

Creative Collaborations Showcase 2025



Tuesday, April 8, 2025 and Thursday, April 10, 2025
University of San Diego | Learning Commons Town Square
<https://www.sandiego.edu/ugresearch/students/creative-collaborations.php>
Office of Undergraduate Research

Creative Collaborations Showcase, 2025

Welcome to the celebration of undergraduate research at the University of San Diego. This is the 35th year that we have showcased undergraduate research at USD. In past years, Creative Collaborations was typically highlighted by a poster session. Starting last year, we have made significant changes to Creative Collaborations with the goal of creating a more engaging experience for the presenters and the audience. The new format involves short oral presentations where students have six slides that automatically advance every 20 seconds. There will be 11-12 student presenters from various disciplines at each session, followed by a short question/answer session that allows the audience to submit questions. There will be two sessions on Tuesday and two sessions on Thursday. The audience will choose the top presentation from each session who will receive the *Creative Collaborations Showcase Audience Choice Award*.

Dr. Timothy Clark
Director for Undergraduate Research

Tuesday, April 8, 2025

Session 1 | 12:15 pm - 1:15 pm

1. **Moriah McLellan**, *Timothy Clark* (Chemistry and Biochemistry)
2. **Madison Santos**, *Cawa Tran* (Biology)
3. **Hannah Lopez**, *Joan Schellinger* (Chemistry and Biochemistry)
4. **Aann Alkhori and Sherry Khalil**, *Timothy Clark* (Chemistry and Biochemistry)
5. **Andrew Dolan**, *Rachel Blaser* (Neuroscience, Cognition, and Behavior)
6. **Kylie Kirkpatrick**, *Odesma Dalrymple* (Industrial and Systems Engineering), *Marissa Forbes* (Mechanical Engineering)
7. **Anselmo Tello, Nicolette Agajanian and Benjamin Washburn**, *Venkat Shastri* (Electrical Engineering)
8. **Derek Hissong**, *Susan Lord* (Integrated Engineering)
9. **Claire Hastings and Naina Makkad**, *Frank Jacobitz* (Mechanical Engineering)
10. **Jaziel Mayoral**, *Marcel Sanchez Prieto* (Art, Architecture, and Art History)
11. **Iggy Wozniak and Bruno Ghonaim**, *Frank Jacobitz* (Mechanical Engineering)

Tuesday, April 8, 2025

Session 1 | 12:15 pm - 1:15 pm

We encourage you to vote for your 2 favorite presentations from each session!

Scan the QR code below to cast your vote



Presentation Voting Form

Do you have questions for the speakers? Submit your questions below for a chance for them to be asked during the Q&A session.

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Question Asking Form

Synthesis of Arylphosphonates through Direct C-P Coupling

Student Name: Moriah McLellan

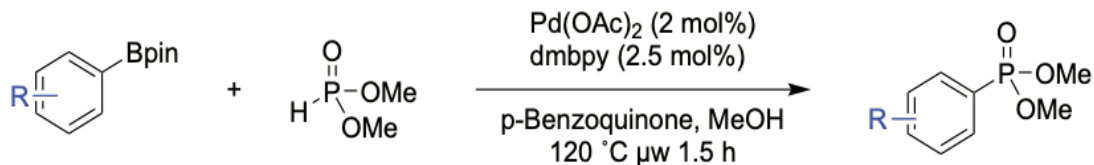
Department: Chemistry & Biochemistry

Faculty Mentor Name: Timothy Clark



Project Abstract:

Arylphosphonates are extremely useful molecules with applications in a variety of fields. They are used in the agricultural industry as pesticides and in the pharmaceutical industry as drug precursors. Known methods to synthesize aryl phosphonates are limited in reactivity and scope. This project has developed a new method to synthesize these compounds using direct coupling of arylboronate esters with dialkyl phosphites. The reaction is run using microwave heating and open to air, and provides a wide variety of arylphosphonates in moderate to good yields. A two-step reaction sequence was also developed starting with a known C-H Borylation reaction to produce the boronate ester, followed by the C-P Coupling reaction. This allows for the synthesis of arylphosphonates from inexpensive, readily available starting materials.



Understanding pathogen infection in corals using a sea-anemone model system

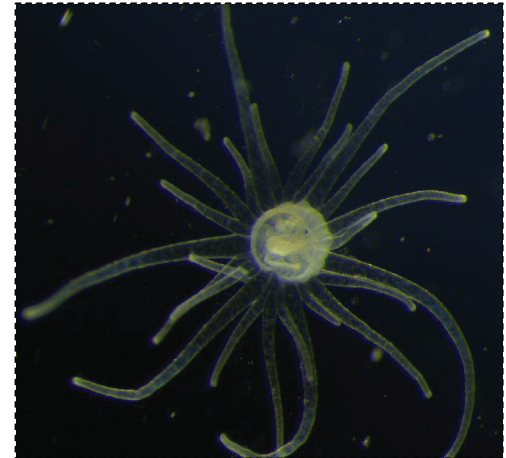
Department: Biology

Student Name: Madison Santos

Faculty Mentor: Cawa Tran



Abstract: Corals are the foundation for a thriving reef ecosystem. Displaying a mutualistic relationship with algal symbionts. Corals have been in rapid decline due to climate change, and a pathogenic bacterium, *Vibrio alginolyticus*. This pathogen is linked to coral bleaching, that can lead to mortality. It's still unknown how *V. alginolyticus* is entering the corals. Using the sea-anemone, *Aiptasia*, as a model system and a fluorescently-labeled strain of *V. alginolyticus*, we hypothesized *V. alginolyticus* is entering through the mouth as the anemones feed, making its way to the gastric cavity. We compared four different treatments, (1) brine shrimp with pre-ingested *V. alginolyticus*, (2) brine shrimp with waterborne *V. alginolyticus*, (3) waterborne *V. alginolyticus*, and (4) a control with only sterile seawater. Using fluorescence microscopy, we tracked the pathogen inside anemones. Anemones were then homogenized and plated to observe bacterial growth in the gastric cavity. There were varying levels of fluorescent colonies of *V. alginolyticus* across all treatments, suggesting food may have an impact on pathogen entry. Ingestion of a pathogen causing coral disease may destroy large portions of a reef, thus, understanding these dynamics of infection are important.



Green solid phase peptide synthesis (SPPS) of silk fibroin tetrapeptide

Student Name(s): Hannah Lopez

Faculty Mentor Name(s): Dr. Joan Schellinger

Department: Chemistry and Biochemistry



Project Abstract:

Solid-phase peptide synthesis (SPPS) is a widely used technique for producing peptides. However, traditional methods often rely on hazardous solvents such as DMF and energy intensive processes like manual shaking. This project is focused on optimizing a greener approach towards the SPPS of the silk fibroin tetrapeptide GAGA. GAGA is known to self-assemble into crystalline, antiparallel sheets that contribute to the strength of silk fibers which can be utilized as sutures for biomedical applications. The goal of this project is to improve the sustainability of the synthesis by utilizing ultrasonication for coupling and deprotection steps and replacing conventional solvents with safer alternatives. Green solvents such as 2-methyl tetrahydrofuran (MeTHF), triethyl phosphate (TEP), and gamma valerolactone (GVL) were investigated and additional modifications, such as adjusting coupling times, were implemented to increase the product yield. NMR spectroscopy and HPLC were utilized to confirm product formation and purity. Future work will focus on further optimizations, including refining solvent systems to broaden the impact of this approach, and applying it to the development of various peptide conjugates.

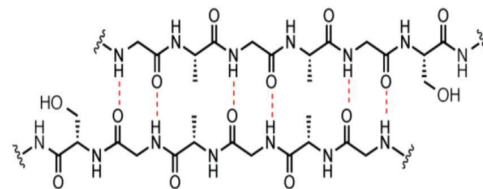


Figure 1. The tetrapeptide GAGA is known to self assemble.

Accessing Biaryl Bisphosphonates Through Oxidative Homocoupling of ortho-Borylated Arylphosphonates

Aann Alkhori, Sherry Khalil
Timothy Clark

Department of Chemistry &
Biochemistry



Project Abstract:

Methods that efficiently synthesize arylphosphonates and biaryl bisphosphonates provide valuable tools for these classes of compounds that have numerous applications. This poster will focus on our progress in developing an efficient synthesis of biaryl bisphosphonates oxidative homocoupling of ortho-borylated arylphosphonates. The key to success of this project is to have robust approaches to synthesizing ortho-borylated arylphosphonates. We previously developed the phosphonate-directed ortho C-H borylation of arylphosphonates, which provides direct access to the desired arylboronate esters. Additional approaches that complement this approach will be demonstrated including directed lithiation/borylation, lithium/halogen exchange, and Miyaura coupling. Applications of the borylated arylphosphonates to oxidative homocoupling reactions will be demonstrated.



The effects of planning time on performance on the Traveling Salesman Problem

Student Name(s): Andrew Dolan, Nicholas Butcher, Chris Na

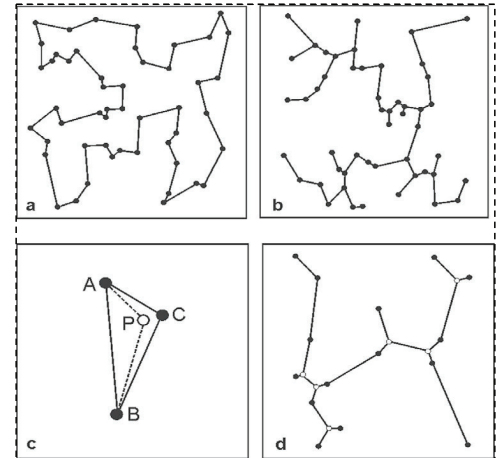
Department: Psychology



Faculty Mentor Name(s): Dr. Rachel Blaser

Project Abstract:

The Traveling Salesperson Problem (TSP) is a combinatorial optimization problem in which participants seek the optimal route connecting an array of targets (McGregor 2011). As the number of targets increases, the number of possible solutions increases drastically. Humans perform extremely well on spatial versions of this task, despite its mathematical complexity, making it an appealing tool for the study of spatial cognition. In the current study, we will look at global vs. local strategy use by college aged students testing the effects of planning time on performance. Previous data indicated that participants were paradoxically better in a memorized version of the task than a search version. We hypothesize that this may have been due to increased planning time in the memory condition of the task. To test this hypothesis, we are presenting participants with different versions of a TSP that vary planning time before allowing a solution. Percent above optimal, intersections, and errors are recorded as measures of performance. Based on previous research, we expect increased planning time to improve performance.



Exploring Temperature Variations to Optimize Biogas and Biomethane Production

Student Names:

Kylie Kirkpatrick

Department: Industrial and Systems
Engineering



Faculty Mentor Name:

Marissa Forbes and Odesma Dalrymple

Project Abstract:

Biogas and biomethane, renewable energies generated from organic wastes, can be used for multiple applications. Biogas is primarily composed of carbon dioxide and methane. The more methane present, the higher the gas quality. Biogas and biomethane can be generated by using local wastes as substrates in anaerobic digestion. The mesophilic temperature range (~25-50°C) is commonly used during anaerobic digestion, with most experiments using ~34°C-37°C. In this study, we explored biogas/biomethane production via the anaerobic digestion of fish carcass, kelp and beer wastewater at three different temperatures in the mesophilic range to explore the impact of temperature on energy yield. We ran ten anaerobic digesters for six days at 20°C, 28°C, and 34°C respectively. With a higher gas quality, we can eliminate chemical scrubbing to turn biogas into biomethane, positively impacting net energy. Lower quality gas can be used for daily energy needs and consumption (cooking, heating). Higher quality gas can be used for larger energy needs (transportation, stored energy).



Glaukos: iDose TR Assembly Automation

Department: Shiley Marcos School of
Engineering

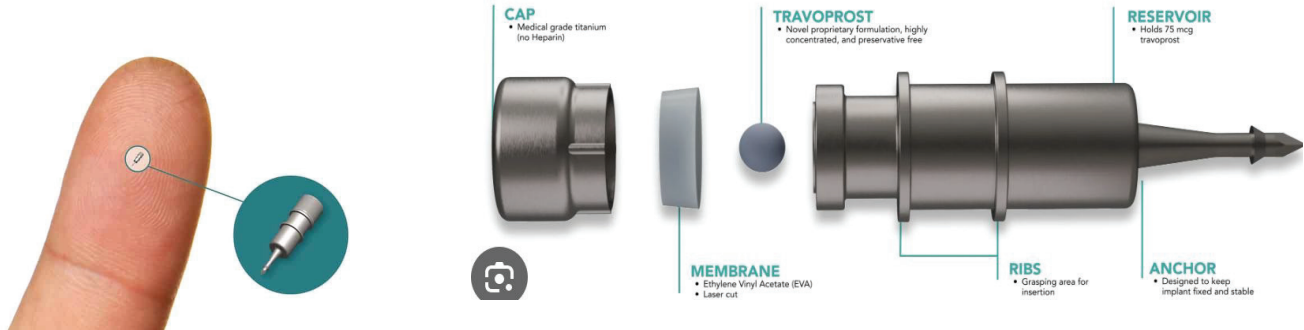


Faculty Mentor: Subramanian Shastri

Students: Daniel Fox, Advika Pillai, Anselmo Talla,
Nicolette Agajanian, Benjamin Washburn, Daniel Quarshie

Project Abstract:

Design a precision end effector that attaches to a robot arm and is able to pick up and assemble each of the iDose TR implant technology parts. These parts are difficult to fit together due to their extremely small sizes of approximately 2 mm long and 0.5 mm wide. Automating the building process for the iDose TR generation 1 and 2 will increase the production rate and efficiency of the company by reducing cycle times. This will be accomplished by utilizing robotic principles to autonomously control the aforementioned end effector into transporting, reorienting, and placing each assembly piece.



BioBrew

Student Names: Derek Hissong, Gabrielle Ramseier,
Emmy Van Witzenburg, Chris Perez, Joe Marcinek

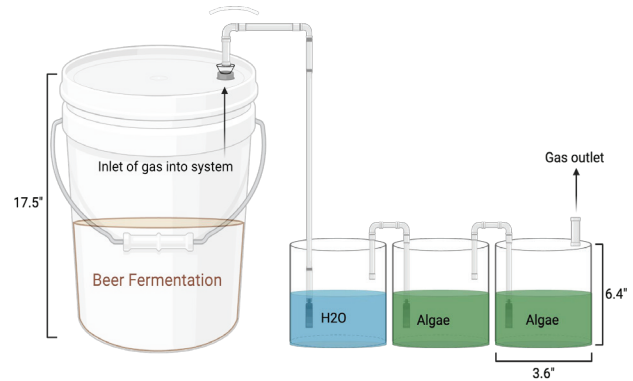
Department: Shiley Marcos School of
Engineering



Faculty Mentor Names: Dr. Diana Chen, Dr. Susan Lord

Project Abstract:

The aim of BioBrew is to demonstrate a sustainable method of reducing CO₂ emissions generated during beer fermentation. We are developing a system that will direct the CO₂ concentrated off-gas from homebrewing fermentation into an algae sub-system which will absorb CO₂ via photosynthesis. This system will potentially be replicable by homebrewers with the potential for scalability to larger-scaled craft brewing operations.



User-Centered Design of a Water Filtration Device for Rural Ugandan Communities



Student Name(s): Avery Aquino, Ayla Deacon, Claire Hastings, Rebekah Mauk, Naina Makkad, Nikki Monge

Department: Engineering

Faculty Mentor Name(s): Dr. Frank Jacobitz and Dr. Susan Lord

Project Abstract:

In Uganda, particularly in rural and urban slum areas, access to clean water remains a critical challenge, contributing to significant health risks from microscopic contaminants such as E. coli. The University of San Diego's senior design team, The User-Centered Design of a Water Filtration Device for Rural Ugandan Communities, focuses on the development of a practical water filtration system to mitigate these health concerns. The proposed solutions involve a biofiltration system utilizing xylem filtration, which forces water through a cross-section of pine plant stem tissue to remove bacteria. Each design aims to provide at least four liters of potable water per day in a single use. Key features include an adaptable compression system to accommodate various xylem sizes, a complete seal to prevent leakage, and an overall cost effective appliance for broad accessibility. Collaborations with Mbarara University of Science and Technology (MUST) and Azrieli College of Engineering Jerusalem ensures comprehensive support, testing, and feedback for user-friendly designs to be culturally acceptable and accessible, providing a sustainable solution to water filtration needs in Ugandan communities.



AFFORDABLE AND PORTABLE MUD 3D PRINTING

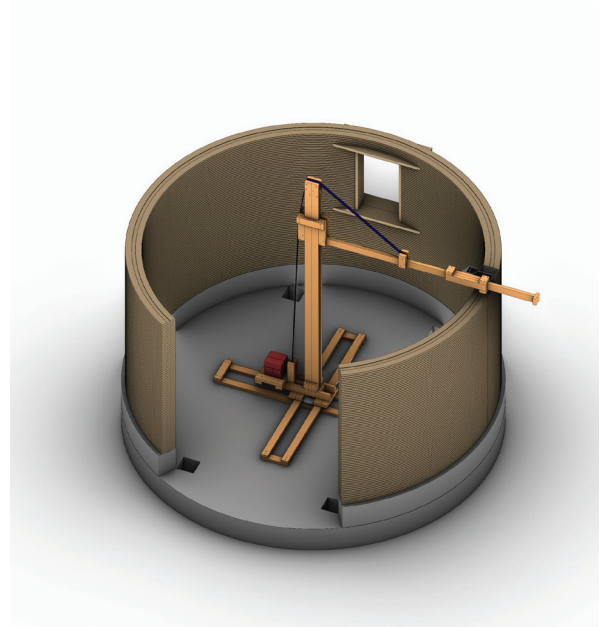
Student Name: Jaziel Mayoral

Faculty Mentor Name(s): Marcel Sanchez Prieto

Department: Architecture



This research project aims to develop a portable and affordable mud wall-building machine to address the environmental impact of cement production. Inspired by William Urschel's 1944 patent for a concrete 3D printer, this project explores the potential of mud as an eco-friendly building material. Traditional mud construction methods are labor-intensive and inefficient, limiting their scalability; therefore, the objective is to create a machine that reduces costs and complexity compared to existing mud 3D printers from companies like WASP and 3D POTTER. The methodology involves 3D modeling a new machine based on Urschel's original design and 3D printing prototypes of the mechanism to install on the final machine. After 9 weeks of trial and error the machine is still not able to extrude a layer of mud because of the current limitation in the strength of plastic cams that drive the pistons, which have to be printed in steel. However, it still seems possible to make the machine work if all the joints are made with metal, so I am publishing this project so others can continue to expand on my work and help make sustainable building practices at the small scale more accessible.



Steady/Unsteady Flow Past a Roughness Element

Students: Iggy Wozniak, Bruno Ghonaim

Faculty Mentor: Dr. Frank Jacobitz

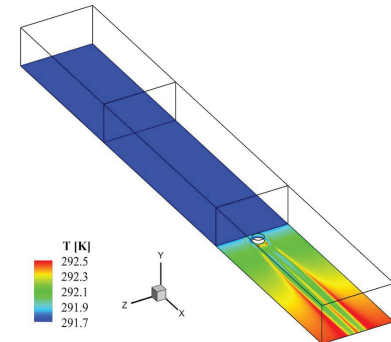
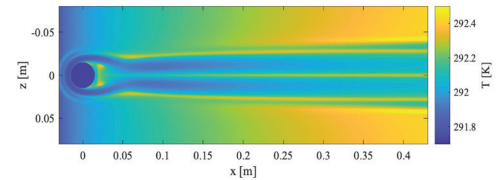
Department: Shiley Marcos School of
Engineering

Understanding fluid dynamics in the presence of surface roughness is critical for engineering applications such as aerodynamics and heat transfer. This research investigates steady and unsteady flow past a cylindrical roughness element using computational fluid dynamics (CFD) simulations in ANSYS Fluent. By simulating the interaction between flow and epoxy/aluminum plates of varying thickness, we analyze the structures formed as the flow interacts with the surface.

The study explores the impact of heating variables on vortex generation and shedding. Using Paraview and ANSYS, we visualize unsteady flow and vortices, providing insight into thermal effects on aerodynamic behavior.

The ongoing simulations incorporate averaged thermal properties of epoxy and aluminum to further refine our understanding of flow behavior.

The findings have real-world applications in extreme-condition testing environments, such as hypersonic and cryogenic wind tunnels, where traditional experiments are challenging. This research provides an alternative approach for studying aerodynamic effects and heat transfer in complex flow systems, contributing to advancements in fluid mechanics and engineering design.



Tuesday, April 8, 2025

Session 2 | 1:15 pm - 2:15 pm

12. **Patrick McDermott, Jonathan Miller, Luca Sacchetto, Charles Gorey, Adam Walter, and Fernando Huerta, Venkat Shastri** (Electrical Engineering)
13. **Cam Colucci, Marissa Forbes** (Mechanical Engineering)
14. **Jasper Caddell, Daniel Codd** (Mechanical Engineering)
15. **Ryan Daily, Marissa Forbes** (Mechanical Engineering)
16. **Santiago Vigil, Nadav Goldschmied** (Psychological Sciences)
17. **Julia Sciallo, Nadav Goldschmied** (Psychological Sciences), **Rebekah Wanic** (Psychological Sciences)
18. **Daniel Armendariz, Jessica Bell** (Chemistry and Biochemistry), **Ellis Bell** (Chemistry and Biochemistry)
19. **Leah Fikermariam, Ricardo Sanchez** (Environmental and Ocean Sciences)
20. **Andrea Rangel, Joan Schellinger** (Chemistry and Biochemistry)
21. **Katie Smith, Callen Hyland** (Biology)
22. **Emily Mendel, Timothy Clark** (Chemistry and Biochemistry)

Tuesday, April 8, 2025

Session 2 | 1:15 pm - 2:15 pm

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Question Asking Form

FARAMIR

(Free-Space Airborne Radio Antenna Measurement Integrated Radio)

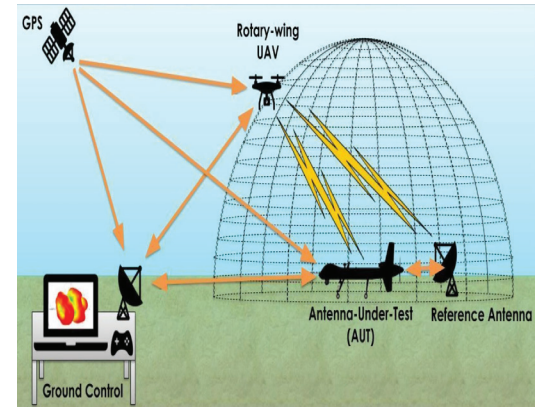


Student Name(s): Patrick McDermott, Jonathan Miller, Fernando Huerta, Luca Sacchetto, Adam Walter, CJ Gorey

Faculty Mentor : Venkat Shastri **Department:** Shiley Marcos School of Engineering **Industry Partner:** General Atomics

Project Abstract:

Antennas are used for a wide variety of applications including wireless communication, broadcasting, radar, and biomedical devices. Reliably testing antennas is crucial for manufacturing working devices in these fields. To test an antenna, maintaining a distance proportional to its transmitted wavelength is required. The leading method for antenna testing calls for the use of an anechoic chamber, however, as antennas become larger and operating frequency becomes lower, this method is not feasible. An alternate method for antenna characterization needs to be developed. This new method needs to be cost effective and consistently repeatable in order for it to have practical applications. Our solution will be to use rotary drone technology along with an attached payload to test antennas of varying operating frequencies.



Ascender Systems

Student Name(s): Cam Colucci

Department: Engineering

Faculty Mentor Name(s): Marissa Forbes



Project Abstract:

In the wake of natural disasters, rapid deployment of temporary infrastructure is critical for effective emergency response. This project aims to develop a reliable and efficient climbing robot capable of scaling poles with diameters ranging from 12 to 24 inches, enabling the installation of essential equipment in disaster-stricken areas. Designed to be set up by a two-person team within 10 minutes, in compliance with OSHA requirements, the system will be capable of lifting a 300-pound payload. By improving speed and safety in deploying emergency infrastructure, this solution will enhance the ability of first responders to deliver timely aid in crisis situations.



Selectable Front Differential for BAJA SAE

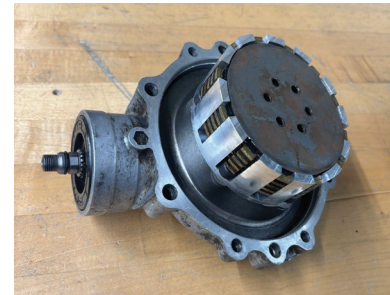
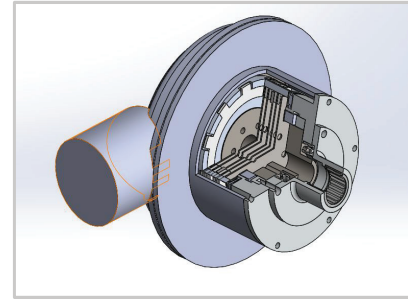
Student Name(s): Jasper Caddell, Raeth Fountain

Department: Engineering

Faculty Mentor Name(s): Daniel Codd



This project focuses on the redesign of a traditional front differential into a selectable front differential, aiming to enhance vehicle performance and adaptability in varying driving conditions. The front differential, a crucial component in the drivetrain, enables torque distribution between the left and right wheels. However, under certain conditions such as low traction, the need for more controlled power distribution becomes critical. The proposed design seeks to integrate a mechanism that allows the driver to selectively engage or disengage the front differential, offering improved off-road capabilities. The project follows the engineering design process, beginning with problem identification and the gathering of requirements from stakeholders, primarily off-road manufacturers and enthusiasts. The conceptualization phase explores mechanical locking systems, evaluating their performance under conditions experienced at competition. Prototypes are then developed and tested to prove or disprove the validity of theoretically based designs. The final design integrates a robust, responsive selectable locking mechanism that manually balances power distribution between the wheels, improving handling in low-traction scenarios. This redesign is expected to contribute significantly to vehicle versatility and user control, optimizing performance for diverse driving needs while maintaining durability.



Solar Turbines Mercury 50 Air Inlet

Student Name(s): Ryan, Jazmine, Owen, Luke,
Josh, Erik

Department: Mechanical Engineering

Faculty Mentor Name(s): Dr. Forbes



Project Abstract: *The Solar Turbines M50 engine plays a crucial role in industrial power generation and mechanical drive applications, widely valued for its reliability and efficiency. However, the current installation and removal process of its air inlet ducting presents significant challenges due to space constraints, excessive labor demands, and safety considerations. Specifically, the existing 30-bolt assembly requires two technicians and approximately two hours to complete, resulting in high operational labor costs.*

This project addresses these issues by developing an innovative clamping system designed to streamline the installation process. The solution involves an over-center beam with clamps and 12 precisely located retaining pins, which effectively manage shear forces and prevent ducting collapse. Custom fabricated from heat-resistant materials, the clamp ensures both structural integrity and operational safety under high-temperature turbine exhaust conditions.

Preliminary testing, including physical prototypes and computational analyses, indicates the new system significantly reduces installation time, achieving a targeted 50% reduction from two-man hours to one-man hour. This translates into an annual labor cost savings of approximately \$20,000. The project outcomes demonstrate not only enhanced efficiency and reduced costs but also improved technician safety and operational reliability for the M50 engine.



The NFL Under Review: Impacts of Instant Replay and Game Officiating



Student Name: Santiago Vigil

Department: Psychological Sciences

Faculty Mentor Name: Nadav Goldschmied, PhD

Project Abstract:

This study explored game related factors associated with the National Football League's (NFL) instant replay system used to reviews officiating decisions. Our data set included 8,776 plays during the 1999 to 2023 seasons, and was used to assess the impact of the NFL's rule change of incorporating a third party (i.e., league headquarters) to make the final decision on any official review, stripping away the authority from the in-game referee who initially made call. This change was implemented beginning in the 2014 NFL season and we found that the third party officials were more likely than head game referees to reverse the initial decision.

Additionally we compared the outcome of challenges initiated by head coaches versus video assistant referees. We found that a challenge initiated by a head coach was more likely to be upheld than a video assistant referee's challenge. Next, using only the data from 2014 onwards we implemented a generalized estimating equation (GEE) regression model and investigated whether the team initiating the challenge was the offensive or defensive one, home or away team, or the field position at the time of the challenge, as well as the amount of time remaining in the game showed no impact on the outcome of these official reviews.



Transitivity in the NFL: Does $A > B$, $B > C$ equal $A > C$?

Student Name(s): Julia Sciallo

Faculty Mentor Name(s):
Dr. Goldschmied and Dr. Wanic

Department: Psychological Sciences



Project Abstract:

Transitivity is a fundamental concept in mathematics which translates inexactly into human thought. This cognitive mechanism is often used to predict game outcomes based on prior match results, suggesting that if Team A defeats Team B, and Team B defeats Team C, then Team A should logically defeat Team C. However, in the National Football League (NFL), game outcomes are often unpredictable due to the highly competitive nature of this endeavour and the restricted talent pool. Using archival data of game outcomes from fifty-two consecutive NFL seasons (1970–2021), this study examined the extent to which transitivity holds in the league, in addition to evaluating the impact of home-field advantage. Results indicated that transitivity held imperfectly approximately 60% of the time but home field advantage appears to play little role in the outcome. This suggests that while past results can provide some predictive value, exploring additional variables (e.g., major injuries, passage of time, exact score) may contribute to transitivity's predictive accuracy.



A Research Game-Changer in Malaria Treatment: Allosteric drug Design

Student Name(s): Daniel Armendariz

Department: Biochemistry

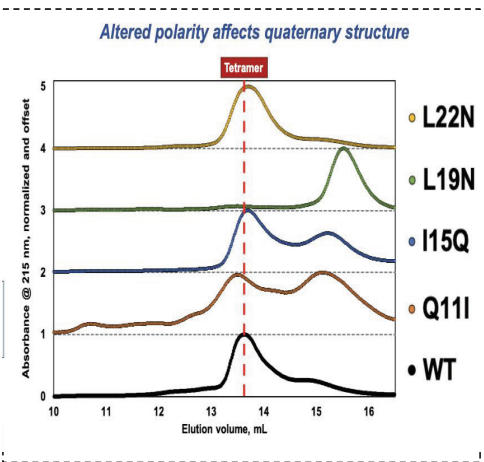
Faculty Mentor Name(s): Dr. Ellis Bell & Dr. Jessica Bell



Project Abstract:

Many enzymes show behavior suggesting allosteric interactions involving communication between subunits in a quaternary structure. Malate Dehydrogenases from a wide variety of organisms have either a dimer or a tetrameric quaternary structure. Little is known at the molecular level of how the subunits in malate dehydrogenase communicate the presence of a ligand on one subunit to another subunit in the quaternary structure. We hypothesize that the polarity of the local environment of E18, governed by 4 residues Q11, I15, L19, and L22 in *Plasmodium falciparum* Malate Dehydrogenase modulates the interactions E18 makes across the interface and helps govern ligand-induced subunit interactions necessary for the normal function of the enzyme. To test this hypothesis, we constructed site-directed mutants of each of these four residues. Mutants were sequence confirmed, and the resultant proteins were expressed, purified, and characterized using enzyme kinetics and size exclusion chromatography. All four mutants had significantly lower specific activities than the wildtype enzyme.

Overall, these results support our hypothesis concerning the importance of the polarity around the E18 residue in *Plasmodium falciparum* MDH, and form the basis for future studies aimed at exploring possible targets on *Plasmodium falciparum* MDH for potential drug design.



Variability in Bat Communities Across Various Sites Within Costa Rica's Tropical Premontane Forest Belt

Student Name(s): Leah Fikermariam

Department: Environmental and Ocean Sciences

Faculty Mentor Name(s): Ricardo Sanchez



Project Abstract:

Bats are crucial components of ecosystems worldwide, responsible for pollination, seed dispersal, and insect control. Climate change however is impacting all organisms modifying their lives. The 117 species of bats native to Costa Rica are equally impacted. In our study, we sampled four different sites in Bajo La Paz in order to compare data on bat diversity to other locations in the highlands of Costa Rica including Villa Blanca, the Municipal forest of Atenas, and Albergue Socorro. We predicted that bat populations and species richness would be steady throughout these highlands. Our objective was to determine which species are concentrated in each region, creating the baseline to evaluate population stability over time. Mist nets are used to capture and identify specific characteristics of the bats such as weight, sex, species, age, and sexual activity, before releasing them. Our findings represent 12 species displayed across 46 captured bats. Our rarefaction curve displayed there would have been a wider range of species caught with more than four nights of sampling. Results represented numerous pregnant bats, supporting our hypothesis that bat populations and species richness are steady in the premontane forests of Costa Rica.

Murciélagos de Bajo La Paz

Bats of Bajo La Paz



Artibeus jamaicensis



Artibeus toltecus



Carollia perspicillata



Artibeus lituratus



Hylonycteris underwoodi



Platyrhinus vittatus



Sturnira hondurensis



Myotis pilosatibialis



Carollia sowelli



Vampyressa thuyone



Micronycteris microtis



Carollia castanea

Green Synthesis and Optimization of Biphenyl Vinyl Disulfone Compounds

Student Name(s): Andrea Rangel

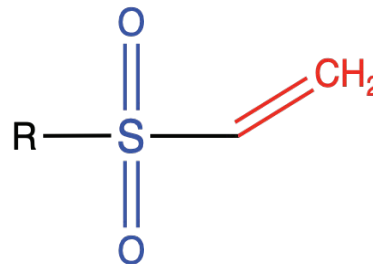
Department: Chemistry and Biochemistry

Faculty Mentor Name(s): Joan Schellinger



Project Abstract:

Vinyl sulfones are functional groups that are composed of a vinyl group bound to a sulfone molecule. These small molecules are versatile for their non-covalent and covalent interactions with a multitude of biomolecules, making them ideal building blocks for the organic synthesis of potential drugs. The current synthesis of our vinyl disulfone targets involves the use of hazardous N, N-Dimethylformamide (DMF) solvent as well as long and tedious reaction steps. In this work, we aim to provide a greener alternative for synthesizing the disulfone reagent while also expanding the current library of vinyl sulfone compounds. Several green methodologies were explored such as the use of safer solvents, ultrasonication and the development of a one-pot synthesis. Three bis(bisphenylvinylsulfonyl)methane compounds were synthesized via a Horner-Emmons-Wadsworth (HEW) reaction with *E* bis-addition selectivity using the disulfone reagent with yields ranging from 47-61%. As we continue to explore these substrate scopes using our optimized green HWE method, we hope to expand the applications of these compounds in drug development.



Effects of Humic Acid on Health and Regeneration of Fragmented *H. vulgaris*

Student Name(s): Katie Smith

Department: Biology

Faculty Mentor Name(s): Dr. Callen Hyland



Project Abstract:

Humic acid (HA), a naturally occurring organic substance found in soil and aquatic environments, is known for its diverse effects on plant growth, microbial activity, and water chemistry. However, its impact on aquatic invertebrates, such as Hydra vulgaris, remains largely unexplored. H. vulgaris, a simple freshwater organism found all over the world in high-HA environments and is renowned for its regenerative abilities. The hydra species serves as an ideal model for studying environmental stressors and their biological effects because of its easy maneuverability in a laboratory setting. HA-containing medium has been developed in hydra research to support the growth of strains in hydra after being moved from high-HA environments to a laboratory. Despite the well-documented benefits of HA on other organisms, no research to date has investigated its influence on H. vulgaris other than anecdotal accounts of HA mediums being observed to cure infections in other strains of hydra, including transgenic strains. This study aims to address this gap by examining how HA affects the health and regeneration of this model organism, by exposing individuals to increasing amounts of HA, potentially providing new insights into the ecological role of humic substances in freshwater ecosystems.



Expedient Synthesis of Aldehydes from Ketones via *gem*-Diboronates

Student Name: Emily Mendel

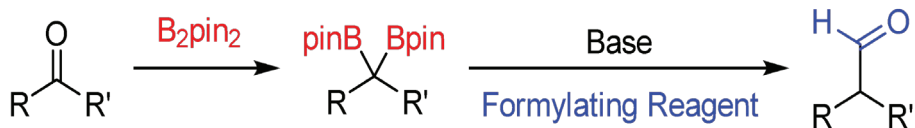
Department: Chemistry and Biochemistry

Faculty Mentor Name: Timothy Clark



Project Abstract:

A common goal in pharmaceutical chemistry is to develop more efficient methods to access building blocks essential to synthesis of biologically relevant compounds. Heterocycles are a common motif in biologically active molecules; however, many heterocyclic aldehydes are not commercially available. Furthermore, homologation reactions are important in drug discovery because a change in a single carbon can affect how a drug behaves and interacts with biological systems. This project aims to develop the homologation of ketones to aldehydes via *gem*-diboronates to access a variety of aldehyde compounds that are challenging to synthesize through other methods. Previous work involved the optimization of the homologation reaction, and current progress involves the expansion of the scope of compounds applicable to the homologation method.



Thursday, April 10, 2025

Session 1 | 12:15 pm - 1:15 pm

23. **Kyle Gustaferry**, *Marissa Forbes* (Mechanical Engineering)
24. **Zachary Babbs**, *Odesma Dalrymple* (Industrial and Systems Engineering), *Marissa Forbes* (Mechanical Engineering)
25. **Alex Beheshti, Giovanni McClure, and Alejandro Murillo**, *Marissa Forbes* (Mechanical Engineering)
26. **Evan Walls**, *Odesma Dalrymple* (Industrial and Systems Engineering)
27. **Ava Ribando**, *Jennifer Zwolinski* (Psychological Sciences)
28. **Tatum Mosley**, *Kacie Miura* (Political Science and International Relations)
29. **Grace Guenther, Cece Xu, and Josefine Schlichting**, *Nadav Goldschmied* (Psychological Sciences)
30. **Lauren Handy**, *Jennifer Zwolinski* (Psychological Sciences)
31. **Maryana Castro, Hamad Alwaqayan, and John Campbell**, *Daniel Codd* (Mechanical Engineering)
32. **Precee Ginigeme**, *Saturnino Garcia* (Computer Science)
33. **Jack Conley**, *Nikhil Yadav* (Computer Science)

Thursday, April 10, 2025

Session 1 | 12:15 pm - 1:15 pm

We encourage you to vote for your 2 favorite presentations from each session!

Scan the QR code below to cast your vote



Presentation Voting Form

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Scan the QR code below to submit your questions



Question Asking Form

Cubic Senior Design

Student Name(s): Gabriel Perez, Jared Schafer,
Lissette Nichols,
Kyle Guastafarro & Itza Fajardo

Department: Engineering

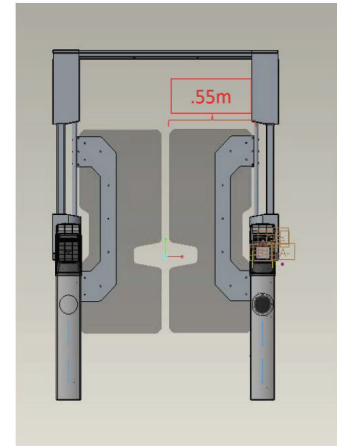
Faculty Mentor Name(s): Dr. Forbes



Project Abstract:

This project aims to develop a braking system for Cubic Corporation's fare gates to combat fare evasion, which costs cities millions annually. Cubic, a leader in transportation technology, provides fare gate barriers, but the current gates lack a braking mechanism, allowing commuters to force them open without paying.

The goal is to design a compact purely mechanical solution (6.87" L x 5.89" W x 4.06" H) capable of withstanding 650 Newtons of applied force.



Resilient Water Systems

Student Names: Zachary Babbs, Siddarth Merchant, Ahmad Alhusaini, & Kailer Morrison

Department: Industrial & Systems Engineering and Mechanical Engineering



Faculty Mentor Names: Dr. Odesma Dalrymple and Dr. Marissa Forbes

Project Abstract:

We are Resilient Water Systems, a community focused capstone project here at the Shiley-Marcos School of Engineering. Our initiative is to improve the water quality in the Achuar communities of Ecuador. Our solution is a rainwater catchment, storage, and treatment system. In January, we got the opportunity to travel to their communities to observe their communities and conduct surveys.



Thermal Receipt Printer Camera

Student Name(s): Alex Beheshti, Alejandro Murillo, Giovanni McClure

Department: School of Engineering

Faculty Mentor Name(s): Dr. Marissa Forbes



Project Abstract:

Our project will be focused on creating a digital camera, run by Raspberry Pi, which will be able to print photos on demand via a thermal printer



Assessing the Viability of Hard Cider Brewery Wastewater for Biofuel Production

Student Name: Evan Walls¹

Department: ¹Integrated Engineering,
²Industrial and Systems Engineering

Faculty Mentor Name: Odesma Dalrymple²



Project Abstract:

Anaerobic digestion is an effective waste management process that reduces organic waste while generating biofuel as an alternative energy source, supporting a circular economy. In Barbados, the Rum & Sargassum (R&S) company has successfully implemented this process using sargassum seaweed, rum wastewater, and sheep manure as feedstocks for biofuel/biomethane production, intended as an alternative to vehicle gasoline. Given San Diego's coastal environment and abundant organic waste sources, we explored the applicability of the R&S model by replicating similar biofuel production methods at USD using feedstocks analogous to those used in Barbados. Our approach utilizes waste feedstocks such as beer wastewater, drift kelp, and animal waste, specifically cow manure and fish carcasses. Expanding the variety of waste sources enhances the adaptability and viability of biofuel production, particularly in regions where organic waste is diverse and widely distributed. To further evaluate the adaptability of this biofuel production model across different waste streams, this study specifically examined the feasibility of using wastewater from hard cider brewing as a biofuel substrate.



The effect of temporal self-disclosure on therapist perception.



Student: Ava Ribando

Faculty Mentor: Dr. Jennifer Zwolinski,
PhD

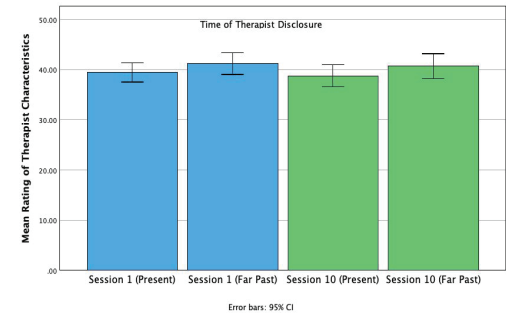
Department: Psychological Sciences

Project Abstract:

Therapist self-disclosure (TSD) has been found to cause positive perceptions of the therapist. Research has indicated that the time between disclosed event and disclosure influences how the disclosure is received when disclosing shared psychological problems. This study gave participants recruited via Prolific ($n=63$) vignettes where the therapist disclosed the same struggle as the client.

Variations included the far past and present conditions, in both session one and ten of therapy. Participants were asked to rate the therapist in each scenario for 10 characteristics. Predictions stated that therapist perception would be more favorable for the far past condition in both the first and tenth session. Two paired-sample t tests were conducted. Results indicated that the far past condition for session one yielded greater perception than the present condition with a statistically significant difference of 1.82 ($t(54) = -2.33$, one sided $p = .01$).

Results indicated that the far past condition for session ten yielded greater perception than the present condition with a statistically significant difference of 2.62 ($t(57) = -2.63$, one sided $p = .005$). Implications include an understanding of how TSD can be used effectively in clinical practice.



Navigating the New Nuclear Arms Race: Foreign Policy Shifts and Global Security Implications

Student: Tatum Mosley

Department: Political Science and
International Relations

Faculty Mentor: Dr. Kacie Miura



Project Abstract:

The emerging nuclear arms race between the United States and China marks a pivotal moment in international relations, driven by both technological advancements and evolving foreign policy goals. This intensifying competition has profound implications for global security and strategic stability. Thus, this research examines the impact of this nuclear arms race on these areas. Using a qualitative research approach, the study conducts a comprehensive review of scholarly literature, policy documents, and government reports to analyze the nuclear strategies and foreign policy objectives of both nations. Employing thematic and comparative analysis, it explores the complex factors fueling this competition. The findings offer critical insights for policymakers and scholars, aiding in the development of strategies to address nuclear proliferation challenges. By examining how technological advancements intersect with foreign policy, this study enhances understanding of key issues shaping global security and strategic stability.



U.S. National Flag alongside China's National Flag (Missouri State University)

Are Black Uniforms Associated with Aggression in National Hockey League?

Grace Guenther, Caleigha Xu & Josefine Schlichting

Department: Psychological Sciences

Professor Nadav Goldschmied



*This study examined the relationship between uniform color and aggressive behavior in the National Hockey League (NHL), focusing on whether teams wearing black jerseys receive more **aggressive** penalties. Previous research (Frank & Gilovich, 1988) linked black uniforms to increased aggression in the National Football League, but methodological flaws have been identified (Goldschmied et al., 2020). Past research results in the NHL are mixed. The current archival investigation encompassed 8 seasons of play (2016- 2023 seasons) and used past classification of which penalties were aggressive vs. not to determine if teams playing at home showed elevated aggression/ were called for more aggressive penalties **when in black uniforms**. We utilized a nested-regression analysis (since penalties are embedded within teams) and found no association between black jerseys and elevated aggression. We outline the strengths and the limitations of this study in comparison to past research.*



Gender and Academic Concerns During the Pandemic

Student Name: Lauren Handy

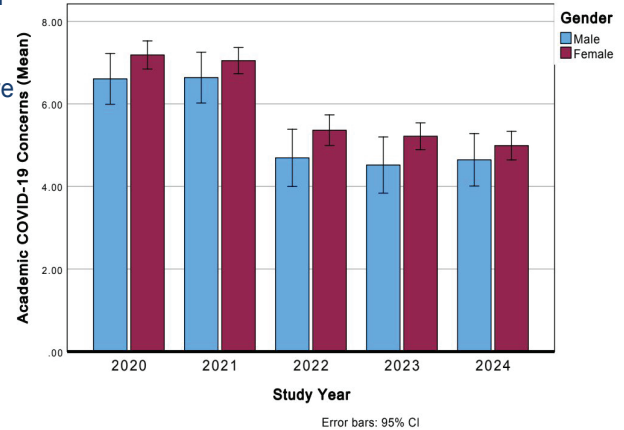
Faculty Mentor: Jennifer Zwolinski, PhD

Department: Psychological Sciences



Project Abstract:

Further investigation is needed to fully understand the psychological impact of COVID-19 in relation to academic functioning (Dixon et al., 2023). Given that college aged females tend to report more general stress than their male counterparts (Graves et al., 2021) and that academic stress initially increased after the onset of the pandemic (von Keyserlingk et al., 2022), we proposed that academic stress was at its highest during the peak of COVID-19 and in particular for females. Participants included 710 liberal arts college students enrolled in Psychology 101 who completed online self-report measures from September 2020-December 2024. Two way ANOVA did not show a gender-time interaction but there was a main effect of both gender and year on academic stress suggesting that females overall showed higher stress, and academic stress was highest in both 2020 and 2021, but then it declined from 2022-2024. Findings from this study show the importance of researching gender differences surrounding academic stress to help females cope with their increased stress symptoms. Also, this study demonstrates that students' academic performances are susceptible to change following the timeline of global happenings.



ASME eHPVC 2024-2025 Team: “The Blue Wave”

Student Name(s): John McCampbell, Hamad Alwaqayan, Maryana Castro, Fawaz Almutairi, Mohammad Almutair, Saod Alshammari

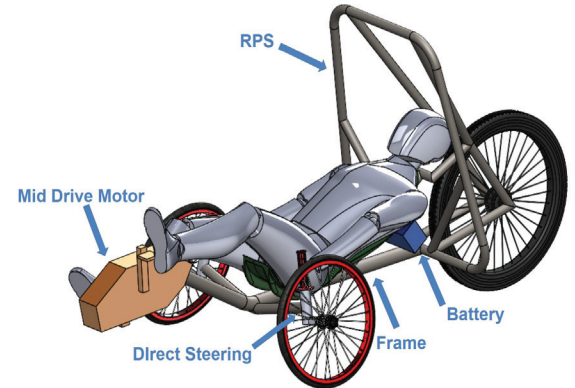
Department: Shiley Marcos School of Engineering



Faculty Mentor Name(s): Daniel Codd

Project Abstract:

University of San Diego engineering students participating in the ASME eHPVC will design, fabricate, and test a durable and reliable hybrid electric and human powered vehicle that will not only exceed competition requirements but will create impact through sustainable transportation on our university’s campus. The competition consists of 3 events: Drag race which 2 vehicles will race from standard start to first to cross the finish line, Endurance race in which vehicles will complete as many laps possible of an obstacle ridden course for 2.5 hours, and Design event where teams will present their vehicle analysis and explain how it will succeed in the competition races.



SpacedCadet

Student Name(s): Precee Ginigeme

Department: Computer Science

Faculty Mentor Name(s): Dr. Sat Garcia



Project Abstract:

SpacedCadet leverages spaced repetition techniques to enhance learning efficiency. The platform is designed to aid students in test preparation by offering a structured approach to question answering and review.

To improve the question creation process for instructors, the project integrates Large Language Models (LLMs) with Retrieval-Augmented Generation (RAG). This approach refines question quality by dynamically retrieving relevant information, reducing hallucinations, and ensuring contextual accuracy.



Edge-X: Workflow for Model Deployment on Edge Devices

Student Name(s): Jack Conley

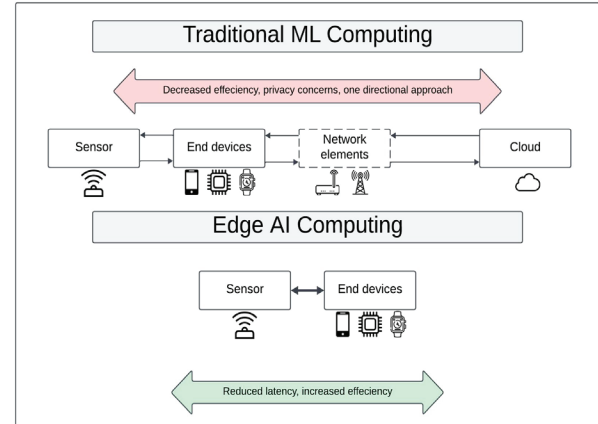
Faculty Mentor Name(s): Nikhil Yadav

Department: Department of Computer Science



Project Abstract:

Edge Artificial intelligence (Edge AI) is a crucial part of many new applications, including event detection, gesture recognition, on-sensor process control, and more effective and secure data transfer between systems. There is an increasing number of hardware choices for the deployment of AI models while designing such applications. It is important to understand the compute costs to effectively select a target hardware board to host such models. In this paper, we propose Edge-X, a cost factor evaluation workflow for the effective selection of hardware to host such models given input parameters. Edge-X prescribes a step-by-step guide for launching an application on an Edge AI device. The workflow is demonstrated using a proof of concept gesture recognition application deployed on three target hardware platforms serving as examples of complex, medium, and simple AI integrations on edge devices. The designed workflow shows capability to select appropriate edge devices quickly for any class of a desired application with AI capability.



Thursday, April 10, 2025

Session 2 | 1:15 pm - 2:15 pm

34. **Patricia Munoz**, *Jack Crumley* (Philosophy)
35. **Carly O'Rear**, *Charissa Noble* (Music)
36. **Sydney Rios Bruner**, *Darby Vickers* (Philosophy)
37. **Mackenzie Guy, Valentina Vargas, Grant Carey, and Fahad Bastaki**, *Susan Lord* (Integrated Engineering)
38. **David Campos**, *Keith Macdonald* (Biology), *Susan Lord* (Integrated Engineering)
39. **Analiese Kirschel**, *Nicole Danos* (Biology), *Jessica Bell* (Chemistry and Biochemistry)
40. **Carmen Gray**, *Andrew Tirrell* (Political Science and International Relations)
41. **Wairi Kimani**, *Alison Sanchez* (Economics)
42. **Grace Moore**, *Maura Giles-Watson* (English)
43. **Erika Atienza**, *Thomas Reifer* (Sociology)
44. **Delaney Batter**, *Derrick Cartwright* (Art, Architecture, and Art History)
45. **Yesika Menera**, *Odilka Santiago* (Sociology)

Thursday, April 10, 2025

Session 2 | 1:15 pm - 2:15 pm

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Presentation Voting Form

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Scan the QR code below to submit your questions



Question Asking Form

The Nature of Metaphysics in Poetry

Student Name(s): Patricia Munoz

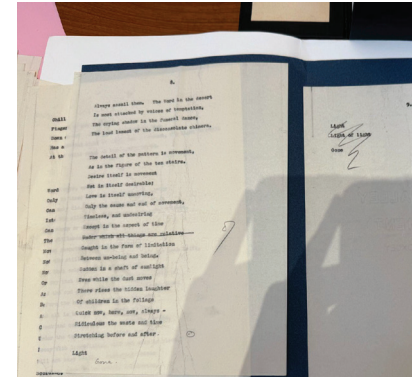
Department: English, Philosophy

Faculty Mentor Name(s): Dr. Crumley, Dr. Clack



Project Abstract:

My project's significance lies in its interdisciplinary approach, bridging Literature and Philosophy to explore the connection between Poetry and Metaphysics. Through a close examination of T.S. Eliot's Four Quartets, I will aim to discover how Eliot has approached fundamental questions of reality, existence and time, echoing the inquiries of Metaphysical philosophers throughout history. Through my analysis of a multiplicity of poetic elements such as syntax structure, imagery, metaphor, and rhyme scheme, I intend to elucidate how these literary devices serve as vehicles for conveying metaphysical concepts. By drawing on texts such as Aristotle's *Metaphysics* and *Poetics*, as well as modern works such as *Introduction to Metaphysics* by Jack Crumley, I will make use of particular frameworks to enrich my exploration with literary and philosophical approaches to ground my research discoveries. Ultimately my research will seek to illuminate how poetry transcends mere impressions of life to engage with the deepest aspects of human experience and understanding. By unraveling the intricate interplay between poetic language and metaphysical inquiry, my project offers valuable insights into ways in which literature shapes and reflects our perceptions of reality and existence.



Early draft of Eliot's quartet, Burnt Norton

Rethinking Authenticity in Shakespeare's Musical Comedies

Carly O'Rear

Music

Dr. Charissa Noble



Project Abstract:

Shakespearean comedies often incorporated madrigals into their productions during England's Tudor period; this relationship promoted the music and play alike. Today, many productions of these comedies utilize word-perfect Shakespeare, or performance with fidelity to the original wording and punctuation. Similarly, music scholars using Historically Informed Performance Practice (HIPP) have studied historical instruments and performance techniques of music from the Tudor era. Although both traditions prioritize historical fidelity in their respective areas, contemporary productions of Shakespeare's musical comedies rarely combine word-perfect practice and HIPP. Siloing disciplines complicates the definition of "authentic performance" in regard to music. I highlight three case studies (Cal Shakes' *As You Like It*, MiraCosta College's *Much Ado About Nothing*, and Cincinnati Shakes' *Twelfth Night*) and discuss how they exemplify a dynamic concept of authenticity, interpreting meaning of artistic works by drawing from discourses on authenticity and hermeneutics. I explore the role of music in Shakespeare's comedies while simultaneously dissecting authenticity in relation to each production.



De-Anthropomorphizing Intelligence: Rethinking Artificial Intelligence Through Baruch Spinoza

Student Name(s): Sydney Rios Bruner

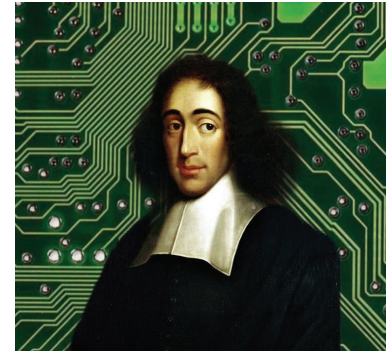
Department: Philosophy

Faculty Mentor Name(s): Dr. Darby Vickers



Project Abstract:

Currently, most consider consciousness as a binary: entities are either conscious or not. Under the confining view of binary consciousness, humans are typically considered the only beings with consciousness. This imposes a significant barrier in the task of determining whether artificial intelligence (AI) is conscious as there is an urge to anthropomorphize at the first sign of complexity, clouding a deep examination of the potential for consciousness in AI. In order to move beyond the binary consciousness framework and borrow a system that admits degrees, I propose the use of Baruch Spinoza's philosophy. Applying Spinoza's philosophy, I will examine components of AI relevant to the potential for consciousness such as its embodiment, its situation within a small world, and its lack of intrinsic motivation. Ultimately, I will argue AI lacks the complexity present in living systems that Spinoza believes allows for consciousness. Further, I will argue AI cannot achieve this kind of complexity without an entirely new computational paradigm.



Pavement to Produce

Student Names: Valentina Vargas, Mackenzie Guy, Fahad Bastaki, Grant Carey

Department: Engineering

Faculty Mentor Names: Dr. Chen, Dr. Shastri, Dr. Lord



Project Abstract:

“Pavement to Produce” addresses the challenges posed by food deserts, urban heat islands (UHI) by transforming the underutilized vertical space in parking lots and buildings into sustainable and productive environments.

The final design integrates a lightweight, nutrient-rich water farming system above parking areas and buildings to minimize heat absorption and enhance local food production. Our system optimizes resource use by requiring significantly less water than traditional farming, supporting the growth of diverse plants, fostering community access to fresh produce bringing the possibility of implementing farming within the urban setting. As an entrepreneurship track team this project emphasizes the development of a scalable technology driven product that serves as the foundation for a viable business by reimagining the built environment with hydroponic farms to empower communities and foster economic resilience through urban space optimization



Figure 1. Hydroponic prototype on the rooftop of the Belanich Engineering Center

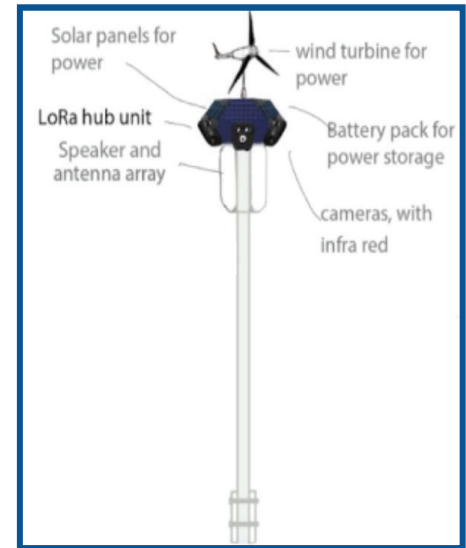
ExSJ SMART Tracking Station

Student Name(s): Susana Vargas, David Campos, Nicole Ramirez, Yusif LaVine, Owen Robertson
Faculty Mentor Name(s): Dr. Susan Lord, Keith Macdonald
Department: Shiley-Marcos School of Engineering



Project Abstract:

In Queen Elizabeth National Park in Southwestern Uganda, interactions between humans and local wildlife are common. Some are beneficial in that they drive ecotourism, providing tourists with an ability to see these unique animals while also raising money for conservation efforts of endangered species. However, others are harmful—whether it be poaching of endangered species or the destruction of crops and livestock by local wildlife. As a result of these issues, this team is tasked with the creation of a Stationary Monitoring and Remote Tracking (SMART) system, mounted on a pole, which will provide 24/7 video surveillance of areas of interest within the park (approximately 150 meters from a ranger station or lodge) in order to expand the sphere of influence of park rangers. This will increase knowledge of animal movements as well as reduce the risk of poaching (e.g. illegal hunting, trapping, and fishing). The system will then allow the rangers to react accordingly to various issues regarding wildlife within the park. This self-powered station must not only account for the power needs of our first generation design, including rechargeable batteries, but be able to accommodate potential future modifications such as data collection from GPS collars.



The Rat in Every Woman

Student Name: Analiese Kirschel

Department: Biochemistry/Biology

**Faculty Mentor Names: Dr. Nicole
Danos, Dr. Jessica Bell**



Project Abstract:

Gestational diabetes (GDM) is developed during pregnancy and alters insulin signaling pathways' ability to process glucose. Exercise and pregnancy stage impact the effectiveness of this pathway and overall development of GDM. During pregnancy, the fetus requires increased glucose to develop. Placental hormones can inhibit the insulin signaling pathways and influence insulin hormone production. In the right amount and intensity, exercise can improve glucose processing by increasing GLUT4 translocation to the cell membrane within the signaling pathway, decreasing glucose in the blood. If exercise can improve GLUT4 translocation to the membrane to process increased glucose, then during all stages of pregnancy exercise may increase insulin signaling pathway protein concentrations. We targeted five proteins for study within the insulin signaling pathway, using skeletal muscle of non-pregnant, pregnant, and lactating female Sprague Dawley rats (non-exercise vs exercise), using protein assays, SDS-PAGE, and Western blot techniques. Phosphorylated IRS-1 protein, indicating activated insulin signaling pathway, was not visible by Western blot, but proteins IRS-1 and actin developed strong bands indicating presence in rat muscle samples.



The Politics of Salmon, Sovereignty, and Dams in Washington State

Student Name: Carmen Gray

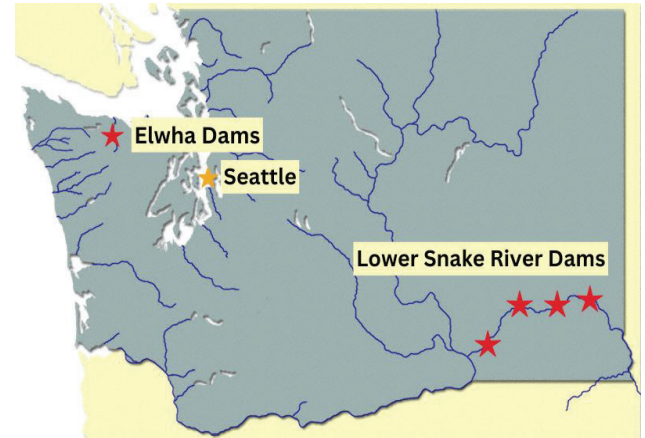
Department: Political Science

Faculty Mentor Name: Andrew Tirrell, JD, PhD



Project Abstract:

River damming projects in Washington State provide an opportunity to understand the terms of effective Indigenous resistance to colonial infrastructure projects. Scientific data indicates improvement in salmon populations since the Klallam Tribe of Western Washington successfully advocated for the removal of the Elwha Dam system. In the southern region of the state, the Nez Perce tribe is engaged in an ongoing campaign to remove the Lower Snake River Dam system. I use comparative methods to establish the shared cultural motives for dam removal between the Klallam and Nez Perce tribes and establish a potential explanation for varied success in their activism. Modern developments in the stratification of United States political partisanship and public understandings of treaty rights and decolonization may account for differing outcomes in these cases despite their surface similarities.



(SalmonAtlas)

The Influence of Socio-Economic Constraints on Women's Economic Empowerment in Kenya: Evidence of Wage Disparities?

Student Name(s): Wairi Kimani

Department: Economics

Faculty Mentor Name(s): Alison Sanchez



Project Abstract:

This study presents an econometric analysis of socio-economic factors which influence wage inequalities in Kenya. This study tests the hypothesis that women experience cross sectoral gender wage disparities which are influenced by cultural and social expectations. Linear, logistic, factorial regressions models and the Mann-Whitney test were utilized to identify statistical determinants of the gender-wage gap through disproportionate educational outcomes, labor outcomes, and social outcomes. The outcomes reflect that education and other demographic factors play a pivotal role in the wage and employment outcomes for women in Kenya. The results suggest that cultural implications are the main influence to the socio-economic constraints on women in Kenya as opposed to men. The study recommends that government policies and investments in instruments for female autonomy should be utilized to reduce the prevalence of gender-wage inequalities in Kenya.



Key words: wage inequalities, labor outcomes, socio-economic constraints.

The Musical Soundscapes of Heaven and Hell in Dante's *The Divine Comedy*

Student Name(s): Grace Moore

Faculty Mentor Name(s): Dr. Maura Giles-Watson

Department: English



Project Abstract:

This project explores the soundscapes that Dante creates in *The Divine Comedy*, which is a highly influential text across literary, theological, and philosophical disciplines. In addition to using structurally clear poetic organization, Dante employs sound and music to create movement between Heaven and Hell which profoundly resonates with the reader. Both music, and its opposite, anti-music, emerge as literary devices that contribute to the poet's creation of a vivid atmosphere within the text. In the process, with a primary focus on the anti-musical sounds of *Inferno*, I analyze the affective literary effects of Dante's varying uses of sound upon the reader. As anti-music, the sounds in *Inferno* function as the antithesis of the celestial music in his imagined *Paradiso*. This duality creates a stark contrast in the mood and action of the text, which aids the reader in distinguishing how sound operates. I argue that Dante's use of sound creates potency within his work, and seeks to create a more graspable literary world, thus increasing reader engagement and resonance with the text.



The Inferno: Canto XIII
Gustave Doré

Medicine and the Pursuit of the Good, the True, and the Beautiful



Student: Erika Atienza

Department: Sociology

Faculty Mentor: Thomas Reifer, PhD

Project Abstract:

The sociologist, Immanuel Wallerstein, argues modern intellectual life split the search for truth—scientific universalism—from the pursuit of the good and the beautiful. The Hippocratic Oath, recognized for epitomizing the dictum of “do no harm,” seems to challenge this separation with respect to medicine, but remains understudied and underutilized. Despite spending some \$4.5 trillion on healthcare, the U.S. ranks among the lowest in outcomes compared to other advanced capitalist countries—a burden that is unsustainable for the economy. My work raises pertinent questions regarding the Oath’s role, if any, in guiding medical inquiry and practice. Drawing on comparative historical and world systems analysis, I rely on Weber’s analysis of rationalization as a framework to argue that Western medicine prioritizes means-end rational action and avoids the question of substantive rationality, to its detriment. I aim to reconsider the Oath’s role in shaping medical care as a means to aim for more sustainable economies and, overall, better outcomes in healthcare.



*Symbol and Sovereignty: Propaganda, Power,
and Medallions under Louis XIV*

Delaney Batter

Faculty Mentor: Derrick Cartwright

Department of Art History



Project Abstract:

This project examines the relationship between the Monarchy and commissioned artwork in the seventeenth century during the reign of Louis XIV. The utilization of high art for propagandistic purposes can be traced back to Louis XIV's court, where a series of edicts and artistic commissions served as instruments of ideological dissemination. This large-scale undertaking of depicting an ultimate ruler transcended mere visual representation, evolving into a nuanced and rhetorical narrative that projected a hollow image of a limitless king to perpetuate a lasting legacy. Within the broader context of artistic forms employed to propagate ideological agendas, this study will conduct a detailed analysis of a series of medallions commissioned and crafted over the course of Louis XIV's reign. Initially conceived as an elaborated revival of the Renaissance tradition of coinage design, these medallions underwent a transformation in the early 18th century, reconfigured to convey fabricated narratives and idealized depictions of the King. Functioning as vehicles for revisionist historiography, these medallions were strategically deployed to influence perceptions across Europe, presenting the King as a symbolic figure of divine authority and natural French supremacy.



How Housing Insecurities Impact Woman

Student Name(s): Yesika Menera

Department: Sociology

Faculty Mentor Name(s): Dr. Odilka
Santiago

Project Abstract:

Studies show that individuals experiencing homelessness and housing insecurity also experience trauma and mental illnesses. Despite this, many resources provided through state welfare services seldom allocate sufficient funds and personnel to help address mental health. This study investigates the relationship between housing insecurity and trauma for adult women who have tried to access assistance throughout Southern California. To do this, I conducted in-depth interviews and DSM-5 questionnaires with twenty-six women during the summer of 2023 and 2024 via Zoom. My findings show that adult women who have experienced homelessness and housing insecurity in Southern California were more susceptible to retraumatization by welfare services as long as they attempted to access it. The results from this study can be used to implement trauma-informed care practices into welfare services to improve resources for women and lower the rate of homelessness.



HOW HOUSING INSECURITIES IMPACT WOMEN



Criteria

1. Self-identified as a woman
2. 18 years old or older
3. Experiencing/experienced housing insecurity at any time
4. Attempted to access assistance
5. Provide informed consent.

Procedure

The study will be a 30-60 minute confidential audio-recorded interview in person or via Zoom with one questionnaire.

Benefits

\$25 Visa Giftcard

Scan Me to Register!



Qualifications For Housing Insecurity

- Live in an overcrowded place/home
- Moving Frequently because of financials
- Spending over 30% of your income on your rent
- Unable to pay rent on time

Procedure

- Couch surfing
- Homelessness
- Lived in a shelter/organization
- Much more ...

About the researcher

As a first-generation Mexican-American McNair Scholar at the University of San Diego, studying psychology and sociology with a focus on law, crime, and justice, I know the importance of amplifying every voice, especially those like mine who have faced housing insecurity. Let's reshape the system and welfare services by listening to all experiences.

Any Questions? Yesika Menera ymenera@sandiego.edu

