maintaining the lowest resistance in the wire so that the heater can withstand high temperatures for an extended period. In this presentation, we will discuss the experimental results and implications, as well as the application in the study of thermal management of IC chips.

Wind Farm Acoustics - Poster #34

Student Authors: Casey Maracek
Faculty Mentors: Heather Lai, Anne Balant, Chih-Yang Tsai

Wind power has been rapidly expanding as a clean energy source and its growth is expected to continue. A small percentage of residents within a wind farm's vicinity experience annoyance and sleep disturbance from low frequency pressure waves (infrasound in the range of 0.002-20 Hz) associated with operational wind turbines, with the number of annoyed individuals increasing as the number and size of wind turbines increases. Pinpointing the annoying pressure waves has been attempted by various researchers, however the results are mixed and not universally agreed on. The short-term goals of this research project are to study infrasound sources and interpret the signals recorded by both a microbarometer and a microphone, while longer-term goals include development of AI/ML to characterize wind farm infrasound as it relates to human response.

Advanced Battery Pack Design - Poster #36

Student Authors: James Pousson, Dean Schepisi, Anthony Ramirez, Fetah Medunjanjn, Tenmetey Tetteh-Nartey

Faculty Mentors: Ping-Chuan Wang

As transportation and infrastructure evolve and green energy sources become more widespread, the need for reliable energy storage systems becomes greater. The goal of our project is to explore the effectiveness of cell-array battery systems with built-in heat dissipation. The most common form of large-scale battery is found in electric vehicles, where layers of battery components are folded on themselves to allow for quick charge and recharge rates with high capacity. This design presents two main issues with serious safety and reliability implication. First, large amounts of heat can be generated near the center of the battery pack which degrades the energy capacity of the batteries. Second, if the casing of the battery pack is compromised anywhere, the entire battery pack can fail catastrophically. Both issues can be addressed when working with smaller arrays of battery cells assembled to match the performance of a larger battery pack. A cooling mechanism is then routed between each individual cell for more effective heat dissipation and to allow for more even heat distribution.

This design is expected to improve the performance and reliability of the battery pack, as well as to avoid catastrophic failure of the entire battery pack by containing the local cell fail within an array. In this presentation, we introduce the proposed internally cooled cell-array battery system design, demonstrate its effectiveness and potential, and recommend plans for further development.

Electrical Reliability of 3D-printed Copper Conductor Lines - Poster #40

Student Authors: Oliver Trzcinski
Faculty Mentors: Ping-Chuan Wang, Graham Werner

Copper (Cu) is used in the electronics industry for its electrical and thermal conductivities that are suited for circuit and heat dissipation applications. For example, Cu is the primary interconnect material in today's microelectronics IC chips. With the advancement in Cu fabrication using additive manufacturing (AM, also known as 3D-printing), it can be expected that AM Cu will be adopted for manufacturing electrical circuits and components. We study the metal degradation mechanism called "electromigration" in AM Cu conductor lines. Electromigration is the biased diffusion of metal atoms induced by the electron current. While Cu electromigration has been extensively investigated in the microelectronics industry, it has not been assessed in AM Cu which has very different microstructure. An experimental system has been developed to conduct electromigration stress on AM Cu conductor lines. Due to the relatively substantial dimensions of our specimens, the challenge of this project is to induce observable degradation within a practical timeframe. In this presentation, we discuss the strategies to maximize the acceleration of electromigration in the specimens, involving increased current and temperature within the thermal constraint. Additionally, as an effect of elevated temperature, Cu oxidation must be minimized. We will present the electrical test results, as well as the microscopy inspection of the physical failure to propose the degradation mechanism in AM Cu.

English Department

Anthology and Report of Latinx Zines: Generation Z Latinx perspectives and interests through forms of creative expression - Poster #4

Student Authors: Lukas Cortes
Faculty Mentors: Marcela Romero-Rivera

The art and medium of zines are seen virtually everywhere, but the studies on them are very little and do not consider their contents to be worthy of commercial conversation. What this project was dedicated in doing, is seeking out "low art" and finding social, economic, and especially political value from the Latinx community in the United States. What I wanted to capture in the essence of this project and the research within it, was the entire spectrum of views and perspectives from the specific demographic and finding overall trends, commonalities, and differences. This was accomplished by instead focusing on only one medium of expression: the zine. Through travelling to different sites across the Northeast of the US, I searched for zines published within the last 10 years to discover what these artists were interested in speaking about. Through this medium, I was able to discover what is at the forefront of the issues that matter the most to Latinx within Generation Z. Moreover, these results could be compared to other demographics like other Gen Z that are not Latinx, older Latinx of other generations, etc. A lot of what this demographic was speaking about politically changed as the political climate changed, but within it, ran across themes of self-identity as a vessel for relationality. As well as, self-care removed from western values, the value of family, and community.

Finance Department

Rational Expectations in Housing Markets: The Case of Survey Forecasts - Poster #26

Student Authors: Svetlana Doronkina
Faculty Mentors: James Forest, Tao Li

This project examines the rational expectations hypothesis within the U.S. housing market using econometric methods to evaluate forecast efficiency and bias. The study focuses on four key housing indicators—building permits, construction spending, new home sales, and housing starts—spanning both pre- and post-2006 housing boom periods. By employing methods such as Augmented Dickey-Fuller (ADF) unit root tests, dynamic ordinary least squares (DOLS) cointegration regressions, Mincer-Zarnowitz (MZ) bias tests, and anchoring bias tests, the research uncovers varying degrees of stationarity and cointegration across indicators, suggesting inefficiencies in forecast accuracy. Results reveal structural breaks and significant biases in some forecast series, indicating that housing market expectations may not fully reflect all available information. This work provides critical insights into the complex dynamics of housing market forecasts and contributes to improving predictive models. These findings are valuable for policymakers and economists seeking to enhance forecasting methodologies, especially in markets prone to volatility and speculative bubbles.

Geology Department

Age Relationships Between Joint Sets in the Eastern Catskill Mountains, NY, and their Tectonic Significance with Respect to WNW Shortening in the Hudson Valley Fold-Thrust Belt - Poster #69

Student Authors: Myles Dower
Faculty Mentors: Frederick Vollmer

As part of an ongoing study at SUNY New Paltz, researchers have been working to clarify the age of the Hudson Valley fold-thrust belt. The HVB's oroclinal structure suggests at least two distinct shortening trajectories, and has created uncertainty in applying an age constraint. Evidence for both Acadian and Alleghenian deformation has been presented. The eastern Catskill Mountains lie in the foreland of the HVB, suggesting a cogenetic relationship between the two formations. We hypothesize cross-cutting relationships between structures in the Catskills can be used to understand timing of shortening and to clarify the age constraint of the HVB. Research previously conducted at SUNY New Paltz has identified two primary joint sets in the Catskills: Set A, oriented ~290°, and Set B, oriented ~020°, as well as 11 WNW-verging brittle shear zones and NNE-SSW striking and gently dipping bedding. This summer, research was continued in previously unstudied areas. 624 joint orientations at 224 stations were measured with emphasis on recording abutting relationships between joints. Additionally, one new shear zone was identified, while new 1-meter DEM data was used to re-measure bedding orientations. While our new data is consistent with previous work and indicative of WNW-shortening in the Hudson Valley, analysis of abutting relationships between joint sets yields no clear age relationship. This may be due to joint reactivation caused by glaciation.

Helderberg-Tristates Group Strata in Southeastern New York State - Poster #68

Student Authors: Darby Siver, Caroline Rosner
Faculty Mentors: Alex Bartholomew

The boundary between the Helderberg and Tristates groups of the Lower Devonian in eastern North America (NA) records several major transitions: 1) a change from passive margin deposition into a time of active tectonics associated with the beginning of a major influx of siliciclastics into the region; 2) a global sea level fall and subsequent rise; 3) a major transition in sea floor communities recognized as a boundary between two Evolutionary-Ecological Subunits; and 4) somewhere in this interval lies the Lochkovian-Pragian stage boundary of the Lower Devonian. While the record of the Devonian Period in NY is the geological standard for all NA, not every portion of the interval is perfectly preserved across the state. The time with the least amount of rock deposited across the state through the Devonian is in that area near the boundary of the Helderberg and Tristates groups in the Lower Devonian. While this dynamic interval is missing across most of NY, strata in the southeastern NY/northeastern PA, between Kingston, NY, in the north and Stroudsburg, PA, in the south, record nearly continuous deposition through this interval.

Recent preliminary investigation of strata across the Helderberg/TriStates boundary in SE- NY has revealed the following findings: 1) a key index fossil for this interval is the terebratulid brachiopod Nanothyris subglobosa, occurring across carbonate and siliciclastic facies and seemingly restricted to the uppermost portion of the Helderberg Group; 2) carbonate facies in slightly deeper-water settings are preserved near Port Jervis at the NY/PA boundary while siliciclastic facies dominate to the north near Kingston; 3) the Port Jervis Formation of SE-NY at the top of the Helderberg Group is likely equivalent to the lowermost portion of the Connelly Formation in the Kingston Region to the north and the Central Valley Sandstone in the Skunnemunk Outlier to the northeast; and 4) uppermost Helderberg Gp. strata are missing north of Kingston, NY.

Mathematics Department

Analysis and Configuration of Hyperfields - Poster #27

Student Authors: Jessica Sweet, Melody Burke
Faculty Mentors: David Hobby

In our research, we explored the properties of a lesser-known branch of mathematics, Hyperfields, in order to expand and contribute more knowledge to the field. In this process, we branched off the concept of fields and analyzed the algebraic structure that is a hyperfield using the operation of addition that is allowed to be multi-valued. With the use of "Advanced Results in Enumeration of Hyperfields" by R. Ameri, et al, we dissected known hyperfields and find patterns in their structure. We also examined the geometric anatomy of the hyperfield using the properties of symmetry and closure. With this in mind, we studied hyperfields in various orders and modules and discovered reoccurring characteristics that we have used to identify new hyperfields and miscalculations in previous hyperfields. These findings have advanced the development of how we illustrate and construct hyperfields.

Music Department

Newburgh Music Workshop - Poster #2

Student Authors: Sarah Berry, Colton Thorn
Faculty Mentors: Kathleen Murphy, Karyn Stuart-Rohm, Viggo Kruger

Problem: Afterschool programs provide safe spaces for children to spend their afternoons and engage in positive activities designed to promote pro-social interactions with others. Results from evaluations of afterschool programs suggest that students who participate show improvement in academics, discipline, school attendance and avoidance of risky behaviors.

Method: We provided a no-barrier, no-experience required entry point for students who wish to engage in music experiences designed to provide hands-on opportunities to create music as well as social interaction, and wellness.

Result: Preliminary results indicate that students who did not know each other before the group were willing to interact and create music together. They were able to describe how participation changed.
Conclusions: Preliminary; start the program earlier in the school year, engagement in music can help to develop social interaction and improve overall mood.

Physics & Astronomy Department

Shipboard and Moored Observations of Non-Linear Internal Waves in the New York Bight - Poster #31

Student Authors: Jacqueline Kelly
Faculty Mentors: Richard Halpern

Internal waves are gravity waves within the ocean interior that travel along the interface between different density layers. These occur in coastal areas globally and are an important driver of mixing and cross-shelf transport of biological organisms, nutrients, and sediment. Internal wave datasets are relatively scarce because of the instrument resolution needed to measure them. The last in situ observations of internal waves in the Mid-Atlantic Bight (MAB) were collected in 2006 off the coast of New Jersey, and the last study within the New York region of the MAB occurred in the 1980s. Here we present in situ measurements of internal waves in the NY Bight from a shipboard survey July 18-20, 2023 and moorings deployed in 35 and 50 m water depths July 18-October 2, 2023. Data coverage spans the water column at 1- 5 m vertical resolution, including acoustic backscatter from a multi-frequency echosounder, current velocity from an Acoustic Doppler Current Profiler (ADCP), and salinity and temperature data from Conductivity, Temperature, and Depth devices (CTDs) and temperature loggers. Analysis of this data allowed for measurements of wavelength, amplitude, and speed of individual high-frequency internal waves. This dataset is expected to inform knowledge of internal wave processes in the Long Island coastal region, which has implications for regional mixing, planktonic transport, prey aggregation, and stratification dynamics.

Trap Strength Measurements with Position Calibrations - Poster #28

Student Authors: Deven Pritchard, Christine Kerne
Faculty Mentors: Catherine Herne

Optical tweezers are characterized by the use of a highly focused laser beam to manipulate microscopic matter – both biological and non-biological. Our goal is to develop an effective and repeatable technique for measuring the strength of the optical trap. The forces produced within optical tweezers are like springs where the trap stiffness acts as a spring constant, determining how strong of a grip the laser has on a specimen. In this project, we work to obtain consistent values for trap stiffness with two techniques: the equipartition method and mean-squared displacement analysis. The material used in our experiments is polystyrene microspheres in a water-based solution. The initial outcome of our approach did not provide us with consistent measurements, although further analysis is promising.

Standardizing Data Acquisition Using High-Power Optical tweezers - Poster #32

Student Authors: Shoshana Shapiro, Jillian Iqbal
Faculty Mentors: Catherine Herne

Optical tweezers use a focused beam of light to trap and manipulate microscopic particles. Our research group has created an optical setup using a 1-watt laser to trap polystyrene spheres suspended in water and measure their oscillations to calculate trap stiffness. While our initial goal was to catalog trap stiffness as a function of laser power, we observed significant inconsistencies between trials. To resolve this, we focused on standardizing experimental conditions and data acquisition methods. We identified key sources of variability, including the positioning of the quadrant photodiode (QPD), the trap's alignment with the laser focus, and external noise. Changes to our data acquisition process were made to account for these issues. These changes improve data reliability and provide a foundation for future semesters.

Comparing instructor intention with student perception: Teaching strategy and philosophy – Poster #30

Student Authors: Gabriela Treble
Faculty Mentors: Catherine Herne

Previous research shows that student-centered teaching is the most effective way to teach physics. Student-centered teaching involves strategies including differentiated instruction, inquiry-based teaching like think-pair-share activities, and problem-solving in class. However, it is also evident that faculty don't often practice these strategies. We investigated the student population taking physics classes along with their instructors at our university to explore how faculty's intended strategies are being interpreted by the students. Our research questions are: how do students interpret instructors' teaching strategies, what teaching strategies do students feel are most effective for them, and is there a congruence between instructors stated pedagogical values and students' interpretations of those values? We surveyed faculty on what strategies and values they intended to implement. At the beginning of the semester, we surveyed students on their preferred strategies and pedagogies. Our results so far show that even though lecture-based teaching is not a student-centered method, students overwhelmingly identified it as an effective teaching strategy. Contradictory to this, students chose student engagement and providing a positive learning environment as the top two elements of education they felt an instructor should prioritize, both of which are arguably not achieved through lecture-based teaching.

Generating microscopic optical vortices in calcite crystals – Poster #29

Student Authors: Elaina Wahmann, Michael A. Buccino
Faculty Mentors: Catherine Herne

Optical vortices are structured laser beams that generate a torque on objects they illuminate. They have been used to investigate properties of biological systems as well as synthesizing micro-machines. In this project we are making tiny vortices with potential applications in studying cells, molecules, and protein folding structures. We are looking for optical vortices in single-crystal calcite on a microscopic scale. We do this by tightly focusing light at the bottom of a crystal in an optical trap. We image the light that passes through the crystal and look for patterns that indicate the presence of a vortex mode. We compare our

images with theoretical models of the mode exiting the crystal. We consistently see a particular pattern that is not immediately recognizable as a vortex mode, but further analysis may be revealing. In this poster we will discuss potential explanations for the measured laser modes.

Psychology Department

Culturally Acceptable Self-Harm - Poster #23

Student Authors: Sonakshi Bansal
Faculty Mentors: Glenn Geher

Contrary to popular belief, self-harm is not limited to purely physical manifestations and is much more prevalent in society, in the form of culturally acceptable forms of self-harm. These may be in the form of overworking, excessive working out, an abnormal urge to seek adrenaline rush through activities known to be detrimental to well-being, etc. The current study aims to assess the influence of two specific emotions—guilt and redemption—as antecedents of culturally acceptable self-harm.

Participants first write about a guilt inducing event, post which they complete the Guilt and Shame Questionnaire (GSQ8). The participant is then randomly allocated to the apology group, or the no apology group. Those in the apology group are instructed to write about how they can redeem for the action that they feel guilty about, and how they would feel if they were forgiven, whereas, participants in the no apology group write about an everyday event. After completing the GSQ-8 again, the participant is given headphones to listen to an aversive auditory stimulus. The participant complete the GSQ again.

The study uses the voluntary endurance of aversive auditory stimuli to assess the effect of guilt and redemption on the tendency of individuals to engage in culturally acceptable self-harm. Results indicate that guilty participants who are not given a chance to redeem endure the aversive stimuli longer than guilty participants given a chance to redeem. Data was analyzed through T-tests to compare the endurance time of participants who were given a chance at redemption, and those who were not.

This study serves to fulfill a research gap between research that shows that guilt has a role in pain tolerance, and research that posits that individuals will be willing to engage in "self-punishment" (social denied pleasure) only if they cannot redeem for their actions.

Play in Cereal Box Packaging - Poster #19

Student Authors: Lucia Daher, Lars Ellwanger, Owen Wardwell, Mike Jagacki

Faculty Mentors: Doug Maynard

Play opportunities have been included in and on cereal box packaging in the United States for many years, yet there has been little scholarly attention paid to the diversity of cereal box play artifacts. This study explores themes and findings of contemporary cereal box play. Data in the form of images of the front, sides, and backs of cereal boxes was collected from all boxed cereal at several local grocery stores. We coded for the presence and type of play, the use of color, added sugar content and other variables. Findings revealed that children's cereal had higher rates of pure play, with no difference in rates of educational play. Similar results were found for sugar content, with significantly higher sugar content found in cereals that incorporated pure play. Organic cereals included more educational play than pure play, compared to non-organic cereal. Cereals that incorporated pure play also had significantly higher ratings of colorfulness as compared to cereals that included educational play. These differences contribute to a broader understanding of play in advertising and marketing.

Stakeholders' Roles in Evolutionizing Education: An Evolutionary-Based Toolkit Surrounding Elementary Education - Poster #25

Student Authors: Stephanie Dickinson-Frevola, Mariah Griffin, Sonakshi Bansal, Desiree Groce-Volinski, Brandon Staccio, Keydy Henriquez, Ethan Eisenberg, Maya Kardas, Aileen McCarthy, Aman Shetty

Faculty Mentors: Glenn Geher

There is a rapidly growing body of research in the field of evolutionary educational psychology that examines children's evolved motivational and educational inclinations as they relate to modern learning and schooling. It is generally agreed that schools are inherently mismatched with how children of our species evolved to learn, thereby contributing to difficulty learning and

associated adverse schooling outcomes. Many researchers argue that, by making small changes to schools that help to better align instructional methods and childhood as a whole with our species' evolved learning mechanisms, we can lessen the negative impacts from evolutionary mismatch and create better outcomes for modern students. In order to create effective change, there must be collaborative work done by parents, teachers, and school administrators. This paper delineates the roles of these stakeholders in elementary education with respect to creating more evolutionarily relevant systems. A research-based toolkit is proposed to guide these stakeholders in evolutionizing the elementary education system.

Shake on It: An Evolutionary Take on Group Size and Social Contracts - Poster #15

Student Authors: Ethan Eisenberg, Brandon Staccio, Nadia Dasi Tamayo

Faculty Mentors: Glenn Geher

A key idea in the evolutionary behavioral sciences pertains to evolutionary mismatch, which exists when modern conditions of an organism do not match the ancestral environments of that organism. One critical such mismatch in humans is found in the fact that many of us live in large groups (e.g., cities), whereas under ancestral conditions, all people lived in small-scale societies. This study sought to explore if people are more likely to break a social contract in large-scale conditions (i.e., cities) relative to in small-scale conditions. Further, we predicted that a contract sealed by a handshake would be more meaningful to people thinking about small-scale societies whereas a contract based on a signature would be more meaningful to people in large-scale contexts. Using a 2*2 between-groups design, manipulating size of environment and nature of contract, and 200 undergraduate students, we found that people given a vignette with a large-scale prompt were more likely to break a contract based on a handshake. And we found precisely the opposite for participants given the small-scale societal prompt. These findings have implications for understanding how group size bears on the proclivity to break social contracts.

Time Pressure as a Barrier to Adult Play: The Roles of Play Guilt, Playfulness, and Stress - Poster #17

Student Authors: Lars Ellwanger

Faculty Mentors: Doug Maynard

Play is an important part in the lives of many people. It has many benefits, but adults might not be getting enough play. This study investigates chronic time pressure as a potential barrier to adult play, through play guilt, perceived stress, and playfulness. We define play guilt as an "emotional state characterized by negative thoughts and feelings about engaging in enjoyable play activities instead of spending time in a more 'productive manner'" As part of this study, a new scale was developed to measure this construct. A sample of 258 U.S. adults completed an online survey which assessed chronic time pressure, perceived stress, play guilt, and playfulness. Results showed that chronic time pressure significantly reduced play fulfillment. Chronic time pressure was associated with higher levels of perceived stress, which in turn was associated with lower levels of play fulfillment. Play guilt was a significant emotional response to time pressure but did not significantly mediate the relationship on play fulfillment. Trait playfulness was also explored as a potential moderator of negative outcomes on play fulfillment. This research provides initial validation of a newly developed play guilt scale, and highlights chronic time pressure and stress being barriers, limiting adult's engagement and fulfillment in beneficial play activities. Future research should continue investigating the role of play guilt and additional factors in shaping the play experiences of adults.

Does Failure Beget Success in Life? An Evolutionary Analysis of Resilience - Poster #20

Student Authors: Maya Kardas, Ashley Sullivan, Shane Lapp, Julia Perfetti, Luke Hoyt, Jason Palmer, Aileen McCarthy, Lindsay Marr

Faculty Mentors: Glenn Geher

From an evolutionary perspective resilience is a critical psychological attribute for reproduction and survival (Geher & Wedberg, 2022). With this in mind, Geher and Wedberg posited that the number of failures one experiences in life is positively predictive of the number of successes one experiences in life. This perspective essentially is an evolutionary take on the importance of experiencing

failure. There is a commonly-held narrative that a principal way of learning is through making mistakes. In psychological research, success and failure are often used as domains to study varying constructs. Past research has not shed full light on this issue. This work is designed to explore the relationship between successes and failures in life from an evolutionary perspective. The main prediction is that, among young adults, self-reported, perceived failures in life are predictive of self-reported, perceived successes in life. 174 undergraduate participants were included in this study. Using various correlational analyses we found strong support for the prediction of a positive correlation between perceived successes and failures. These data could have positive implications in education, athletics, industry and beyond.

Life History and Allocation of Surplus Resources: A Budget-Allocation Approach to Studying Altruism - Poster #12

Student Authors: Aileen McCarthy, Emma Jerabek, Stephanie Dickinson-Frevola, Ayla Vickery

Faculty Mentors: Glenn Geher

The present study is designed to examine the relationship between life history strategy and altruism. Life history strategy (LHS) can be described by how an individual's developmental environment shapes the way they perceive their current environment. LHS has specific focuses in reproductive versus somatic effort, reproductive efforts being correlated with relatively slow LHS and somatic efforts corresponding to relatively high LHS. Altruism can be defined as engaging in prosocial behavior at a cost to oneself. Specifically, this study predicts that people who score as having "slow" life history strategies will be more likely to share resources with others, while we expect participants who show a "fast" life history strategy to be less likely to show altruistic tendencies. We utilized a correlational study using 264 participants, primarily undergraduate students. Participants completed measures of LHS by Figueredo et al (2006), and we created a budget-allocation scale to see how people differentially allocate resources to themselves, family, friends, or to strangers. Using a multiple regression analysis, a primary hypothesis was generally supported; people who scored as having relatively slow LHS indicated a stronger tendency to allocate more resources to family. Further, also as predicted, individuals who scored as having relatively fast LHS indicated a stronger tendency to keep resources for themselves.

The Evolutionary Psychology of Betrayal: An Analysis of Personality Traits Most Associated with Revenge – Poster #13

Student Authors: Aileen McCarthy, Maya Kardas, Stephanie Dickinson-Frevola

Faculty Mentors: Glenn Geher

This study explored dispositional predictors of reactions to betrayal. With a sample of 160 undergraduate students, we examined the degree to which each of the Big Five Traits and each of the elements of the Dark Triad predicted the tendency to react strongly and negatively to a perceived betrayal. Participants engaged in an online simulated game experience in which they all ended up being betrayed by "Sam," a hypothetical opponent. Consistent with our predictions, each facet of the Dark Triad was positively associated with wanting to get revenge on Sam. Further, people who scored as emotionally unstable, closedminded, and disagreeable showed a strong inclination toward wanting revenge. Connections with the evolutionary psychology of social interactions will be discussed.

Casual Computer Gameplay – Poster #21

Student Authors: Olivia Palazzolo, Lisbeth Hernandez, Rory Myles

Faculty Mentors: Doug Maynard

The present study examines whether playing a simple game with a human versus a computer opponent, as well as the outcome of the game, will impact the participant's emotional state. Participants were randomly assigned to play dots and boxes against a computer opponent or a confederate. We predict that those who play against a human opponent will show a greater level of positive affect (Hypothesis 1A) and a lower level of negative affect (Hypothesis 1B) than those who are playing against a computer opponent. We also hypothesize that participants who win their game will show higher levels of positive affect (Hypothesis 2A) and lower levels of negative affect (Hypothesis 2B) than participants who lose their game. We are recruited college students 18 years of age or older; 30 per opponent condition (60 total). Participants are randomly assigned to one of the two opponent conditions (human or computer) and play a single online game of the popular paper-and-pencil game, dots and boxes on gametable.org. Participants assigned to the human condition meet and play

against a confederate who has been trained to a moderate level of skill with the game and those in the computer condition play against the website's AI, set to a moderate level of difficulty. We begin by explaining the rules of the game and walk the participant through a smaller (3x2) trial game with the researcher to ensure they understand the rules. Once the trial has finished, participants play a game on a medium-sized board (8x6) with the confederate or AI opponent. After the game concludes, participants complete a survey online using Qualtrics, where they respond to demographic questions (e.g., age, gender, familiarity with the game), and complete the positive and negative affect schedule (PANAS). The experimenter notes the condition the participant was in and the result of the game (whether the participant won, and the total score for both the participant and their opponent).

Consistent with Hypothesis 1A, participants in the confederate condition reported significantly higher
levels of positive affect than those in the computer condition, $t(54) = 2.61$, $p = .012$, $d = 0.71$. However, the difference between the two opponent types on negative affect was only marginally significant, Welch's $t(49) = 1.84$, $p = .072$, $d = 0.47$. Therefore, Hypothesis 1B was not strongly supported.

Participants who won had significantly higher levels of positive affect ($M = 29.54$, $SD = 9.94$) than those who lost ($M = 23.32$, $SD = 8.90$), $t(52) = 2.14$, $p = .037$, $d = 0.68$. Winners also had significantly lower levels of negative affect ($M = 12.31$, $SD = 1.65$) than those who lost ($M = 15.17$, $SD = 4.82$), Welch's $t(52) = 3.25$, $p < .001$, $d = 0.80$. Therefore, Hypotheses 2A and 2B were both supported.

Video games can illicit many different reactions. Our study hopes to distinguish these emotions using the same game with different oppnents. We found that the social aspect of play can have ubiquitous positive effects on opponents mood and overall enjoyment in regards to play. Both negative and positive emotional affect is only marginally significant when opponents were faced with a in game computer opponent. These findings can contribute valuable data to gaming companies to inform them how to maximize enjoyment for their games.

Volunteer Motives: In Their Own Words - Poster #18

Student Authors: Leeza Pantano, Lars Ellwanger

Faculty Mentors: Maryalice Citera

Organizations rely on volunteers, yet recruiting and retaining them remains a challenge. Understanding volunteer motivations can help organizations sustain a committed volunteer base. This study explored volunteer motives. 39 structured interviews from volunteers at an environmental preserve were qualitatively coded and 13 motivation categories identified. Interrater reliability conducted on 25% of interviews yielded a 91.84% agreement. The most frequently cited motivation was intrinsic interest (90%), followed by paying it forward (59%) and affiliation with the preserve (59%). Social interaction was also crucial, as volunteers valued connections with like-minded individuals. While extrinsic rewards were noted, long-term engagement was primarily driven by intrinsic rewards. These findings highlight the gray area between initial incentives and sustained commitment. While external rewards may attract volunteers, long-term retention depends on intrinsic satisfaction and meaningful engagement. Organizations can enhance volunteer engagement by aligning roles with passions, fostering social connections, and recognizing contributions. Limitations include a focus on positive experiences and the inability to distinguish between initial and sustained motivation. Future research should explore how volunteer leaders influence long-term engagement. By using these motivation categories, organizations can create fulfilling volunteer experiences and an engaged volunteer base.

Understanding the Efficacy of Child Advocacy Center Programs: A Life History Approach – Poster #16

Student Authors: Gab Picciocchi, Emma Jerabek, Shayla Thatch

Faculty Mentors: Glenn Geher

Based on the work of Herbert (2015), who studied the efficacy of Child Advocacy Centers, the current study proposes that the use of a Child Advocacy Center (CAC) relates to Life History Strategy. CACs are programs that are designed to be safe and inviting spaces to provide services for victims of child abuse. The previously conducted research has supported the need for more widespread use of CACs. However, the data have been limited, primarily examining usage rates rather than the actual efficacy of the programs. This particular study hopes to partly address this gap by examining the relationship between the utilization of such centers and Life History Strategy. The basic prediction is that child abuse survivors who use these services will be more likely to show relatively slow Life History Strategies. Comparisons will be made between survivors of child abuse who have made use of CACs relative to those who have not done so.

Evolutionary Mismatches Inherent in Elementary Education and the Associated Implications for Student Outcomes – Poster #24

Student Authors: Sonia Santos, Anthony Caserta, Julia Colodny, Stephanie Dickinson-Frevola, Ethan Eisenberg, Mariah Griffin, Aileen McCarthy, Shayla Thach, Nadia Tamayo

Faculty Mentors: Glenn Geher, Kathryne Gruskin

While evolutionary mismatches can be seen in many areas of human life (e.g., diet, exercise, online communication), evolutionary mismatches are particularly pervasive in our elementary schools. Due to the critical nature of social-learning and cultural transmission, there is a long history of learning that has shaped the evolved learning mechanisms of children. Yet, many aspects of modern schools work against these evolved mechanisms. Evolutionary mismatches in schools include age-segregated classrooms, decontextualized learning, instruction from adult teachers, directed curricula, sedentary work, computer-based learning, and

deemphasized play. There are a number of resulting negative student outcomes of such mismatches that need to be identified and explored to guide future research. This poster synthesizes the current research behind each example of evolutionary mismatch in elementary schools as well as the associated impacts on student learning and development. The goal of this work is to lay an evolutionary foundation for understanding school-related problems and aid in developing schools that are better aligned to students' evolved learning mechanisms.

Validating a Measure of Volunteer Motivation - Poster #14

Student Authors: Diyanni Toxey, Leeza Pantano, Lars Ellwanger
Faculty Mentors: Maryalice Citera

A volunteer motivation scale was created to explore a tentative model of 6 factors that drive and hinder volunteer participation and engagement. We examined the scale's validity by surveying 108 participants with a newly developed 80-item volunteer motivation measure using a 5-point Likert scale (Strongly Agree to Strongly Disagree). We correlated volunteer motives with satisfaction and engagement. All six of the volunteer motive factors (Meaning $r=.57$, $p<.001$, Belongingness $r=.63$, $p<.001$, Hedonic $r=.50$, $p<.001$, Autonomy $r=.45$, $p<.001$, Interest $r=.29$, $p=.008$, and Mastery $r=.32$, $p=.003$) significantly and positively correlated with satisfaction. Similar significant positive correlations were found for the 6 volunteer motive factors and engagement (Meaning $r=.60$, $p<.001$, Belongingness $r=.67$, $p<.001$, Hedonic $r=.60$, $p<.001$, Autonomy $r=.57$, $p<.001$, Interest $r=.58$, $p<.001$, and Mastery $r=.56$, $p<.001$). Future research should focus on collecting longitudinal data from volunteers of a specific organization. By using a validated measure of volunteer motivation organizations can gain insight into attracting and retaining volunteers.

The Relationship Between Specific Language Background, Stimulus Modality, and False Memory - Poster #22

Student Authors: Ruby Wilson
Faculty Mentors: Elizabeth Hirshorn, Giordana Grossi

Memory is extremely fallible. It is easy to create a false memory (i.e., a memory of something you did not experience) using the DRM paradigm. It works by giving a participant a study list of related words (e.g., dress, coat, pants, etc.) that purposefully omits highly related words (e.g., shirt). In a recall test, participants are asked to decide if words are "old" (e.g., dress) or "new" (e.g., milk). Highly related concepts, in this case shirt, are incorrectly recalled as "old" more often than unrelated concepts like milk due to shirt being semantically primed by previously encountered related words. Research shows that the semantic priming is also present cross-linguistically, such that in an English/French bilingual, dog in English primes chien (dog) in French or even related words like chat (cat). A second robust finding is that the DRM effect is larger when stimuli are presented auditorily vs. visually in languages that use alphabetic writing systems (e.g., English). However, it has been reported that the opposite effect was observed in Chinese, which has a very different writing system, such that false memories were recalled more visually than auditorily (Mao et al, 2010). The current study recruited bilingual participants who have the common language of English, but whose second language is either Chinese or a language that uses an alphabetic script (e.g., French or Spanish), to test if these modality effects also transfer cross-linguistically. Results showed the predicted pattern of a larger auditory DRM effect in English-French bilinguals than English-Chinese bilinguals, although the effect was not significant. Interestingly, the predicted modality effects were present in the memory for old words, where English-French bilinguals were more accurate for visually than auditorily presented words, but English-Chinese bilinguals were equally accurate for visually and auditorily presented words. These results suggest that the languages you know may influence how you use your memory.

Sociology Department

Preventing Short-Term Rental Conversion Through Long-Term Landlord Support - Poster #5

Student Authors: Alex Ardieta
Faculty Mentors: Anne Roschelle

Over the last decade, the rise in third-party market platforms has resulted in a crisis surrounding the quantity and affordability of long-term housing. The domination of short-term rental (STR) units in housing markets across the United States has disproportionately affected small towns in New York's Hudson Valley region. When faced with the appeals of short-term rental markets, long-term landlords are financially pressured to convert their long-term units – displacing tenants, reproducing the negative externalities associated with STRs, and further diminishing long-term housing options. This research explores five potential legislative structures to encourage cooperation between public offices and private long-term landlords to maintain a sufficient long-term rental stock in the Hudson Valley through policy/fiscal support. In this research, qualitative data and insight were collected through secondary analysis and one-on-one interviews with local renters, long-term landlords, and public officials. Preliminary analysis revealed a strong preference amongst participants for non-cash municipal supports, dilapidated/brownfield site usage requirements, and public engagement opportunities during the permission process.

A Lesbian Niche: How Online Representations Influence Offline Perception - Poster #6

Student Authors: Sophia Lattof
Faculty Mentors: Judith Halasz

For young lesbians figuring out their sexuality, access to the internet and online queer communities plays a role in the process of constructing an identity. Social networking sites (SNS) are increasingly important as places of interaction and socialization, and online exposure to queer identities has changed the way people interact with others and how they view themselves. As social media

influencers and micro-celebrities have gained traction in recent years, their platforms have become sites of socialization where representations of lesbian identities are spread and perpetuated. The purpose of this study is to identify how and where this socialization occurs, how it influences identity formation and lesbian self-presentation, and the impact that it has on lesbian communities offline. To answer this question, I conducted a series of interviews with college-aged self-identified lesbians on their habits and interactions with other lesbians both online and offline. I analyzed the interview transcripts using a combination of deductive and inductive coding. The results of this study address the ways in which representations on SNS influence offline self-perception and the formation of an individual lesbian identity. More broadly, this sociological study contributes to the symbolic interactionist and social psychological understanding of the offline effects of social media during critical periods of identity formation in the life course.

Theatre Arts Department

SPIES ARE FOREVER, A Staged Reading. Directed by Barclay Travis - Poster #3

Student Authors: Barclay Sherwood
Faculty Mentors: Isabel Smith-Bernstein

As a Theatre Studies and WGSS student, directing and producing this staged reading served as a final chance to create a space that abides by the values I've connected with and brought forth in my time as a Theatre Arts student. In February, I made my directorial and producing debut with SPIES ARE FOREVER by Joey Richter, Brian Rosenthal, and Corey Lubowich, a queer comedy and satire musical. My goals were to respectfully represent LGBTQ+ characters, performers, and identities on-stage, and create a rehearsal space that prioritizes comfort and care. By combining what I've learned in my Theatre and WGSS classes with my first-hand experiences working in Theatre spaces, I was able to foster a close-knit community of artists that prioritized care for and trust in one another. Throughout January and February, I worked with a 10-person cast and 9-person creative team in a conversational, considerate, and playful rehearsal room, allowing everyone to contribute ideas to the project while checking in to ensure comfort for all involved. SPIES performed to full, engaged, and excited crowds for two free-of-charge performances in Parker Theatre. Theatre with not just a focus on, but a love for LGBTQ+ people resonates deeply with our student body. My experience producing and directing this show proved to me that rehearsal rooms can be fun, safe, and productive all at once. The reception of the production proved that when the space has those traits, it shines through in the performances too.

2024-2025 RSCA Award Recipients

The Research, Scholarship, and Creative Activities (RSCA) program is dedicated to supporting student-faculty collaborations. In addition to hosting this annual Student Research Symposium, we provide several grants and awards.

The following pages list the winners of our summer grants (SURE), academic year grants (AYURE), and student opportunity grants for the 2023-2024 season.

2025 SURE Award Recipients

To Be Announced Soon!

Fall 2024 AYURE Award Recipients

Lola Allen (Cellular Biology), '25
Faculty Mentor: Lydia Bright (Biology)
Constructing an evolutionary tree of local Paramecium species

Brandon Gardner (Mechanical Engineering), '26
Faculty Mentor: Rachmadian Wulandana (Engineering Programs)
Performance Evaluation of 3D-printed Blades for Wind Energy Demonstrator

William Hamling (Electrical Engineering), '26
Faculty Mentor: Kevin Shanley (Engineering Programs)
An Automated Pressure Driven Flow System

Chelsea Lavelle (Mechanical Engineering), '27
Faculty Mentors: Bryan Czibesz (Art), Ping-Chuan Wang (Engineering Programs)
Exploring Thermal Management of Electronics through Cross-disciplinary Collaboration

Casey Maracek (Electrical Engineering), '24
Faculty Mentor: Heather Lai (Engineering Programs)
Evaluation of data collection and AI based processing techniques for the assessment of wind farm noise

Alisha Mokal (Biochemistry), '26
Faculty Mentors: Preeti Dhar (Chemistry), Aaron Haselton (Biology)
Evaluating the Insecticidal Potential of Saussurea lappa Extracts on Drosophila melanogaster

Barclay Sherwood (Theatre Arts, Theatre Studies), '25
Faculty Mentor: Isabel Smith-Bernstein (Theatre Arts)
SPIES ARE FOREVER, A Staged Reading. Directed by Barclay Travis

Julian Simek (Chemistry), '26
Faculty Mentor: Miles Wilklow-Marnell (Chemistry)
Assessing the Catalytic Activity of a PAsP-type Pincer Iridium Complex in Alkane Dehydrogenation

Ruby Wilson (Psychology, Psychobiology), '24
Faculty Mentor: Elizabeth Hirshorn (Psychology)
The relationship between specific language background and stimulus modality on false memory

Caz Wood (Chemistry), '25
Samuel Turner (Biochemistry), '24
Faculty Mentor: Pamela St. John (Chemistry)
Studying DNA Aggregation Using Both Atomic Force Microscopy and Fluorescence Polarization

Tianna Yu (Biochemistry), '25
Faculty Mentor: Alyssa Liguori (Biology)
Quantifying genetic and phenotypic differentiation among Daphnia pulicaria populations

Spring 2025 AYURE Award Recipients

Taheemuddin Ahmed (Electrical Engineering), '25
Faculty Mentor: Wafi Danesh (Engineering Programs)
LUROX D & E AI Prosthetic & EEG Analysis

Noelle Boruta (Mechanical Engineering), '27
Faculty Mentor: Ping-Chuan Wang (Engineering Programs)
Mechanical Integrity of 3D-printed Stainless-steel Structures Characterized by Fatigue Testing

Jennifer Callan (Mechanical Engineering), '26
Faculty Mentor: Rachmadian Wulandana (Engineering Programs)
CO2-rich Curing of Hempcrete for Carbon Sequestration

Lukas Cortes (English; Women's, Gender, and Sexuality Studies; Latin American, Caribbean, and Latinx Studies), '26
Faculty Mentor: Marcela Romero-Rivera (English)
Anthology and Report of Latinx Zines: Generation Z Latinx perspectives and interests through forms of creative expression

Svetlana Doronkina (Finance, Business Analytics), '25
Faculty Mentor: James Forest (Finance)
Rational Expectations in Housing Markets: The Case of Survey Forecasts

Carolann Paszek (Sculpture), '25
Faculty Mentors: Emily Puthoff (Art)
Eco Art Lab

Student Opportunity Grant Winners 2024-2025

Caleigh Addis (Graphic Design)
Taheemuddin Ahmed (Electrical Engineering)
John Alexander (Adolescent Education - English)
Alex Ardieta (Sociology, Geology)
Sonakshi Bansal (Psychological Science)
Julia Barbour (Painting & Drawing)
Sophia Bon (Printmaking)
Jody Borhani-D'Amico (Photography & Related Media)
Gabrielle Bush (Printmaking)
Jennifer Callan (Mechanical Engineering)
Emma Carty (Anthropology)
Isabella Cremo (History, Political Science)
Jazmyne Daily-Simpson (Graphic Design)
Reilly Deller (Ceramics)
John DiMaio (Graphic Design)
Nguyen Minh Doan (Painting & Drawing)
Ethan Eisenberg (Psychological Science)
Rivka Gorelick (Photography)
Srinija Gumudavelli (Psychology)
Gregory Hakobian-Leone (Music)
Olivia Hansen (Graphic Design)
Lisbeth Hernandez (Psychology)
Kathryn Humphrey (Graphic Design)
Jacqueline Kelly (Physics)
Emilie Kim (Ceramics)
Marin Koferl (Anthropology)
Grace Lindenfelser (Printmaking)
Diego Lopez (Anthropology)
Alexis Madden (Biochemistry)
Vincent Mandracchia (Music)
Nathaniel Martinez (Graphic Design)

Emma McGrath (Ceramics)
Nicole Miller (Adolescent Education - English)
Daniel Nicholas (Biology)
Chrystalynn O'Boyle (Studio Art)
Allison O'Connor (Graphic Design)
Jolie Orbeta (Painting & Drawing)
Risa Oshinsky (Sculpture)
Olivia Palazzolo (Psychology)
Brooke Pennington (Visual Arts)
Brandon Pettenati (Music - Recording & Electronic Music)
Abigail Petteys (History)
Sarah Prohens (Photography)
Jangir Qayum (Photography)
Bill Reed (Painting & Drawing)
Halla Rhode (Printmaking)
Celina Sciuto (Graphic Design)
Matthew Selvaggio (Mechanical Engineering)
Shannon Seymour (Chemistry)
Julian Slavin (Music Composition)
William Speziale (Anthropology, Asian Studies)
Alexander Tonetti (Ceramics)
Jayden Trim (Anthropology)
Mars Weigley (Sculpture)
Ruby Wilson (Psychological Science)

Publication Opportunities for Undergraduates

Looking for next steps for your project? Consider publishing it! Your faculty mentor can guide on best options within your discipline. Additionally, these journals focus on publishing undergraduate research.

Multidisciplinary

The Undergraduate Research Commons has a list of journals and other avenues of undergraduate research communications.

Stanford Undergraduate Research Journal is an annual peer-reviewed publication of research articles written primarily by Stanford undergraduates, but also well-qualified students at other institutions, from all academic fields.

Pittsburg Undergraduate Review (PUR) is a multidisciplinary journal that accepts papers from around the world.

American Journal of Undergraduate Research is a refereed journal for undergraduate research in the pure and applied sciences, mathematics, engineering, technology, and related areas in education.

Humanities

The Allegheny Review, now entering its 31st year of publication, is one of America's few nationwide literary magazines dedicated exclusively to undergraduate works of poetry, fiction, creative nonfiction, and art.

History Matters: An Undergraduate Journal of Historical Research.

Science, Technology, Engineering, & Math

Journal of Young Investigators is dedicated to the presentation of undergraduate research in science, mathematics, and engineering.

Journal of Undergraduate Reports in Physics is a peer-reviewed journal of the Society of Physics Students (SPS) for archiving research conducted by undergraduate physicists.

IMPULSE is the first international, online neuroscience journal for undergraduate publications.

The Penn Bioethics Journal is the nation's premier peer-reviewed undergraduate bioethics journal.

Catalyst: Rice Undergraduate Science and Engineering Review accepts submissions from undergraduate students who have performed science or engineering research at any international university or research institution laboratory.

Social Sciences

Undergraduate Economic Review is aimed at promoting high quality undergraduate research.

Undergraduate Journal for Global Business and Community offers undergraduate students a venue for publishing works.

The Dialectics Undergraduate Journal of Leadership, Politics, and Society aims to promote undergraduate discourse and scholarship and to encourage students to pursue and engage in thoughtful discourses on topics of societal importance.

Issues in Political Economy is committed to supporting and encouraging quality undergraduate research in all areas of economics.

Psi Chi Journal is a peer-reviewed publication by the national honor society for psychology.

The Yale Review of Undergraduate Research in Psychology is an annual journal that showcases the best and most original research in psychology conducted by undergraduates from around the world.