CUSRD

Chapman University Student Research Day

Wednesday, May 10, 2017

Spring Session Abstract Volume

OURCA
AT CHAPMAN UNIVERSITY

Office of Undergraduate Research & Creative Activity

IL•17

Message from the Director

Greetings and welcome to the 2017 Spring Chapman University Student Research Day. This celebration highlights the breadth and depth of scholarly research and creative activity conducted by Chapman undergraduate and graduate students. It is a truly exciting day to learn about, explore, and appreciate the efforts that students and faculty have put into a wide variety of research and creative projects across the campus. It is my hope that all members of the university community can engage in and benefit from the Chapman University Student Research Day.

To students—take a look at the impressive range of projects in which your classmates have been involved over the past year, and become inspired to continue or participate for the first time in research yourselves during your time here at Chapman University.

To faculty—recognize the hard work of the students you have mentored, taught, and supervised, and celebrate the culmination of their efforts in a professional presentation setting.

To all—enjoy learning about this unique aspect of a Chapman education that allows students to engage in scholarly and creative activity at the highest level: expanding knowledge and pushing at the boundaries of one's academic discipline.

Thanks for joining OURCA in this celebration, and enjoy the day!

Dr. Anna Leahy is Director of the Office of Undergraduate Research and Creative Activity and Associate Director of the MFA program in creative writing at Chapman University.

Keynote Speaker – Mike Paul Hughes

For the past twenty-five years, Mike Paul Hughes has worked in the areas of Guidance, Navigation and Control (GN&C), and Systems Engineering for NASA science missions. His work spans Earth Science, Deep Space, and Human Spaceflight. He was the GN&C lead for Terra Earth Observation System at Lockheed Martin in Valley Forge, Pennsylvania. In 2000, he moved to NASA Jet Propulsion Lab in Pasadena, California, and was the Attitude Determination and Control lead for the comet-busting Deep Impact mission and then Juno Flight Systems Engineering Manager. In 2007, he returned to Lockheed Martin in Denver, Colorado, to join the Orion team, where he was the GN&C Lead Systems Engineer, Pad Abort-1 Flight Dynamics Lead, and, later, the Entry Descent and Landing System Phase Lead. His current role is GN&C Manager for Space Exploration Systems and Osiris-Rex asteroid sample return mission. His background also includes aerodynamics, parachutes, loads, dynamics, software, and systems. Hughes is recipient of NASA's Awareness Honoree Award for his work on Orion EDL system. He received his BS in Aerospace Engineering from Penn State 1991, magna cum laude, and MS in Electrical Engineering from USC 2004, with a focus in estimation theory. Hughes is also a bassist, composer, music producer, and inspirational public speaker.

Acknowledgements

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- Dr. Glenn Pfeiffer, Provost
- Crean College of Behavioral Sciences
- Schmid College of Science and Technology
- Wilkinson College of Arts, Humanities, and Social Sciences

Schedule of Events

9:30 – 11:30 pm	**Student Poster Session I**	**Sandhu Conference Center**
12:00 – 1:30 pm	**Lunch & Keynote Speaker** *Mike Paul Hughes* *RSVP required*	**Bush Conference Center** *Beckman Hall, 404*
2:00 – 4:00 pm	**Student Poster Session II**	**Sandhu Conference Center**

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Poster Session I

Abstracts

Graduate Students

Biological Sciences

1. **The Role of Neuronal Nitric Oxide Synthase (nNOS) in Interferon-Gamma-Induced Melanoma Progression**
   Presenter(s): Shirley Fong
   Advisor(s): Dr. Sun Yang

Human cutaneous melanoma is one of the few cancers in which the incidence rate continues to increase in recent years, making this disease a rising public health concern. Interferon-γ (IFN-γ) produced by immune cells plays a critical role in tumor immune surveillance; however, a SWOG clinical trial done in 1990, surprisingly showed that it stimulated disease progression instead in patients with early stage melanoma. To date, the underlying molecular mechanisms of IFN-γ-mediated pro-tumorigenesis have not been well defined.

Neuronal nitric oxide synthase (nNOS) overexpressed in human melanoma is a promising druggable target, which stimulates melanoma progression associated with induction of nitric oxide (NO). Knockdown of nNOS significantly reduces melanoma tumor growth and lung metastasis in vivo. For the first time, our study shows that IFN-γ significantly induced the expression level of nNOS in melanoma cells, while such induction was absent with IFN-α treatment, a FDA-approved adjuvant for melanoma chemotherapy. Consistently, intracellular nitric oxide levels are also elevated when treated with IFN-γ and diminished when IFN-α is used. Our study also showed that signal transducer and activator of transcription 3 (STAT3)-mediated signaling pathway was markedly activated by IFN-γ in human melanoma A375 cells. In addition, reverse phase protein array (RPPA) results showed that IFN-γ treatment induced the expression of genes associated with anti-apoptosis, transcription, immunosuppression, and DNA repair, such as HES1; However, genes associated with cell cycle and apoptosis such as FASN were found decreased after IFN-γ treatment in human melanoma.

Our study will enhance our fundamental understanding of melanoma pathogenesis, leading to the development of novel pharmacologic inhibitors for the treatment and prevention of human melanoma.

Food Science

2. **Postharvest Quality and Physiology of 'Granny Smith' Apples Subjected to Phytosanitary Irradiation**
   Presenter(s): Alan Baquero, Anderson Melo, Nasim Kheshti
   Advisor(s): Dr. Anuradha Prakash

California apples destined to Mexico are subjected to one of two phytosanitary treatment – cold treatment that requires a minimum of 40 days at 0 C or less, or fumigation with methyl bromide which causes damage to the fruit. An alternative treatment, recently approved by USDA-APHIS is irradiation at 250 Gy. The objectives of this study were to determine the postharvest quality of 'Granny Smith' apples (Malus domestica) treated by irradiation.

Freshly harvested 'Granny Smith' apples were irradiated at target doses of 250 and 1,000 Gy and then stored for 7 days at 1 C (to simulate transportation from California to Mexico) and 7 days at ambient temperature (to simulate distribution and retail). Upon treatment, apples treated with 1,000 Gy exhibited an increase in ethylene production and respiration rate as compared to the control. During storage, ethylene levels in the irradiated apples dropped (26%) and remained lower even during ambient temperature storage as compared to control. Respiration rate, however, remained higher (50%) than the control throughout storage, although the control apples gradually increased their respiration rates reducing the difference to 12% by the end of the storage period at ambient temperature. The differences in respiration rate were not manifested in any of the quality parameters tested: color, browning index, malondialdehyde (MDA), sugar content and organic acids. Skin and flesh exhibited similar levels of total phenolics in both control and irradiated apples; however, the phenolic content of skin was significantly increased (P<0.05) by irradiation at a dose level of 1000 Gy.
Exposure of apples to 1,000 Gy resulted in significant decrease (30%) in firmness as compared to the control and 250 Gy apples. The lack of response of the Granny Smith apples to irradiation at 250 Gy shows that this dose can be used as an alternative to MeBr, or cold treatment, for California apples exported to Mexico.

3. **Mislabeling of Catfish Products on the U.S. Commercial Market**
   Presenter(s): Shayna Bosko
   Advisor(s): Dr. Rosalee Hellberg

Seafood mislabeling is a form of food fraud associated with high economic incentives. While numerous studies have inspected the mislabeling of various types of fish like salmon, grouper, and halibut, there is limited information on mislabeled catfish in the United States. The objective of this study was to conduct a market survey of restaurant and fresh/frozen catfish products sold in Southern California to identify the percentage of species mislabeling using DNA-based methods. Forty catfish samples were collected from restaurants and forty catfish samples were collected from grocery stores or fish markets for a total of 80 samples. DNA was extracted from each sample and tested using species-specific real-time polymerase chain reaction for North American catfish, Ictaluridae. Samples that tested negative for Ictaluridae were tested using species-specific real-time polymerase chain reaction for Asian catfish, Pangasiidae. Any sample that tested negative for Pangasiidae was tested using DNA barcoding of the mitochondrial cytochrome c oxidase subunit I (COI) gene to identify the species. Overall, 9% of the catfish products were found to be mislabeled. In all seven cases of mislabeling, products labeled as catfish were identified as containing Pangasiidae species. Five (12.5%) restaurant samples were mislabeled and two (5%) grocery store samples were mislabeled. The results of this study reveal the occurrence of catfish mislabeling in Southern California and suggest the need for continuous monitoring of these fish on the commercial market.

4. **Anti-glycation Properties and Physical Quality Attributes of Cookies with Coffee Silverskin**
   Presenter(s): Leandra Filiaci, Cynthia Locke, Anjali Sarath
   Advisor(s): Dr. Lilian Were

Coffee silverskin (CSS), a byproduct from roasted coffee, has the potential to reduce advanced glycation end-products (AGEs) resulting from the Maillard reaction (MR) and may allow CSS to be repurposed. The anti-glycation potential of 0%, 0.8% and 1.6% CSS was investigated in cookies baked with stevia, a non-reducing sugar, or corn syrup, a reducing sugar. Hunter colorimeter was used to examine the effect of CSS on the color of cookies; cookies with 1.6% CSS had the lowest L value while cookies with 0% CSS had the highest L value. Free carbonyls measured

at excitation wavelength 347 nm and emission wavelength 415 nm increased as CSS concentration increased. A UV scan showed two peaks in each sample around 215 and 270 nm corresponding to the presence of amino acids and aromatic compounds, respectively. The intensity at these peaks increased with increased concentration of CSS. Fluorescence of Advanced Maillard Products and Soluble Tryptophan (FAST) scan was performed to determine the effect of heat on nutritional quality. FAST Index decreased with increasing CSS concentration due to anti-glycation properties of intermediate MR products. Tryptophan fluorescence increased with increasing CSS concentration because of CSS contributing to protein content of cookies. The results suggest that adding CSS to cookies increases protein quality and may be nutritionally beneficial due to the lowering of advanced Maillard products, however, the effect of reducing capacity of sugar needs further investigation.

5. **Lowering Greening in Cookies Made from Sunflower Butter Using Acidic Ingredients**
   Presenter(s): Sihui Liang, Lan Tran, Vu Pham
   Advisor(s): Dr. Lilian Were

Sunflower butter is a low allergenic plant-based butter alternative to peanut and tree nut butters. However, chlorogenic acid (CGA)-amino acid oxidation induced greening in sunflower butter bakery products makes customers hesitate to choose sunflower butter as a baking ingredient. This study centered on lowering greening in cookies using acidic dairy and sweetener baking ingredients. The effect of pH on greening reaction was investigated using different acidic ingredients (sour cream, buttermilk, yoghurt and honey) and were compared to maple syrup. All cookies were adjusted to the same moisture content. The intensity of greening, percent greening, CGA concentration were measured using a Hunter Lab colorimeter, image analyzer and high performance liquid chromatography respectively. Moisture content, spread factor and texture of cookies were also measured. Moisture content, texture and spread factor of cookies were not significantly different amongst treatments. The percent greening of cookies in decreasing order was maple> sour cream> buttermilk> yoghurt> honey. Cookies made with maple syrup had the highest pH (8.69) and greening intensity (a*= -8.9) while cookies made with honey had the least greening (a*= 3.9) attributed to its lowest pH (7.84) amongst treatments. Total phenolic content (TPC) had a strong negative correlation (r= -0.95) with greening of cookies after one hour post-baking. The CGA content of cookies after 1 hour made with maple syrup showed the lowest amount (87 µg/g) compared to cookies made with honey which had the highest CGA (100 µg/g). It was concluded that the lower pH from the acidic fermented dairy (buttermilk, sour cream, yoghurt) or honey ingredients reacting with baking soda resulting in cookies with less greening, higher free CGA and TPC content. Use of low pH bakery ingredients can thus be used to lower the intensity of greening and increase the acceptability of sunflower butter bakery products of consumers.

6. **Tryptophan and Schiff Base Formation in Cookies as a Function of Sunflower Meal and Oat Flour Concentration**
   Presenter(s): Rowena Zahn, Nasim Kheshti, Arianna McKinney, Beatrice Michael
   Advisor(s): Dr. Lilian Were

The use of sunflower meal (SFM) and oat flour in cookies has the potential to provide a gluten-free vegan snack with high protein and phenolic content. However, nutritional concerns come into question due to the greening that occurs in SFM products and steel-cut oatmeal as a result of phenolic-protein interactions. Chlorogenic acid and aventhramide are the main phenolic compounds in SFM and oats, respectively. In this study, tryptophan and Schiff base intensity were measured at EX280 nm and Em 300-500nm, and EX350 nm and Em 380-600nm, respectively. In

addition, texture, internal color, water activity and pH of cookies with different ratios of SFM/oat were investigated over 5 days after baking. SFM 45 and SFM 55 with 45% and 55% protein content were used. The pH of the control decreased by 0.9 with the addition of SFM 45 and decreased as the ratio of SFM increased. Water activity was higher in 100% oat cookies compared to samples with mixed oat flour and SFM. Cookies with both SFM and oat flour were firmer, with cookies containing 75% SFM as the firmest. Hunter a-value was lowest for samples with 50% SFM 55 at 0.25h after baking. During 5 days of storage, the most greening occurred in samples with 75% SFM 45, which had the lowest water activity. The tryptophan fluorescence decreased as the amount of SFM 45 increased, while the highest intensity of Schiff base was ranked: 50% SFM 55 > 0% SFM 45, 25% SFM 45 > 50% SFM 45, 75% SFM 45 > 100% SFM 45. In conclusion, the greening was significantly (p < 0.05) higher in samples with the lowest water activity, with the highest greening in samples of 75% SFM. The green color can be decreased by using a lower percentage of SFM.

Undergraduate Students

Art

7. **Ruins in Romantic Art**
   Presenter(s): Madeline Anderson
   Advisor(s): Dr. Wendy Salmond

During the Romantic era, people became completely fascinated with Gothic ruins. One ruin that captured particular attention was Tintern Abbey—an abandoned 14th century abbey in South Whales, England. The artist J.M. William Turner visited the abbey on multiple occasions and created numerous paintings and drawings of the crumbling abbey. Turner's artwork is able to evoke a sense of sublimity and nostalgia, in a similar way to the actual architectural space itself. Through an analysis of the various Romantic paintings of Tintern Abbey conclusions can be made as to why this dilapidated building is able to evoke such powerful and contradicting feelings as sublimity and nostalgia. A study of the concepts and theories developed by prominent Romantic scholars about nostalgia and sublimity will also be taken into account. To supplement this visual and conceptual analysis, an investigation into Turner and Wordsworth's poetry about the abbey will be used to determine the reasons people were drawn to this subject matter. In addition, by examining the social and political context, other answers to what might have attracted writers, artists, and everyday people to become so intrigued with Gothic ruins will be discovered. This research project will provide a new and inventive perspective on the topics of ruins, memory studies, and the sublime, which have been gaining considerable interest in recent years.

8. **The Unfolding of Time: Representations of Eternity in 15th Century Netherlandish Art**
   Presenter(s): Jessica Bocinski
   Advisor(s): Dr. Wendy Salmond

It is widely accepted within the anthropological discipline that time is an essential element of society which influences human interpretation and perception; however the study of time has only recently been addressed by

art historians. Exploring how, and which, notions of time were absorbed into the cultural mindset at different periods provides unique insight into how art objects were created, viewed, and used within society. This project investigates the medieval Christian concepts of time in order to recontextualize the formal elements and spiritual function of 15th century Netherlandish art. Saint Augustine's contention that time, made up of an illusion of past, present, and future, is but a simplification of God's eternity, shaped the medieval mentality and is apparent in the paradoxical combinations of space, figure, and narrative in the triptychs and altarpieces of Netherlandish artists such as Jan van Eyck, Rogier van der Weyden, and Hugo van der Goes. Through a visual analysis of narrative techniques and spacial construction, I explore how Netherlandish altarpieces embody the unfolding of time conceptualized by Saint Augustine in order to inspire the pious viewer to enter God's eternity. Understanding depictions of time and eternity in 15th century Netherlandish works challenges their traditionally static, iconographic evaluations, and reveals a dynamic awareness of the anachronic possibilities of art.

9. **Freed from Fascism: Berlin's Gallery Culture in the Aftermath of World War II**
   Presenter(s): Brooke Fessler
   Advisor(s): Dr. Wendy Salmond

In post-World War II Germany, the city of Berlin was left in ruin after six years of war. A nation ripped apart both physically and at its governmental core was finally freed from Nazi fascism in 1945, and the German people were finally able to reconstruct their culture. Born out of years of strict regulation of the German art world, a new type of art was put on display. Focusing specifically on gallery culture in Berlin in the post-war years, one can see how twelve years of classically influenced Nazi art gave way to a push towards the avant-garde. The people of Berlin no longer cared to see the carefully curated "Aryan" art of the Third Reich; instead, the leaders of Berlin's reemerging gallery culture were driven to feature the art previously deemed "degenerate". The Galerie Gerd Rosen was created with this goal in mind, and featured exhibitions that displayed modern art that was banned during the years of Hitler's power. Armed with artistic freedom, artists such as Hannah Hoch and Hans Uhlmann showed their works here. My project explores the cultural impact of the Galerie Gerd Rosen's activities in the period between 1945 and the start of major tensions between the Soviets and Allies in 1950. This was a time of artistic exploration in Berlin, when the city's galleries replaced the Nazi ideals that had haunted the nation for so many years with exhibitions that promoted freedom of expression in the arts.

10. **Temple Artworks of the Bagan Archeological Site**
    Presenter(s): Lauren Ogie
    Advisor(s): Dr. Wendy Salmond

The Bagan Archeological Site located in Myanmar is home to the largest assemblage of Buddhist monuments in the world with more than 3,200 temples and stupas across 30 square miles. Research on Bagan's temples has emphasized the archeology of the site and preservation of the monuments, but surprisingly little information is available on the religious role of the art within the temples. My project examines how both Hindu and Buddhist religious stories are depicted within some of the temples in images from frescos, sculptures, and glazed plaques to reliefs. Most artworks depict Buddhist Jataka stories. I will investigate the relation of stories from temple to temple through the artworks, the stories that are told in the lesser temples versus the more popular temples, and which stories appear the most throughout the temples.

11. The Village of Giverny and its Impact on American Impressionism

Presenter(s): Patrick Smith
Advisor(s): Dr. Wendy Salmond

Sitting on the bank of the Seine River in Northern France is the village of Giverny. Here, Claude Monet—one of the giants in French Impressionism—crafted some of the most iconic works of the French Impressionist movement. It is this association with Monet that drew flocks of American painters to both live and paint at Giverny. From John Singer Sargent to Lilla Cabot Perry, Monet's move to Giverny influenced many key members of American Impressionism. Arguably, the most impacted of these painters was Theodore Robinson, who had such an intimate relationship with Monet, that, in 1888, he moved to Giverny as his next-door neighbor. This project explores the transformation of Robinson's painting style from that of a realist and naturalist to something more loose and painterly, more Impressionist. Yet although he was immersed in the environment of Giverny, Robinson's Impressionist style was different than that of his next-door neighbor Monet. A comparison of his paintings with Monet's reveals the creation of a distinct style that sought to refine the blur of Impressionism. With the emphasis of more strong, physical, and geometric aspects of composition, Theodore Robinson had put an American spin on what was a heavily French-dominated Impressionism.

12. Brunelleschi's Dome: Brilliance meets Affluence

Presenter(s): Caroline Spogli
Advisor(s): Dr. Wendy Salmond

Brunelleschi's dome on the Cathedral of Santa Maria del Fiore in Florence, completed in 1436, is considered one of the greatest products of the Italian Renaissance. Although it is widely credited to one man and his own ingenious innovations, the plan and eventual construction of the dome leaves much to be explored. Like almost all public Renaissance structures, the dome was completely funded by Brunelleschi's influential patrons; the Medici family. My project explores every detail of the dome's construction, using both primary and secondary sources to understand how much of the finished dome was part of Brunelleschi's own vision; and to what extent his patrons infringed upon his own vision of the dome. This exploration of Brunelleschi's dome reveals that while patronage was an essential element of Renaissance artistic production, no matter who is ultimately given 'credit' for a building, innovation in the Renaissance was more often a compromise between those who funded the projects and those, like Brunelleschi, who ultimately executed them.

13. Scientific Involvement in Symbolist Visual Art

Presenter(s): Jessee Stoddard
Advisor(s): Dr. Wendy Salmond

Visual works of art from the Symbolist Movement, produced during the late nineteenth century, have been commonly stereotyped as exploring purely mythical ideas and imaginative subject matter. On the contrary, this analysis argues that Symbolist artists gave visual form to the emerging scientific truths of their time. Through their distinct use of line, color, and compositional organization, these artists offered a way of comprehending the newly exposed perceptual realm. This research is a preliminary investigation into the close relationship between Symbolist works and the many groundbreaking scientific discoveries made over the course of the nineteenth century—discoveries that altered humanity's very assumptions about themselves and the world around them. Examination

of a handful of representative pieces by Symbolist artists including Odilon Redon, Jean Delville, Edvard Munch and Carlos Schwabe reveals the impact upon their work by advances in Astronomy, Biology, and Darwinism. Willing to address revelations disturbing to society, Symbolist artists acknowledged the rapidly shifting world, possibly as a means of comfort during a period of abundant uncertainty. Hidden beneath the layer of widespread public paranoia prompted by the unknown, the Symbolists noticed a particular type of magic in the step humanity was able to take towards a greater sense of knowledge.

14. **Power and Piety: Examining the Papal Tiara in the Context of the Modern Church**
    Presenter(s): Manon Wogahn
    Advisor(s): Dr. Wendy Salmond

The papal tiara has been a symbol of the papacy since its first appearance around the 8th century. The exact symbolism of the three-tiered crown is unknown; a popular interpretation is that it represents the three divisions of the Christian Church: the Church Militant, Church Penitent, and Church Triumphant. Also called the triregnum, the tiara was last worn in public in 1963 by Pope Paul VI, who later donated his crown for charity. Since then, the last four popes, including the current Pope Francis, have received tiaras but have never worn them publicly. This project analyzes the relationship between the disappearance of the papal tiara and the changing values of the modern papacy after the Second Vatican Council (1962-65) by examining the surviving papal tiaras, including their method of display and public perception, as well as the tiara as represented in paintings and other visual documentation. The project investigates the symbolism surrounding the rejection of the papal tiara and of the coronation ceremony itself as it relates to the increased visibility of the pope in modern times. The papal tiara has been transformed from a symbol of the pope's temporal power to an inappropriate representation of material wealth that has become irrelevant to the image of modest piety promoted by the contemporary papacy.

Biochemistry and Molecular Biology

15. **Partial Amino Acid Sequence and Anti-Cancerous Activity of a Lipid Transfer Protein from Fennel (Foeniculum vulgare) Seeds**
    Presenter(s): Caroline Aziz
    Advisor(s): Dr. Aftab Ahmed, Dr. Rukhsana Lalani

Traditional medicine has a profound impact on populations in developing countries due its wide availability and low cost. Fennel (Foeniculum vulgare) is a plant that is commonly used in traditional medicine to treat many digestive and respiratory problems. Despite the practical use of the fennel seeds, the source of bioactivity is not fully understood. The objective of the current project is to fully characterize the primary structure of a non-specific lipid transfer protein (nsLTP) from fennel seeds and test its anti-cancer activity using human cancer cell lines. The proteins from the fennel seeds were extracted in Tris/HCl pH 8.0 buffer and successfully purified by two-dimensional liquid chromatography (2D-LC), using gel filtration chromatography followed by reverse phase HPLC (RP-HPLC). The purity of the isolated nsLTP protein was judged by the SDS PAGE gel electrophoresis. The purified nsLTP was loaded onto the PVDF disc and sequenced by automated amino acid sequencer, model PPSQ-31A (Shimadzu). The partial amino acid sequence was established up to 22 amino acid residues and the sequence was searched using Protein BLAST. The amino acid sequence similarity search confirmed the protein as a lipid transfer protein. The cell viability

assay was performed on the isolated LTP protein using the CellTiter-Glo (Promega). The results of the assay demonstrated anti-proliferative activity against prostate cancer cell lines (PC3) and breast cancer cell lines (MCF7). There was a decrease in cell viability approximately 30% and 60% in PC3 and MCF7 cell lines respectively.

16. **Structure Activity Relationship Studies of Novel Diarylpentanoid Analogs Targeting The Androgen Receptor in Prostate Cancer Cells**
    Presenter(s): Haili Coffin
    Advisor(s): Dr. Marco Bisoffi, Dr. Justin O'Neill

The development of prostate cancer (PCa) relies strongly on the activation of the androgen receptor (AR) signaling pathway by its natural ligand dihydrotestosterone. Furthermore, PCa progression to metastatic disease represents oncogene addiction to AR activity. Androgen ablation therapy is thus a mainstay therapy against this disease, but the development of ligand-independent AR activation and persisting AR expression eventually leads to castration resistant PCa (CRPC). Therefore, down-regulation of AR expression in PCa cells may be an effective therapeutic modality. The diarylpentanoid ca27 has previously been shown to down-regulate AR expression by an unknown mechanism of action. The present work represents a preliminary structure activity relationship (SAR) study addressing the contribution of the hydroxyl (OH) groups and Michael acceptors of ca27 to the down-regulation of AR protein expression. Accordingly, LNCaP human PCa cells were treated with ca27 and a selection of analogs differing with respect to the position of the OH groups and the presence/absence of the Michael acceptors. AR expression was determined by Western blotting using specific antibodies against the AR and β-actin as a loading control and quantified using Image J analysis. The dose-dependent effect of ca27 and its analogs was visualized by bright field light microscopy. Our data shows that the presence of OH groups and Michael acceptors are major contributors of AR down-regulation. In addition, this observation was confirmed by the dose-responsive nature of our results. Our studies aim at identifying active pharmacophores of diarylpentanoids that down-regulate AR expression. When targeted to prostate cancer cells, this could lead to the development of novel therapeutics against CRPC.

17. **Synthesis of Breast Cancer Targeting Peptide-Doxorubicin Conjugate for Increasing the Efficacy of Doxorubicin**
    Presenter(s): Alicia Cuber
    Advisor(s): Dr. Kamaljit Kaur

Chemotherapy is constantly challenged by poor selectivity of anticancer drugs for the diseased cells and/or their limited access to the cancer cells. Our goal in this project is to synthesize a peptide-drug conjugate that increases the therapeutic efficacy of current chemotherapeutic drugs like Doxorubicin by delivering the drug specifically to cancer site and avoiding healthy cells. The specific goal of this project is to synthesize, purify and characterize a new peptide-drug conjugate where a 10-residue peptide will be conjugated to Doxorubicin via a linker. The learning objectives of this project are to learn how to design a peptide-drug conjugate for breast cancer cell targeting, how to develop a synthetic protocol for the synthesis of the peptide-drug conjugate, the synthesis of peptide based molecules, and analytical techniques like reverse phase high performance liquid chromatography and MALDI-TOF mass spectrometry. The objectives for this research are to design a peptide-drug conjugate and develop a synthetic method for the synthesis, conduct the synthesis, purify and characterize the peptide-drug conjugate, and prepare a final written report and presentation for the project.

18. Studies of Ultra Low Crosslinked Poly (N-isopropylacrylamide) Microgel

Presenter(s): Sonia Djafri
Advisor(s): Dr. Andrew Lyon, Dr. Molla Islam

Microgels are colloidally stable networks of polymer chains that are swollen in water. They have been used in a wide array of soft material applications because of the characteristics they share with biological tissue and their tunable and chemical and mechanical properties. An example of interest is ultrasoft microgels displaying emergent platelet-like behaviours, allowing for clotting in vitro, and achieving wound-triggered haemostasis in vivo. Here, ultra low crosslinked poly(N-isopropylacrylamide) microgels (PNIPAm) were synthesized by precipitation polymerization in the presence of the co-monomer acrylic acid (AAc). This AAc acts as chemical handle and can be modified used for additional functionalities. Atomic Force Microscopy (AFM) and Dynamic Light Scattering (AFM) techniques were used to study microgel morphology and size. Gold nanoparticles (AuNPs) of different sizes were synthesized and encapsulated into the lyophilized microgel, known as the breathing-in method. These hybrid PNIPAm-co-AA microgels loaded with AuNPs are of interest to determine the loading capacity and pore size distribution of nanomaterials penetrating the microgel surface. This allows for maximizing the efficacy of binding sites. These microgel-AuNP hybrid will be studied by AFM and optical microscope. These results will allow for a deeper understanding of nanomaterials ability to penetrate PNIPAm-co-AA microgels and thus provides valuable information in further studies of using microgels for applications at the biointerfaces.

19. Investigation of the Cellular Mechanisms Involved in Resistance to Erlotinib

Presenter(s): Parvin Mahdipoor
Advisor(s): Dr. Marco Bisoffi

Tumor cells are heterogeneous; in any given population, cells rely on different signaling pathways and/or proteins for their survival and resistance against exogenous molecules. They are also plastic, which means they can modify their intracellular mechanisms to adapt to their environment and/or the anticancer treatment. Innate resistance to cancer drugs that target specific proteins in the cell could be a result of selection of cells that rely on alternative proteins, and is one of the major challenges for cancer therapy. On the other hand, acquired resistance (which happens after initial response to the selected therapy) is usually due to intracellular adjustments of the surviving cells, which could include adjusting the expression and activation of specific proteins and/or signaling pathways. In this study, we focused on a specific anticancer drug, erlotinib, which specifically targets a receptor tyrosine kinase, epidermal growth factor receptor (EGFR). We exposed a small panel of breast cancer cells to a wide range of erlotinib concentrations in order to determine the dose lethal for 50% of the cells (LD50). Then, we exposed each cell line to the anticancer drug using two different methods: exposure to a high dose (4 x LD50) of erlotinib to collect the survivors after 72 hours; and exposure to a series of gradually increasing concentrations, to induce acquired resistance to the selected drug. We then compared the resistant cells collected by each method to the original population for each cell line, separately, by real-time PCR, to investigate the changes in the expression level of a small array of selected proteins. This study reveals the heterogeneity in protein expression in any cell population, which could explain the unresponsiveness of a subset of the cells to molecularly targeted drugs, as well as the plasticity of the cells in response to external harmful stimuli, which could play a role in acquired resistance.

20. Cloning and Expression of NifA in Gluconacetobacter Diazotrophicus

Presenter(s): Jacob Mullen
Advisor(s): Dr. Cedric Owens, Michael Medina

The α-proteobacterium Gluconacetobacter diazotrophicus is a nitrogen fixing bacterium that is associated with plants, and plays a crucial part in providing fixed nitrogen to many crops such as sugar cane. The enzyme responsible for reducing atmospheric N2 to ammonia (NH3) is nitrogenase. Expression of the operon containing nitrogenase is regulated by the σ54 transcriptional activator NifA. NifA contains three structural domains: the N-terminal nitrogen sensing domain; the central AAA+ domain involved in the interaction with the σ54 factor of RNA polymerase via an ATP-driven reaction, and the C-terminal domain responsible for DNA binding. NifA also contains a putative redox sensitive metal binding site between the AAA+ and DNA binding domain. NifA activates nitrogenase transcription when nitrogen levels are low and redox levels are favorable, but the molecular mechanisms of nitrogen sensing, and redox sensing are currently poorly understood. This project aims to answer how NifA responds to cellular nitrogen and redox levels. We have successfully cloned NifA from G. diazotrophicus genomic DNA, and have also made N-truncated and C-truncated NifA mutants. We are currently undertaking expression and purification trials in order to obtain and purify protein for biochemical and structural characterization.

21. Gluconacetobacter Diazotrophicus Growth and Antibiotic Conditions

Presenter(s): Andrew Stepien
Advisor(s): Dr. Cedric Owens

Gluconacetobacter diazotrophicus is a nitrogen fixing bacteria present in the roots of plants. We investigated strategies to efficiently culture and grow G. diazotrophicus is a lab setting. The growth kinetics of G. diazotrophicus were optimized and analyzed with differing media, amounts of aeration and starter culture density. Tetracycline and Kanamycin antibiotics were tested at different concentrations with G. diazotrophicus to determine IC50 values. Results showed that C2 media along at 6 mL reaction volume yields consistent and reliable growth of G. diazotrophicus . Tetracycline's and kanamycin's IC50 value was experimentally determined to be 10 µg/ml and 35 µg/ml respectively. These growth and antibiotic parameters will be a solid baseline; valuable for future research into G. diazotrophicus and possible mutant growth kinetics.

22. Characterization of NifA from Gluconacetobacter diazotrophicus

Presenter(s): Patrick Lin
Advisor(s): Dr. Cedric P. Owens, Michael Medina

Synthetic ammonia (NH3) production via Haber-Bosch process requires large amounts of energy derived from fossil fuels. The nitrogen-fixing bacterium Gluconacetobacter diazotrophicus provides an alternative solution to NH3 production, as it expresses the protein nitrogenase, the only known enzyme capable of catalyzing the reduction of N2 to NH3. Genetically modified G. diazotrophicus with up-regulated nitrogenase expression and increased NH3 production may have potential applications in agriculture. This project investigates NifA, a sigma-54 activator, which regulates the transcription of nitrogenase-encoding genes, the nif operon, by interacting with RNA polymerase. NifA initiates nitrogenase expression in response to low nitrogen level and reducing cellular environment. To characterize NifA, the nifA gene was amplified from G. diazotrophicus genomic DNA and cloned into an expression vector. Expression trials were started in E. coli to generate protein for biochemical and structural characterization.

Several nifA constructs were made, with mutations in putative regulatory, redox sensing, or DNA-binding sites for structure-function analysis. Results of this project will be used to further characterize NifA and its mechanism in regulating nitrogenase expression, and ultimately, to manipulate the regulation of nitrogenase expression in G. diazotrophicus.

23. Processing and Characterization of Human and Rat Decellularized Skeletal Muscle Grafts

Presenter(s): Meghan Nelson
Advisor(s): Yen-Chen Huang

Decellularized skeletal muscle grafts would be advantageous in clinical settings to treat volumetric muscle loss in patients such as trauma or war victims. Current treatment consists of autologous muscle grafts or advanced braces. Ideally, decellularized skeletal muscle grafts would improve patient treatment by preventing infection, promoting myogenesis, stimulating muscle repair, and removing risk of donor site morbidity. To develop these new grafts as a treatment option, human rectus femoris and rat hindlimb muscles were processed and characterized. Grafts were first decellularized, disinfected, and lyophilized. This was followed by measurement of growth factors, cytokines, and matrix components by ELISA. Increasing surface area of tissue through cutting a greater number of slices in the tissue samples prior to processing resulted in improved decellularization. The removal of the immunogenic components, DNA and myofibers, was verified through histology stains and DNA quantification. Assays were developed that verified the retention of myogenic factors. Further work will assess the biocompatibility of the decellularized skeletal muscle graft.

24. The Role of Exosomes in Prostate Field Cancerization

Presenter(s): Julie P.T. Nguyen
Advisor(s): Dr. Marco Bisoffi

Field cancerization is formally defined as the presence of molecular alterations in structurally normal tissues adjacent to tumors. Currently, the etiology of prostate field cancerization is still unknown. We hypothesize that exosomes (vesicles excreted by cells that may contain protein, lipids, or RNA) are released by tumors and are endocytosed by adjacent normal cells converting them into abnormal cells, thereby aiding cancer progression. The following biomarkers have been associated with field cancerization: MIC-1, PDGF-A, FASN, and EGR-1, while markers for exosomes are CD-9, CD-63, and PSMA. To test this hypothesis, exosomes were isolated from human prostate cancer cell models LNCaP and PC-3 and were used to treat human non-cancerous RWPE-1 cells. Quantitative reverse transcriptase polymerase chain reaction and Western blotting were used to determine mRNA and protein expression levels of the biomarkers, respectively. The future implications of this study are to utilize biomarkers to indicate pro-cancer development in normal cells, allowing for patient intervention before cancer development by inhibiting exosome release from tumor cells. In addition, knowledge of molecular mechanisms of field cancerization may lead to the development of preventative measures to inhibit tumorigenesis and tumor multifocality.

25. Regulation of Lanthanide Uptake in Methylobacterium Extorquens AM1

Presenter(s): Marco Saglimbeni
Advisor(s): Dr. Elizabeth Skovran

Lanthanide elements are used in many modern technologies such as smartphones and computers, but their extraction requires harsh mining conditions that damage the environment. Methylobacterium extorquens AM1 is a methylotrophic bacterium that can use lanthanides for methanol oxidation. M extorquens AM1 has been shown to recover these metals from discarded electronics, highlighting their potential as recovery agents for used lanthanides. However, how lanthanides are acquired and transported into the cell is completely unknown. Transposon mutagenesis identified several predicted iron uptake genes as required for lanthanide-dependent growth. We hypothesize that lanthanides are obtained by a process similar to siderophore-mediated iron uptake and that identified iron uptake genes mediate lanthanide uptake as well. Gene knockouts of identified genes were created to assess their requirements for lanthanide-dependent growth. Additionally, transcriptional reporter fusions were constructed to determine if these genes are regulated by lanthanides. Expression from a predicted promoter was measured in the presence and absence of lanthanum and in iron uptake regulatory mutants, irr and fecI. Our results indicate that lanthanide uptake is indeed similar to iron uptake as uptake genes are repressed when each respective metal is present in high exogenous concentrations. Additionally, our results suggest that transcriptional regulators of iron uptake are also responsible for regulation of the identified lanthanide uptake gene cluster. These results contribute to our understanding of the lanthanide uptake system of M extorquens AM1, knowledge of which will help to engineer the bacteria as a biorecycling strategy for recovery of lanthanides from electronics waste.

26. Structure Activity Relationship Studies of Novel Diarylpentanoid Analogs Targeting the Androgen Receptor in Pancreatic Cancer Cells

Presenter(s): Caileen Sylvester, Taryn Miyake
Advisor(s): Dr. Marco Bisoffi, Dr. Melissa Rowland-Goldsmith

Clinical data suggests that the development and progression of pancreatic cancer may be supported by hormones, including androgen acting through the androgen receptor (AR) signaling axis. Consequently, hormone ablation therapy may be an effective therapeutic strategy, as may the down-regulation of AR expression. The diarylpentanoid ca27 has previously been shown to down-regulate AR expression by an unknown mechanism of action in prostate cancer cells. By extrapolation, we have hypothesized that it acts accordingly in pancreatic cancer cells. To test this hypothesis, we have tested ca27 and some of its analogs in a preliminary structure activity relationship (SAR) study with respect to the presence/absence and position of the hydroxyl (OH) groups on its aryl rings and the presence/absence of the Michael acceptors on its carbon chain. AR expression was determined by (1) Western blotting using specific antibodies against the AR and β-actin as a loading control, ad (2) quantitative reverse transcriptase polymerase chain reaction (qRT-PCR). Also, the effect of ca27 and its analogs was visualized by bright field light microscopy. Our data shows that the presence and position of OH groups, as well as Michael acceptors, are major contributors of AR down-regulation. Our studies aim at identifying active pharmacophores of diarylpentanoids that down-regulate AR expression. When targeted to pancreatic cancer cells, this could lead to the development of novel therapeutics against this disease.

27. Determining the Role of the Androgen Receptor in Pancreatic Cancer Cell Models

Presenter(s): Taryn Miyake
Advisor(s): Dr. Melissa Rowland-Goldsmith, Dr. Marco Bisoffi

Ongoing research and clinical trials continue to indicate a gap of knowledge with respect to the importance of hormonal control, regulation, and contribution to the tumorigenesis and progression of pancreatic adenocarcinoma (pancreatic cancer). Due to the slight but persistent higher incidence of pancreatic cancer in men, it is especially important to elucidate the role of the androgen signaling axis in pancreatic cancer cells. Towards this goal, the major task of the present research is to determine the role of the androgen receptor in the proliferation and survival of pancreatic cancer cell models. Two experimental approaches are used to examine this phenomenon. First, we have screened synthetic organic small molecules with diarylpentanoid character and identified compounds able to inhibit androgen receptor expression, the proliferation and migration, as well as induce cell death of COLO 357 cell model of pancreatic cancer. Second, we are adopting plasmid based transient transfection protocols to down-regulate the expression of the androgen receptor in the COLO 357 followed by analysis of their proliferation. The combination of a pleiotropic and specific approach towards regulating androgen signaling will allow us to determine the role of this pathway in pancreatic cancer cell models, while leading to the identification of organic compounds that can be further explored for drug development.

Biological Sciences

28. Compromised Chemical and Behavioral Defenses are Associated with Precise Predator Avoidance in the sea hare Dolabrifera dolabrifera

Presenter(s): Alex Himstead
Advisor(s): Dr. William G. Wright

To compensate for their loss of a protective shell, sea hares and other soft-bodied gastropods have evolved multifaceted chemical defenses and a simple form of learning known as sensitization. Previous research has shown that these chemical and behavioral defenses are compromised in one sea hare, Dolabrifera dolabrifera. We hypothesized that this species compensates for its diminished defenses by avoiding predator species. As a first step toward testing this hypothesis, we observed the movement patterns of seven small groups of Dolabrifera (30-300 individuals) in isolated tide pools near Punta Culebra, Panama over a two-week period during summer 2016. We found that these sea hares emerged from well-protected cracks and crevices to forage on algae precisely as the daytime ebbing tide fell past each tidepool. This strict limitation of foraging to daytime low tides suggests that sea hares are avoiding both daytime high tide (likely piscine), and nocturnal (likely crustacean) predators. This strict timing regimen for hiding vs. foraging is unusual among sea hares, and supports the hypothesis that Dolabrifera's well-protected resting microhabitat and precisely timed foraging schedule allows it to avoid, rather than defend against, its predators.

Chemistry

29. A Method to Calculate the Binding Constant of a Polyaromatic Hydrocarbon Degradation Pathway

Presenter(s): Becca Brunter
Advisor(s): Dr. Warren de Bruyn

Polyaromatic hydrocarbons (PAHs) found in natural waters are known to have toxic effects in epidemiological studies. It has been shown that the toxicity of PAHs may be reduced when bound in a complex with naturally occurring humic substances. This research aims to help demonstrate the binding of PAHs with humic substances as a degradation pathway by providing a viable experimental procedure to measure the binding constant between PAHs and humic substances. In this research, it was determined that a suitable method to determine the binding constant was to identify the change in PAH fluorescence due to its binding with humic substances. This was achieved by plotting the ratio of the fluorescence of a PAH as a function of the fluorescence of the PAH-humic substance complex versus the concentration of humic substance. The resulting slope was therefore the calculated binding constant. To carry this out, an Aqualog steady state spectrofluorometer was utilized to measure fluorescence. Specifically, three approaches to obtain fluorescence were used in order to examine variation due to inner filter effects. This included a standard emission approach, an absorbance approach in which there was a manual correction for inner filter effects, and an excitation-emission matrix approach which automatically corrected inner filter effects. The two PAHs tested were phenanthrene and fluoranthene and the two humic substances tested were humic and fulvic acid. The experiment was then repeated to ensure reproducibility. It was also run at a lower temperature to examine temperature dependence in which the binding constant significantly decreased. Overall, the binding constant gives vital information regarding the interaction between PAHs and humic substances which is especially important to understand due to the health implications that PAHs pose.

30. In-Vivo Inhalation of Arsenic Laden Mine Waste Particles

Presenter(s): Tessa Oliaro, Fernando Silva, Matthew Gothong
Advisor(s): Dr. Christopher Kim, Sovanndara Hok

Toxic metal(loid)s such as arsenic pose environmental hazards to human and organisms' health in many locations throughout California where metal mine tailings are located near residences and ecosystems. However, the relationships between the geochemical properties of airborne dust particles and the bioavailability of potentially harmful elements in particles have not yet been clearly established, thus impairing risk assessment efforts in mining-impacted regions. The bioavailability of inhaled arsenic is largely dependent upon two factors: the size and solubility of the arsenic-bearing particle. The size of the particles dictates how far into the lungs and other tissues the potential arsenic-containing particles will be lodged, while the solubility determines how rapidly and completely the arsenic is absorbed into the bloodstream and through the other organs.

Our research aims at determining the bioaccessibility and bioavailability of mine tailings samples in the respirable (i.e. ≤10 μm) size range. Rats were exposed to an acute dose (1000 μg/m3) of airborne particles from two mine waste sources from the Marigold East gold mine in California for a period of 3 hours, then sacrificed immediately after exposure and after 1 and 7 days post-exposure, with results compared with a control group that was not exposed. Arsenic concentration was measured in the urine, feces, blood, and a range of tissues.

Together the results suggest that arsenic is released from the mine wastes in two stages: 1) a rapid release of highly soluble, surface-bound arsenic; and 2) a slower release of less-soluble, particle-bound arsenic. The mine tailings do demonstrate higher bioavailability than the waste rock suggesting that processing of the ore produces more soluble arsenic phases. The knowledge generated by this experiment is expected to be transferable to other environmentally-contaminated regions where fine-grained dusts and their associated contaminants have the potential to be mobilized and inhaled, increasing hazardous exposure to residents/visitors.

31. Effects of Aggregation through Partial Drying on Metal Ion Adsorption to Iron Oxyhydroxide Nanoparticles

Presenter(s): Fernando Silva
Advisor(s): Dr. Christopher Kim

Global Global metal ore mining leaches large quantities of heavy metal ion waste, such as Zn(II), posing a threat to aquatic systems. Nanoscale iron oxyhydroxides, such as goethite (-FeOOH), are of great interest due to their capacity to adsorb and retain dissolved metal(loid) ions in aqueous environments. Prior studies have shown the adsorption and retention of metal cations are dictated by its pH and ionic environment [1]. The physical properties of synthetic goethite aggregates can determine the extent of adsorption and retention of heavy metal cations.

Goethite nanoparticles were aggregated by air drying at room temperature to varying degrees of mass reduction. The aggregates' size were determined using dynamic light scattering (DLS). Each aggregates were exposed to a 0.5mM Zn(II) solution and pH was changed to 7 then 5 for optimal adsorption and desorption respectively. Both solutions were centrifuged and the concentration of Zn(II) in the supernatant was measured using atomic absorption (AA) spectroscopy.

Extended x-ray absorption fine structure (EXAFS) spectroscopy was utilized to determine the bonding environment around Zn(II) in the nanoparticles. Zn(II) adsorption and retention rates were found to be negatively correlated with the hydrodynamic radius of the nanoparticles. In addition, EXAFS fitting show that aggregation through evaporation induces a decrease of Zn-Fe bonding radius of approximately 0.5Å with respect to the un-aggregated nanoparticles during adsorption and comparable Zn-Fe bonding radius when desorbed.

[1] Chesne et al. (2014). Geochemical Transaction 15:6

Communication Studies

32. The Effects of Inclusive and Prejudiced Social Media Messages on Middle-Eastern Muslim American Identity

Presenter(s): Juliette Atchekzai
Advisor(s): Dr. Riva Tukachinsky

Immigrants to the United States often face the difficulty of dual-identity, living in two cultures in one country. One such group is the Middle-Eastern Muslim Americans, who, in our current political state encounter prejudice, discrimination, and stigmatizations of their identity. The present research examines the role of social media in fostering affinity or dissociation with the different aspect of their Middle-Eastern Muslim American (MEMA) identity. In this experiment, Muslim Americans of Middle-Eastern descent (n=82) were randomly exposed to varying

fictitious Facebook posts and were then asked to answer questions that measured their identity strengths. The source of the Facebook post either made an inclusive and prejudiced statement in regards to MEMAs. The post was accompanied by various combinations of comments that either are inclusive of, or prejudiced against MEMAs, or shared a mix of opinions. It is hypothesized that posts that are in support of MEMAs will strengthen American identity, posts that are against MEMAs will make participants dissociate with American identity and strengthen Middle-Eastern Muslim identity, and posts that show a mix of support and opposition for MEMAs will slightly strengthen both Middle-Eastern Muslim and American identities. This study is imperative in today's world to understand the impact and effect of social media prejudice versus supportive activism on a large population that otherwise has been relatively understudied in the field of mass communication and identity.

33. Organizational Attributes of Nonprofit, Social Enterprises, and For-Profit Businesses

Presenter(s): Lydia Benjamin, Jamie McCain
Advisor(s): Andrew Schrock, Dr. Kerk Kee

As an entrepreneur begins to plan their business model, the first decision they make will be the type of business they would like to start. They may choose to build a nonprofit organization, a social enterprise, or a for-profit business. There are many distinctions between these three types of organizations including revenue sources, organizational missions, and overall strategic plans. While nonprofit organizations rely on donors and sponsors for funding to carry out their mission to make a difference, for-profit organizations reach their goal of generating revenue by people purchasing their product or service (Conrad and Glenn, 1976). Social enterprises focus on serving a certain community in addition to making a profit. Given the differences among the three different organizational structures, they each employ different strategies in order to be a sustainable business. By focusing on three different, specific organizations, this poster compares and contrasts different organizational attributes that allow nonprofits, social enterprises, and for-profit businesses to be sustainable.

34. Media Habits of Young Children and Parents' Involvement

Presenter(s): Dory Ann Carter, Katie Russell, Suman Rizvi, Samantha Swain, Charlie Bruene
Advisor(s): Dr. Riva Tukachinsky

Media literacy has become an important subject for today's youth due to new technologies providing information on multiple platforms. It is important for children to understand how media works, what its purpose is, and how to become an informed, critical consumer of media. Not only is it important for children to gain media literacy, but it is also critical for parents to gain media literacy in order for them to help their children use and consume media in a healthy way. The paper reports on a media literacy course for parents with children five years old and under. Parents were given a survey before and two weeks after participating in the workshop. They were asked how informed they are about the media their children intake, and if their media habits and what they implement on their children change after the media literacy class.

35. Social Comparison and Openness in Tinder Users

Presenter(s): Sarah Espinzoa, Allison Arthur, Olivia Corbell, Chloe Loenard, Jordan Dixon
Advisor(s): Dr. Sam Dorros

Tinder is a popular smartphone dating application used by a wide range of people with different ages, dating preferences, and geographic ranges. Tinder dating app usage may affect users openness and measure of social comparison. The purpose of this study is to analyze the relationship between openness and social comparison in male and female users on Tinder. Additionally, this study will evaluate openness and social comparison in current Tinder users. Finally, this study will investigate the association between openness and social comparison among users. A 5 point likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) will be used to measure how open Tinder users are with other Tinder users, and how often users compare themselves to other users. Of the total number of participants (N = 217), 27% were male (n = 59) and 73% were female (n = 158). Participants were recruited through convenience and snowball sampling by student researchers. After taking an online survey, results showed that openness and social comparison were significantly correlated with how many matches users receive. Additionally, results of this survey were correlated with issues of anxiety, depression, happiness, and mental health.

Computational Science

36. Project Twittify

Presenter(s): Tyler Andrews, Neetu Patel, Jeffery Haskell, Emily Daskas, Vince Carpino, Goldie Malamud
Advisor(s): Dr. Michael Fahy

Our project, Twittify, has the main objective of attempting to combine Spotify and Twitter APIs in order to make an interactive, unique GUI application that allows users to have an experience that combines some of the best aspects of each API into one client. This application contributes to the areas of our interest in our course very well because it incorporates the concept of taking more than one API of several popular social media platforms or games and combines it into one improved client. What is specifically appealing about Twittify is that it really appeals to this generation's admiration for social media and music by taking some of the best features of both APIs and incorporating it into our application. Some of those features include being able to search tweets about specific songs and a feature to create a playlist of songs and view tweets about those songs. These features were implemented in a way that displays the creativity and passion that our team had for this project. The user will have extreme ease when using Twittify thanks to an interactive GUI that will make the user experience more exciting and easier than a simple console app would. In the end, the big picture of this project is to provide users with a simple, visually pleasing application to be able to research and create their next hit playlist.

37. ChapTweets

Presenter(s): Liliana Hernandez, William James
Advisor(s): Dr. Michael Fahy

ChapTweets is a python based Twitter client application that utilizes the Twitter API to provide analysis on user tweets, topics followed, topics tweeted about by followers and related analysis to show trending topics on a

contained target of users. Our target centers on Chapman University and its presence on the social media platform. This project explores uses of transmission control protocol, standard client-server paradigm, application user interface, and application, transport, and network layer interactions. In addition to protocol, ChapTweets demonstrates a common interface for the user to indicate what analysis and actions s/he would like to perform through a menu of options.

Our goal is to give the user a Twitter-like experience via the command line and provide the user with the option to display the desired information on the command line prompt or to share it by email. We will also work on converting the information from Twitter into CSV files and use the files to perform analyses which will report the demographics of tweets about chapman. Hopefully this will give us information as to the most popular and least popular demographics that are tweeting about Chapman. We also plan to sort tweets about chapman and topics similar to chapman by various topics (sports, education, etc).

38. Computational Protein to Ligand Docking in Common FDA Approved Drugs

Presenter(s): Courtney Krysl
Advisor(s): Dr. Gennady Verkhivker

The binding of protein to ligand pertaining to particular FDA approved drugs was analyzed in this project, specifically, the docking process. Researching the 3D structure of these drugs can help us to understand how they fold, how they function, and then also how they malfunction, the major question to be answered in this project. A ligand cannot perform its function if the docking process is not successful, thus this is a very important step in all the processes our body performs. To find the crystal structures of various protein kinase complexes, the associated protein data bank (pdb) entries were looked up on a protein data bank website. These structures contain two parts, a ligand and a protein complex. The files were separated in order to see the appropriate docking of the two after appropriate modifications. To view these structures we downloaded the swiss pdb viewer on our computers. Once the crystal structures were open in swiss the individual structures were modified and save independently as pdb files. Then, modifications were made to the raw (now separate) structures to allow for ligand protein docking (bonding into the appropriate site). To do these modifications a WHATIF server was used. Then the ligand files were opened in swiss/chimera for further editing. The ligand file was saved as a MOL2 file, while the protein remained a pdb file. Further molecular editing was done to prepare the ligand and protein for docking and for swiss, the docking program used to generate protein ligand 3-D structures for viewing and analysis. Analysis was then done looking into how the ligand binds to the protein in order to perform its function.

39. Computational Analysis of TCR Repertoires in Patients with Breast Cancer

Presenter(s): Kristalee Lio
Advisor(s): Sergio Branciamore, Dr. Andrei Rodin

TCR repertoires are being sequenced beyond faster than they are being analyzed, thus there is a direct need for an effective approach to analyze and characterize these immunological phenotypes. The current study suggests an approach to analyze and model TCR profiles. Through TCR profiling of different populations, it is known that repertoire diversity declines linearly with age, and is significantly reduced in patients suffering from autoimmune diseases or cancer, relative to healthy individuals. Additionally, TCR profiling revealed a significant difference in signature sets between patients with low grade and high grade glioma tumors. These studies and others of its kind have sequenced TCRs from patients using only one type of tissue to estimate repertoire diversity. However, it is

known that circulating lymphocytes account for a minute fraction of all lymphocytes. Thus the current study sequenced TCRs from peripheral blood mononuclear cells, tumor infiltrating leukocytes, and lymph nodes – PBMC, TIL, and LN, respectively – in newly diagnosed breast cancer patients.

The first stage of analysis addressed the validity of sampling three tissues. Analysis revealed a statistical difference through the standard relative entropy measurement, SRE, in each of the pair-wise tissue comparisons. Once these significant differences in repertoires were ascertained we ascribed them to dynamic biological processes – such as diffusion, inflammation, and inflammation-selection. The goal of modeling these three biological processes was to (1) understand the driving factors involved in gathering of TCRs and (2) predict SRE as a means to create a reliable approach for analysis of the masses of generated TCR data. The results of our models hold potential for personalized treatment in predicting patient outcome and immunological phenotypes, such that remission or response to cancer treatment could be predicted.

40. Find the Best Car for You

Presenter(s): Corey Lowe
Advisor(s): Dr. Michael Fahy

The purpose of this project is to develop an application that will help you find the best car for yourself. This project will rely on Web API's to get a majority of the information. This includes the Edmunds Web API. The project will also be based on the Android platform to easily create a mobile application based on Android. Allowing users to find a car based on desired features rather than desired make and model can help alleviate the struggle of finding a car with the features that you want the most. The project will also be able to collect data on the most desired features on certain locations. The hope is to be able to collect data that helps manufactures place cars with specific features in the right location in the world. This project will held the end user and the manufacturer create a seamless car purchase or lease process.

41. Group Chat Application

Presenter(s): Jennifer Ly, Logan Jensen, Marc Karam
Advisor(s): Dr. Michael Fahy

For our research project, we shall be creating a network layer application in Java that utilizes Transmission Control Protocol and connection sockets in the form of a group chat. We decided to use TCP because we need to establish a reliable connection to the users. In order to provide a method of communication between chat users, we plan to have a message relaying service, backed with a graphical user interface made from the NetBeans IDE, using JavaSwing. Our interface will act as an intermediary between the user and the program for quick, easy access. The inclusion of usernames shall differentiate between multiple users and provide anonymity within one chat session. Our expectations for this project are that the users of the group chat shall be able to communicate with one another from remote locations successfully.

42. About AroundMe!

Presenter(s): Shayne Zamora
Advisor(s): Dr. Michael Fahy

The purpose of my project is to make a easy to use command line user interface for the Google Places API. My goal is to lessen the complexity and increase the functionality of Google Places. This contributes a better interface for people who may not be able to run the web application of Google Places in their browser. This gives more of an easier access to Google Places. Instead of having to singularly open a web browser and use the Google Places web application. This new user interface will be simple enough for anyone to use with a simple run of the program. Here, I am going for accessibility and ease of use. The creative methodology I am using to build this program is simple, quick and self explanatory instructions. The goal here is simplicity. The user should not have to try and find a way to use the program that is not explained within. The expected results of this program should be that the user is able to run the program and be able to runt he program successfully without the need of any external sources. A user who knows a minimal amount about programming should be able to run this program successfully. In summary, I am building in Python 2.7 a user interface client for the Google Places API out which should result in any user—including one who does not know anything about computer programming—being able to use without any external sources needed except my personal GitHub repository.

Environmental Science and Policy

43. Science Colleges that Look Ahead - A Framework for Assessing and Creating Interdisciplinary Science Curriculums using the Schmid College at Chapman University as a Case Study

Presenter(s): Elizabeth Flowers
Advisor(s): Mackenzie Crigger

There is limited research exploring the correlation between an interdisciplinary bachelor's degree and an increase in income when compared to individuals with a single discipline bachelor's degree. Many colleges and universities have implemented an interdisciplinary curriculum under the assumption that it better prepares graduates for jobs. In this study, this assumption was scrutinized and found to be trending towards accurate, with a 9 percent increase in pay for individuals with an interdisciplinary education over those with a single discipline education. The Schmid College of Chapman University was chosen as a trial case for this study. A framework was created for implementing an interdisciplinary science curriculum, focused on creating classes that incorporate Environmental Science and its sustainability component into 6 majors at Chapman. Data on interdisciplinary bachelor's degrees and income was collected in a survey to the general public. Chapman specific data was collected by releasing a survey to students and faculty and through interviewing professors. Curriculum data was compiled manually for the 2006-2007 catalog through the 2016-2017 catalog using a 25 keyword search among 6 majors. This quantitative approach was the first step to analyzing classes pertaining to sustainability over 10 years across Environmental Science and Policy, Food Science and Nutrition, Mathematics, Physics, Biology and Chemistry. A qualitative analysis was conducted by reading course descriptions and speaking to students and faculty who had been involved in classes of interest. Using this data, recommendations were made, including proposals for interdisciplinary Schmid classes, a framework for writing more accurate and inclusive course catalogs, the number of new Schmid faculty required and the types of credentials and experience required of these faculty.

44. Utilizing Public Awareness and Education to Improve Sustainability Curriculum at Chapman University

Presenter(s): Tamilyn Chipeco
Advisor(s): Mackenzie Crigger, Dr. Kerk Kee, Dr. Jake Liang

In a county that uses one-third of the world's paper, a quarter of the world's oil, 23 percent of the coal, 27 percent of the aluminum, and 19 percent of the copper (Scientific American, 2012), higher education institutions are more urgently tasked to educate their students on the topic of sustainability. At an institution like Chapman University, where students are encouraged to become well-rounded "Global Citizens", it is imperative that they are given the opportunities to learn about why sustainability matters and how to make a difference in their lives today and in the future. The purpose of this project is to demonstrate the potential for increased environmental and sustainability education through the presentation of its perceived need and the use of Chapman resources to implement new ideas and campaigns. Data collection on the current status of Chapman's curriculum shows that there is a lack of education in this area, as only 24.1% of students surveyed answered that sustainability has been brought up in any of their upper division courses. Conclusive research by the Strategic Environmental Communications lab and outside studies show how to most effectively remedy this insufficiency, and was utilized in this project to maximize positive results. Collaborating with Facilities Management, the Sustainability Department, the Ideation Lab, Strategic Marketing and Communication, and Sodexo Dining Services for this project demonstrates the ease and accessibility of making substantial change in how Chapman communicates environmentalism. The measures taken for this project are expected to result in an effective portrayal of Chapman's value for sustainability, higher public awareness of environmental issues, a reduction of the campus' environmental impact, and quantitative savings in key resources.

45. Senior Environmental Science & Policy Capstone: Environmental Health

Presenter(s): Tessa Oliaro
Advisor(s): Mackenzie Crigger

There is a very important intersection between the environment, public health, and socioeconomic factors (Braveman, 2014). These include waste disposal, water use and quality, road safety, ecosystem services, and many more. Environmental health stresses, "the health impacts of physical, chemical, and biological agents in the environment and workplace, and learns to develop strategies to measure and control major environmental health problems both locally…and in settings around the globe" (UC Berkeley School of Public Health, 2017). This overarching umbrella can have emphases in environmental epidemiology, exposure science, climate change, ergonomics, home and industrial hygiene, and molecular epidemiology. Exploring each of these branches will prove that sustainable curriculum within an interdisciplinary environmental health approach, is essential for educational institutions.

Chapman University has a wide range of majors and minors that do not capitalize on the environmental health aspects of an interdisciplinary approach. Research labs are available that emphasize the effects of environmental hazards on humans, but this theme does not infiltrate into curriculum as strongly. The development of a public health framework will help guide the process for this project. According to the Center of Disease Control, the most effective programs have procedures that are "useful, feasible, ethical, and accurate" (U.S. Department of Health & Human Services, 1999). The two objectives for this project are: make current classes more robust with

environmental health ideology in College of Educational Studies, Wilkinson College, and Schmid College of Science & Technology; create a solidified global health pathway for students across varied disciplines as a Public/Global Health Minor.

46. Moving Forward: Analyzing Student and Faculty Transportation Trends for Sustainability and Transportation Infrastructure Planning on Campus

Presenter(s): Danielle Platt
Advisor(s): Mackenzie Crigger

As Chapman University grows in both its geographic campus area and its student body, use of public transit, parking patterns, and other behaviors related to campus transportation must be analyzed to determine how transportation challenges should be handled now, and in the coming years. This study analyzes transportation survey data collected from students and faculty members of Chapman University, and makes policy recommendations for how best to encourage transportation alternatives to personal vehicles as to both reduce automotive emissions, and parking demand, and increase use of public transit infrastructure and active transportation options.

47. Climate Change and Terror Attack Frequency: Understanding the Relationship Between Environmental Change and Global Terror

Presenter(s): Danielle Platt
Advisor(s): Dr. Hesham El-Askary, Dr. Peter Simi

As climate change alters precipitation, weather patterns, arable land areas and agricultural outputs in regions around the world, there is evidence to suggest that these regional environmental changes may lead to civil unrest and increased resource competition as individuals leave rural communities and attempt to find greater economic and employment stability in major cities. Contributing to the growing body of research analyzing the interdisciplinary relationship between climate change and violent unrest in specific regions and countries, this study analyzes approximately 40 years of weather and terror attack frequency across 30 countries around the world to directly study the relationship between terror attack frequency and nation-specific weather pattern change. While this poster focuses on analyzing the correlations between environmental change and terror attack frequency, we also include in our study analyses of other nation-specific socioeconomic measures and indicators of stability, such as economic growth data, average agricultural productivity information.

Film

48. A Certain Tendency of Venezuelan Cinema

Presenter(s): Veronica Gonzalez Kompalic
Advisor(s): Dr. Kelli Fuery

Under the tyranny of the Chavismo regime, the last decade of Venezuelan cinema has witnessed a sudden awakening of oppositional consciousness that challenges and undermines the cultural and social structures of the pseudo-socialist dictatorship. Venezuelan filmmakers, in response to the legal and governmental constraints in media and artistic expression and the social order of fear, intimidation and silence imposed by Hugo Rafael Chávez

Frías, have abstracted and transferred their social repression to alternative narratives that succeed in its criticism of systematic oppression yet are able to pass legal and “spiritual” censors imposed by the new age of oligarchs. By examining the shared thematic repression and liberation depicted in "Hermano" (Marcel Rasquin, 2010), "Azul y no tan Rosa" (Miguel Ferrari, 2012), "Pelo Malo" (Mariana Rondón, 2015) and "Desde Allá" (Lorenzo Vigas, 2016), the abstraction and translation of national trauma becomes evident through the projection of anger, opposition and governmental criticism into themes of queerness, masculinity and death or loss of motherhood. The regime and social unrest of the last two decades has had an unprecedented impact in deconstructing and challenging aspects of Venezuelan society that were regarded as the foundations of its culture, such as machismo and gender hierarchy, nationalism, family units and Catholicism and creating an extreme national diaspora. The presence of politics in the everyday life of an individual within this nation has ruptured a previously seemingly strong and settled sense of nationhood and cultural identity, which delineates the struggle for selfhood present in these films. The awakening of oppositional Venezuelan cinema, regardless of how sudden it might be, serves as a demonstration of the survival and endurance of authenticity and voice amidst the silence of the oppressed, undermining tyrants along the way.

49. Shattering the Black Box: William Castle as Participatory Artist

Presenter(s): Jonathan Mackris
Advisor(s): Dr. Kelli Fuery

The films of William Castle have been compared to that of contemporaries such as Alfred Hitchcock and Roger Corman, his art dismissed as mere cult entertainment (Heffernan, 2004). The purpose of this paper is to locate Castle within the broader artistic motivations and practices that characterize the mid-20th century, from Situationist theory to the expansion of cinema into the gallery and, most importantly, to the birth of explicitly participatory and conceptual art that begins in the 60s and culminates with the relational aesthetics posited by Nicolas Bourriaud (2002). In examining these films through such a lens, and with particular reference to the function of his “gimmicks” within the work as a whole, we discover that Castle is not simply a provocative showman but an artist whose work challenges the relationship between spectator and screen and whose innovations defy the limitations of the lexicon of traditional cinematic discourse.

Food Science

50. Dried Agaricus Bisporus White-Button Mushrooms as an Antioxidant in Raw Beef Patties.

Presenter(s): Natalie Tom
Advisor(s): Dr. Lilian Were

About 31.6 billion pounds of beef is wasted per year and one of the key contributors to this waste is lipid oxidation. Beef patties are unable to attain a long shelf life, because lipid oxidation deteriorates the beef due to the production of unstable free radicals. 1% of Agaricus Bisporus (white-button) mushroom powder that was oven-dried or lyophilized was added to the beef patties as a natural antioxidant to inhibit the production of unstable free radicals. The beef patties were stored in the refrigerator at 4°C for a span of 12 days and various tests were performed every 3 days for a span of 12 days. The antioxidant capacity of these ground beef with white-button mushrooms was analyzed using Thiobarbituric Acid Reactive Substances (TBARS) that quantifies MDA, a product of lipid oxidation. Moisture and color tests were also performed to analyze the effect of mushrooms on the quality of the raw beef

patty. It was determined that all beef patties with 1% added mushroom powder had significantly lower TBARS values than the control throughout the span of 12 days. The TBARS value for the 2% salted samples was about 0.10 higher than the 1.5% salted samples on DAY 12 of testing. For 1.5% salted samples, the redness (a*) color in the negative control was significantly more red with a maximum redness intensity of 13.28 compared to all samples with mushrooms which had a maximum intensity of 11.818 through the span of 12 days. There was no significant difference in redness (a*) with the 2% salted samples. Agaricus Bisporus mushrooms act as an antioxidant and extends the shelf life of raw beef patties, while not compromising the overall color and moisture of the product.

Health Sciences and Kinesiology

51. Electromyography for Prone Y Exercise Learning Tool

Presenter(s): Erika Faria, Rachel Cooklin, Madeline Johnson, Taylor Scavo
Advisor(s): Dr. Eric Sternlicht

The purpose of this study was to analyze upper and middle trapezius recruitment during the Prone Y physical therapy exercise with and without visual electromyographic (EMG) feedback. During the Prone Y exercise, the middle trapezius is targeted for training as the superior trapezius is commonly overdeveloped and individuals recruit the upper trapezius more than the middle trapezius. This imbalance of the regions of the trapezius muscle often leads to glenohumeral joint dysfunction. Fifteen healthy, college aged students were selected for the study. Directions on the Prone Y were provided prior to both trails with minimal verbal feedback. The trapezius activity was recorded using BTS FREEEMG probes (BTS Bioengineering, Brooklyn NY). During the trails, subjects received visual feedback. They were shown EMG recordings of the upper and middle trapezius muscle while conducting Prone Y exercise. Data was analyzed using BTS SEMGanalyzer and statistically analyzed using a t-test and considered significant with a p < 0.05. Average normalized upper trapezius EMG activity (mean + s.d.) for the visual trial versus nonvisual trial were 0.254 ± 0.121 and 0.207 ± 0.083, respectively. The average normalized EMG activity (mean + s.d.) in the visual trial versus nonvisual trial for the middle trapezius were 0.452 ± 0.203 and 0.395 ± 0.265. No statistical significance was found between trials. Subsequent testing on two subjects with feedback conducive to a physical therapy environment was conducted. A positive correlation between agonist muscle activity and negative correlation for antagonistic muscle activity was seen for the visual and verbal feedback. The added pilot data indicates that consistent verbal and visual EMG cues could be implemented in a physical therapy setting to improve patient recruitment of targeted muscles.

52. The Use of EMG as a Physical Therapy Learning Aid

Presenter(s): Madeline Johnson, Rachel Cooklin, Erika Faria, Taylor Scavo
Advisor(s): Dr. Eric Sternlicht

The purpose of this study was to compare the muscle recruitment of an agonist and antagonist muscle during the step up physical therapy exercise with and without visual electromyographic (EMG) biofeedback. 15 healthy, college-aged subjects were recruited to participate in the study. Subjects performed the step up with and without visual feedback in two separate sessions over a four-week period. Muscle activity was recorded from the Vastus Medialis (VMO) of the target leg and Medial Gastrocnemius (MG) on the contralateral leg. EMG recordings were collected using a BTS FREEEMG system and data was processed using BTS SEMGanalyzer software (BTS

Bioengineering, Brooklyn, NY). Results: The mean +/- standard deviation MG muscle activity during visual sessions was 0.340 (SD 0.141) and 0.310 (SD 0.138) during non-visual sessions. The mean +/- s.d. VMO muscle activity was 0.309 (SD 0.097) during visual sessions and 0.299 (SD 0.139) during non-visual sessions. A paired t-test was used to determine statistical significance between sessions with values considered significant with a p< 0.05. No significant differences were observed between visual and non-visual trials for the agonist and antagonist muscles. Following complete data analysis on the 15 subjects, subsequent trials were conducted on two subjects while visual, verbal, and palpation feedback was given throughout the entirety of the visual feedback exercise trial. While no statistical analysis of the subjects could be performed, the results showed trends of greater muscle activity in the agonist muscle and less activity in the antagonist muscle when the subject received biofeedback. These findings support the conclusions of previous studies (Holermann, Taian, Vieira, Taskiran, Ekblom, One-Bin), suggesting that EMG biofeedback can be used as a tool for assisting patients with proper muscle recruitment during physical therapy sessions.

53. Efficacy of Electromyography and the Dead Bug Exercise

Presenter(s): Taylor Scavo, Rachel Cooklin, Erika Faria, Maddy Johnson
Advisor(s): Dr. Eric Sternlicht

The Dead Bug exercise is performed in physical therapy clinics to restore lumbar spine stability and core strength in patients with lower back pain (LBP) (2). The aim of this pilot study was to utilize electromyography (EMG) to evaluate the levels of abdominal and hip flexor motor recruitment during the Dead Bug when subjects performed the exercise with and without visual cues. Sixteen healthy, college age students volunteered as subjects for the study. Subjects performed the Dead Bug with and without visual cues and were given instruction on how to execute the exercise. Data was recorded using a BTS FREEEMG Analyzer and signal processed and data analyzed using the BTS SEMGanalyzer software (BTS Bioengineering, Brooklyn, NY). Electrodes were placed on the right rectus abdominis (RA) and right rectus femoris (RF) of each subject of the agonist and antagonist muscle, respectively. Subjects performed two trials of the exercise on two test days with two weeks in between testing. EMG data were normalized to the maximum voluntary isometric contraction or maximum voluntary contraction and paired t-tests were used for statistical analysis (p < .05). The averages of the normalized data between both visual trials for RA and RF were 0.302 ± 0.158 and 0.118 ± 0.094, respectively. The averages of the normalized data between both nonvisual trials for RA and RF were 0.284 ± 0.146 and 0.084 ± 0.049, respectively. No significant differences were found for visual and nonvisual trials for agonist and antagonist muscles. The protocol used in the study was not identical to a physical therapy setting with tactile and continuous feedback. As a follow-up, two subjects performed the dynamic Dying Bug with continuous verbal feedback and a positive trend was shown in mean visual values relative to nonvisual values for the targeted muscle.

54. Patient Activation Among Diverse Populations: A Systematic Review

Presenter(s): Megan Kenney
Advisor(s): Dr. Elizabeth DeBaetes

The purpose of this article was to review the current research regarding patient activation among diverse populations. Patient activation is defined as an individual's knowledge, skill, and confidence in managing his or her own health and health care. A total of 62 articles were used in this review (54 primary research articles, six retrospective analyses, and two systematic reviews). Articles were obtained using the EBSCO search engine through

the Leatherby Libraries at Chapman University. Preliminary and secondary searches were conducted using the keywords "patient activation." Only articles published within the last ten years (2007 to 2017) were included to ensure the most current data was examined. Two landmark studies from 2004 and 2005 were included as well. All articles were required to meet the relevance of the paper: an overview of patient activation among diverse populations. Additional articles related to the patient activation measure as well as the theory, outcomes, and interventions of patient activation were included. The selected articles presented data from normal, low socioeconomic status and minority, older adult, chronically ill, obese, diabetic, HIV positive, mentally ill, neurological, orthopedic surgical, hospitalized, clinical, and parental populations. Patient activation was significantly associated with a wide range of positive health outcomes and clinical markers. Higher patient activation scores were related to lower healthcare costs, beneficial health behaviors, and improved confidence in health management. Emphasizing patient activation bodes a more sustainable future health care system.

Honors

55. Harry Potter as a Cultural Brand: Exploring Identity Myths in a Post-9/11 World

Presenter(s): Shannon Annarella

Advisor(s): Dr. Julye Bidmead

J.K. Rowling's Harry Potter universe has conservatively garnered over $25 billion since the first novel was published in 1997. Her creation has been launched into a variety of consumer spaces, from books to films, video games, theatre productions, and theme parks. Borrowing from Douglas Holt's principles of cultural branding, I will contextualize the success of the Harry Potter franchise as it relates to our collective and personal anxieties in a Post-9/11 world. Specifically, I will assess how the core seven-book series embodied a 'melancholic rhetoric' that paralleled the US and UK's entry into the Iraq war and the corresponding shift towards mourning (and thereby healing) in the new Harry Potter and the Cursed Child plays. I will also be exploring the Fantastic Beasts and Where to Find Them spin-off film franchise and how its foray into the past continues to mirror our modern world. Following this analysis, I will show how Harry Potter is incorporated into our identities through engagement with fellow fans, physical and online 'Third Places', and most importantly, through media pilgrimages and other ventures into narrativized spaces such as the Wizarding World Theme Parks. This project is an extension of my senior capstone and explores the Harry Potter phenomenon in an original way by combining scholarship from a plurality of disciplines. I will be drawing from such fields as cultural and media studies, psychology, and business and combining them with theories and scholarship regarding literary critique, video games, and 'spatial narratives'.

56. Analysis of the Female Presence in the Male-Dominated Comic Book Industry

Presenter(s): Nicole Choy

Advisor(s): Dr. Julye Bidmead

The rise in the public's interest in comic books and comic book characters as grown. As comic books begin to occupy a more significant role in cultural and social exchange, more of academia is beginning to incorporate comics to inform various disciplines of study. In examining comic books as reflections of changing social, political, and even economic conditions of women within comic book culture. This project not only challenges the widely accepted perspective of comic books as a form of "low art," but explores just how dynamic social movements, like the second

wave of feminism, has impacted the content being produced within comic books, how this has influenced the feminist ideologies present in many comic books published within the last decade, and how these comics play a significant role on the cognitive and social development on young readers, specifically influencing ideas about gender roles and imposing social expectations on young girls. This poster will look at the demographic information of comics through history, in the context of the social or ideological conditions at the time, discuss the importance of empowering female representation, and analyze the this representation in the comics Y: The Last Man, Batgirl of Burnside, and Thor (2014).

Mathematics

57. Gilmore Girls and Instagram: A Statistical Look at the Popularity of the Television Show Through the Lens of an Instagram Page

Presenter(s): Brittany Simmons
Advisor(s): Dr. Sandy Oliver Lopez

After going on the Warner Brothers Tour in December of 2015, I created an Instagram account for the television show Gilmore Girls. This account, which started off as a way for me to create edits of the show and post my photos from the tour turned into something bigger than I ever could have imagined. In just over a year, I have over 55,000 followers. On the account, I post content including revival news, merchandise, and edits of the show that have been featured in Entertainment Weekly, Bustle, E! News, People Magazine, Yahoo News, & GilmoreNews.

I created a dataset of qualitative and quantitative outcomes from my posts from December 2015 to April 2016, and September 2016 to November 2016. This includes a total of 671 different posts. I am interested in analyzing data for each post including outcomes such as number of likes, number of comments, number of views, caption type, and type of post (video or picture).

My primary research questions are:

- Does the caption type affect the number of comments received?
- Does the type of post affect the overall interaction (the number of likes, comments, and video views) from my followers?

I will use statistical methods that I learned in my Math 203 Introduction to Statistics course to describe the dataset and to conduct tests of hypotheses for each of my research questions.

Peace Studies

58. Stereotypes and Portrayals of the Poor

Presenter(s): Beck Wilson
Advisor(s): Dr. Lisa Leitz

In order to understand how stereotypes about the poor are being perpetuated and the effects that they can have on attitudes and public policy, I conducted a review of existing literature on the subject. Literature has examined the ways in which positive coverage of the homeless in the 80s has given way to harsher portrayals in more recent years (Buck et al. 2004, Pascale 2005, Shields 2001). In addition, trends have been found that whites, men, and

political conservatives are more likely to support restrictive measures on those who are homeless (Lee et al. 1991, 2004; Toro & McDonell 1992), with evidence that educational backgrounds have mixed results due to boosting tolerance while dually reducing support for economic assistance (Phelan et al. 1995). With a past focus on research done to understand the reasons and nature of homelessness, future research calls for a greater emphasis on prevention in order to affect policy. Thus, my future research will focus on stereotypes and portrayals of the poor in Orange County and the ways in which they affect legislation and civic community leaders.

Pharmacy

59. Development of an EDB-FN Targeted Peptide for a Chemotherapy Drug Conjugate for Prostate Cancer

Presenter(s): Katarina Falero
Advisor(s): Dr. Rakesh Tiwari

Prostate cancer is the most common cancer among men, after skin cancer, but it is often successfully treated if it is detected early. Current methods to identify prostate cancer are not efficient and often detect benign forms as cancerous. Efforts were made to develop a peptide that can be used to detect prostate cancer in a more accurate and less invasive way. Extradomain B of fibronectin (EDB-FN) is a specific kind of fibronectin that is found to be a known marker for prostate cancer. EDB-FN is associated with tumorigenesis and angiogenesis, and can be targeted using a peptide. Previous research of a fluorescently tagged peptide had an affinity for EDB-FN and depicted how fluorescence intensity directly correlated with an increased Gleason score. The peptide, CTVRTSADC was synthesized using fmoc-tbu solid-phase peptide synthesis and purified using a preparative-High Performance Liquid Chromatography (prep-HPLC). The mass of the purified peptide was analyzed and found to be 954.374 da to confirm complete synthesis of CTVRTSADC and characterization using a Matrix Assisted Laser Desorption/Ionization – Time Of Flight (MALDI-TOF) mass spectrometer. Purified CTVRTSADC was then cyclized with 10% DMSO in water and stored for further research. Development of the prostate-specific peptide CTVRTSADC was successful and could be used for conjugation of an anticancer drug.

Political Science

60. Are Americans Scared Of Muslim Immigration? Why Where You Live In The US Can Determine That.

Presenter(s): Yousef Al-Fassi
Advisor(s): Dr. Ann Gordon

I examine support or opposition to Muslim immigration in correlation to geographic location. Where does the most fear of Muslims immigration reside in the United States? Other variables such as age, religion, and amount travelled will also be looked at. There is a wave of anti-Muslim rhetoric in the news helping incite fear in many citizens. My hypothesis is that the further you are from the coasts or major city the more fearful you are of Muslim immigration. Lack of exposure as well as strong beliefs can be a definitive factor. Whether there is a distinct connection between

which state you are in and the level of fear you have will be key in proving my hypothesis. Although there will be other sources, the majority of the data will come from the Chapman University Survey of Fears.

61. Partisanship and Fear of Terrorism

Presenter(s): Jake Bishop
Advisor(s): Dr. Ann Gordon

Terrorist groups carry out horrific attacks that harm and kill innocent citizens almost every week worldwide. These attacks incite fear no matter how powerful a person may be, because terrorism affects everyone. Citizens, interest groups, and politicians all have different responses to terrorist organizations and how to handle their fears. Attitudes change, policies are affected, and political parties shift their ideologies to please their electorate. Using data from Chapman University's Survey on American Fears, I looked at the correlation between political ideology and fear of terrorism. The survey finds that there is a strong correlation between the two and that generally the more conservative a person is, the more afraid of terrorism they are. This follows with previous research done on political ideology and fear of terrorism. Previous research shows that Americans become more conservative when they are afraid of terrorism, are more likely to trust a male Republican during times of terror, and that Republicans "own" issues of national security. This knowledge allows for an exploration into factors that affect these attitudes, such as gender roles, the media, political party history, and much more. Interesting findings includes stereotypes of Republicans and Democrats, the affects of fear on the 2016 election, and the way different emotions such as anxiety and fear affect voters differently. This research is on the forefront of understanding not only how voters' fears affect politics, but also how politics affect voters' fears.

62. Defining Women's Empowerment

Presenter(s): Kayla Brons
Advisor(s): Dr. Crystal Murphy

What does it mean to be an empowered woman? The humanitarian development buzzword has been deployed across the globe and has been used as a device to promote and garner support for various causes, from microfinance to education to cash transfers. While each project claims to achieve women's empowerment, there is much discrepancy between how each endeavor utilizes the term to justify its endeavors and collect supporters. This project analyzes how the semiotics of empowerment are used in the cash transfer domain, through an analysis of impact evaluations to show that the term is often conceptualized as a process of increasing freedom and choice, but how this is expressed ranges. Changes in intra-household relations, enhanced positions in society and increased bargaining power are a few examples, but to understand the term within these assistance contexts is to acknowledge that there is no universal recipe for empowerment. This creates a dilemma for people interested in seeing women gain power: what shall practitioners count to affirm that empowerment occurs? The project illustrates a multifaceted picture of women's experiences with cash transfer programs through a snapshot of findings from Dr. Crystal Murphy's research in South Sudan.

63. Man v. Nature: American Fears of the Environment

Presenter(s): Hannah Brower
Advisor(s): Dr. Ann Gordon

This paper will explore how fearful Americans are about the state of the environment and how concerned they are with a plethora of environmental issues, including air pollution, water pollution, and global warming. Relying on the Chapman Survey of American Fears data on the environment, I will examine how fearful about an environmental issue an individual is and how their age, income, education level, preferred news channel, and political party affiliation correlate with their level of fear. I expect to find strong correlations between younger people, Democrats, those who prefer liberal news providers, people with higher incomes, and people with a college education, and a higher level of fear about the environment and environmental issues. Building on previous research the relationship between political party affiliation and preferred news outlet and fear of environmental issues, Democrats who watch more liberal news channels receive more expose to environmental issues instilling the importance and fear. Younger people are more likely to have to deal with the serious consequences of environmental abuse I suspected them to be more fearful of environmental issues. When money is scarce and families live paycheck to paycheck or do not know where their next meal may come from it seems as though environmental issues would be less relevant. Environmental issues are complex and often hard to understand, individuals who have received a college education will have a better understanding of the serious threat environmental issues lend to the planet and the future of human kind leading these individuals to have more fear about the environment. Ultimately, this research exposes how fear drives individual's political decisions.

64. A Shot in the Dark: Public Opinion on Gun Control in the United States

Presenter(s): Mollie Cameron
Advisor(s): Dr. Ann Gordon

Gun violence is a leading cause of death in the United States. The present study uses data from the Chapman Survey of American Fears where people were asked about how afraid they are of the government regulating firearms. It will be compared to data regarding gender, age, political party, race, education, and location. This will help to provide an in-depth exploration of who is in favor of gun control and why. In the United States right now there is an overwhelming support for moderate gun control, even by current gun-owning citizens. It is important to focus on the public opinion present in this topic and why there has been no legislative action. There are many contributing factors - lack of research on gun violence, special interest groups and their influence in elections, and political activity of the gun rights population. Gun violence as a topic of research is blocked from any federal funding, without this understanding it is impossible to create effective gun safety legislation and have a public and political understanding of the impacts.Throughout this study the different factors of political identity, gender, age, location, political involvement and more will be examined and related to the gun control movement. By analyzing who is afraid of firearm regulation, it is possible to find ways to get out of the standstill that the United States is facing with gun safety.

65. The Man Behind the Curtain: Who is Really Pulling the Strings?

Presenter(s): Josie Chan
Advisor(s): Dr. Ann Gordon

Did a member of Senate filibuster a bill because of an influential billionaire behind the scenes? As politics continue to play a huge part in everyone's daily lives, whether we realize it or not, the general public's fears of the government continue to grow stronger. Whether it is trepidation that the government is filled with corrupt, yet highly influential officials, or that regular civilians lack privacy due to drone usage by governmental agencies; the general public has genuinely started to fear the government.
According to Chapman's Survey of American Fears, about 60.5% of those who participated in the survey, were either afraid or very afraid of corrupt government officials. Income is a huge factor related to whether or not the general public is more likely to be afraid of corrupt government officials; the rich compared to the poor. This brings up the larger question of distrust towards the government. If those who are wealthy are less likely to be apprehensive towards the government compared to the poor, what does this mean for the future of our democracy? The present study examines which factors are influential towards the general public's distrust and fear of the government, specifically, corrupt government officials.

66. Your Greatest Fear Has Been Realized: The End of the World

Presenter(s): Blake Crandall
Advisor(s): Dr. Ann Gordon

I plan to identify the role of religion, age, political ideology, and education in the fear of the end of the world. I hypothesize that those who have a religious background, conservative ideology, and higher education will be less fearful of the end of the world. You will be blown away by the other factors that play into this fear. Hollywood, scientists, and various religions all have different narratives of how the world will end. But how do you think it will end? The second coming of Jesus Christ? World War 3? A giant meteor hitting the earth's core? Or the exhaustion of our natural resources leading to human extinction?

After taking a religious class here at Chapman, it was interesting to learn about how different religions view life, death, and the end of the world. With the use of the Chapman University Survey of American Fears (2016), I have found that 30.6% believe that the world will end as outlined in the Bible and 27.7% believe that the world will end due to a natural disaster. However, only 7.6% believed that the world will end in their lifetime. This topic is very important because the meaning behind it is that tomorrow is never promised. The world can end at any time and it is important that we live each day to the fullest and always try to become the best version of ourselves. We may not know for certain how or when the world will end, but we can choose what to believe.

67. Does My Vote Matter? Placing Trust in the Democratic Process

Presenter(s): Ben Field
Advisor(s): Dr. Ann Gordon

Understanding the voting behavior of certain communities allows for a deeper comprehension of the institution of democracy and its broader effects on sections of society. Myriad studies have analyzed voting behavior and the correlation between assorted demographic groups and for whom or what they vote for. One important factor that

is presupposed but not always analyzed is the idea that people believe their vote matters. It is one thing to vote on an issue based on religion, age, gender, etc. but the concept of one's vote and its consequence is a question that is constantly met with dubiety by distrusting voters who feel that the system is rigged against them.

I believe that by analyzing trust in the democratic process through demographics and utilizing data from Chapman University's Survey on American Fears and the National Election Study the research will show that people belonging to lower socioeconomic classes, minority groups, or other marginalized communities are more likely to distrust the democratic process and in turn, believe that their vote does not matter. Ultimately, it is my belief that people who do not earn a hefty salary or are constantly marginalized do not feel that their vote matters as their place in political society is skewed by a governmental apparatus that values wealth and prestige over hard-working minorities. In turn, this leads to a feeling of insignificance and the pernicious creation of a skeptical attitude towards the politicians and legislation that are supposed to be representative of one's interests.

68. The Impact of Abortion Views on Public Opinion of the Supreme Court

Presenter(s): Robert Heins
Advisor(s): Dr. John Compton

Abortion has long been considered one of the most controversial topics the United States Supreme Court has ruled on. My research examines how one's opinion on abortion impacts their view of the United States Supreme Court. This analysis will show how much of an impact one policy stance has on the public's overall view of a much larger institution. To analyze my question, I will utilize American National Election Studies Time Series data from the years 1976, 1988, and 2016. These years will allow me to study the role abortion plays in crafting opinion of the court before the politicization of and at the height of pro-life activism. I hypothesize that being pro-life will cause a more negative view of the Court and the strength of this correlation will decrease when abortion is less of a political issue. Utilizing regressions and controlling for variables such as ideology and political knowledge, I will analyze if there is a relationship between one's abortion views and their feelings towards the Supreme Court.

69. Who's Afraid of the Big Bad Bot? The American Fear of Technology in the 21st Century

Presenter(s): Callan Keeter
Advisor(s): Dr. Ann Gordon

The growth and integration of new technology into lifestyles worldwide have many Americans asking questions about privacy and security. Although there are high rewards at stake for governments, corporations, and individuals who embrace technological changes, the risks of these developments are also at the forefront of people's thoughts. Using the recent data of the Chapman University National Survey of Fears, I examine correlations and means to determine the specific populations in America that fear technology. I go on to detail possible causes of this fear using the available research on the subject. As we move forward further into the 21st century, we encounter a world where businesses can track your web browsing habits and sell that data, where Eric Snowden has exposed the invasive policies of the NSA, and where robotics and AI are advancing at unprecedented rates. The American fear of technology holds more weight with every passing year. The findings of this research show that the elderly and lower income American is most likely to hold fears about technology, and that those fears come from lack of experience with reliable or advanced technology.

70. The End Is Nigh: A Dissection of the Correlation Between Fear of God and Fear of Climate Change

Presenter(s): Roanan Keldin
Advisor(s): Dr. Ann Gordon

The environment is in turmoil. The actions the U.S. have taken in climate change negotiations are motivated by public fear. It is necessary to dissect the public perspective on climate change to understand what exactly causes people to be aware of this pressing issue. One of the primary factors that shapes this perspective is religious affiliation. There exists a positive relationship between fear of religion and fear of climate change. Those that have a strong, consistent faith (fear of a god) tend to have a stronger fear of climate change compared to those that do not have a religious affiliation (do not fear a god). I will explore the underlying reasoning behind this correlation and the factors that motivate religious people to be more afraid of climate change. I will additionally dissect the negative effects of looking at such topical issues with a religious lens. As each day passes, the need to raise public awareness on environmental issues heightens. The only way to save the planet and make our earth a sustainable place to live is to identify why some are more afraid of climate change than others. The data provided by the Chapman University National Survey of Fears, indicates a positive correlation between fear of religion and fear of climate change.

71. In God we Trust, but Who Else? Public Distrust of Government

Presenter(s): Audrey Lane
Advisor(s): Dr. Ann Gordon

This paper evaluates the correlation between religion and public's distrust in government. I looked at previous research and reviewed articles focusing on distrust of government. Previous research I found there were few articles discussing religion influences on public distrust in government. My paper evaluates objectively the impact religion has on the public's distrust of government. The correlation between religion and distrusting government has not been truly explored, making my paper unique. Some of the data sources I use are Chapman University National Survey of Fear and the American National Election Studies 2012. The surveys collected information from thousands of participants and is a strong sample of the population. The paper uses information from different published journal articles, evaluating trust in government. With this paper I attempted to link the dependent variable, trusting the government, with the independent variable, one's devotion to faith. Analyzing survey data I found the numbers were statistically significant. Not only were the variables statistically significant there was also a correlation found between the two variables. This research is extremely exciting because researchers never looked at religion's impact on public's distrust.

72. Shaping What Counts and Gets Counted: Discourse and Disruption within M&E of Cash Transfer Models

Presenter(s): Atty McLellan
Advisor(s): Dr. Crystal Murphy

The global aid industrial complex is replete with competing agendas for providing international assistance. State and non-state actors involved have different ways of managing, evaluating, and distributing scarce resources. Cash transfers are growing in popularity as a way for governments, NGOs and donors to help the Global South, but efficacy claims derive from very different research questions with different evaluations of what is considered a

"successful" program. Although there is inconsistency within these evaluations, the results have the ability to garner material support and reify those constructs of success ahead. This poster explores the contested sites within the measurement and evaluation of cash transfers. The critical meta-analysis of cash transfer research presented here summarizes trends in the metrics and the discursive terms being used in evaluations, and seeks to point out that there is little consensus when saying that a program is "successful." The analysis not only interrogates the utility of several surveillant metrics, but also illuminates how little attention has been paid to the feedback of recipients of the interventions. The paper concludes with an outline of the possibilities presented by qualitative, inductive analyses of beneficiary views of the tools. Narratives by beneficiaries of World Food Program's largest cash transfer intervention to date in South Sudan, demonstrate the value of local perspectives.

73. The Secret Users Guide for Liberals, Independents, and Conservatives to Win the White House: Demographics and Political Ideologies

Presenter(s): Cassandra Medina
Advisor(s): Dr. Ann Gordon

I consider that understanding political ideology is of most importance but we must consciously understand the demographics behind it. I will be approaching this issue by looking at the set of demographics that range from gender, income, education, ethnicity, religion, and age. While observing if these demographics influence party identity, ideology, and strength of partisanship in these cases. The key issues that I am focusing on, how do certain demographics influence the party ideology that a person chooses? Utilizing cross-national level data from the 2012 ANES election study I will be analyzing multivariable, and frequencies to be able to assets if any correlations can be made by the variables. I regard this as extremely important into considering closing this deep divide between parties. I believe that the demographics will show a correlation, additionally, income will have little influence in regards to being able to make a connection between these factors. The results of the research will simply indicate that demographics will influence the party identity, ideology, and strength of partisanship. Furthermore, I evaluate and consider that support from previous findings will indicate that demographics variables do cause influence.

74. Proliferating a Culture of Fear: Islam in a Post 9/11 America

Presenter(s): Setareh Motamedi
Advisor(s): Dr. Peter Simi, Dr. Ann Gordon

The threat of terrorism perceived by the American public has been shaped by a series of traumatic events over the past decade. In the years following the attacks of September 11, 2001, fear of terrorism has extended beyond the threat of terrorist groups. Much of the American public considers not only terrorist groups like al-Qaeda, but the entire religion of Islam to be a security threat. In much of this security discourse, ideas of hatred, violence, and terror have become associated with Islam. This study explores that association, and aims to identify what motivates existing stereotypes. Drawing on research from the Chapman University Survey of American Fears, we will analyze responses to suspicion and public approval of increased security, in order to evaluate the relationship that exists between fear and the religion of Islam. We will consider the perceived nature of Muslim people among the American public, and the stereotypes which have contributed to the construction of Islamophobia. Though Americans are divided in their feelings towards the religion of Islam, there does appear to be a strong connection between the fear of terrorism and trust in Muslim people.

75. You Are What You Read: Or Are You?

Presenter(s): Christopher Nelson
Advisor(s): Dr. Ann Gordon

Your political ideology is determined by the medium in which you consume your news. This has become a common thought process throughout the development of different methods of information distribution. Yet, how true is this commonly held belief? Despite the repetition of this uncontested argument, little truth lies in the fact that your medium of choice determines your political preference. It is often assumed that those who choose to receive their information through online news sources are more likely to be more liberal, since it's assumed that an impending liberal bias exists across online media. The same thought process applies to the print and radio medium, where the converse is in affect. Those who are more likely to read print and listen in order to receive their information are more likely to identify with a more conservative political ideology. Similarly, this common notion is completely fictitious, and the medium in which you consume your news has little to no affect on your political ideology. The research presented in this paper demonstrates major reasons as to why the medium in which you use to consume your news has no effect on your political ideology.

76. Democracy At Stake: Is New Media Harming Voter Turnout?

Presenter(s): Ryan Shiri
Advisor(s): Dr. Ann Gordon

The consensus of research literature dealing with the usage of new forms of news outlets and their affects on voter turnout rates has shifted overtime from having no clear correlation into having a slight positive correlation. Originally, the research about media usage and voter turnout was unclear and showed no evident correlations. In the 1990's and early 2000's, most research assured the fact that new media outlets, like the Internet, had become a huge source of news content for many citizens, however there was no evidence of a strong correlation between those new news outlets and voter turnout rates. However, by the 2008 and 2012 presidential elections, new research arisen and depicted a positive correlation between new media outlets, particularly with social media and internet usage proving to increase voter turnout. Even poor sources of news content like facebook feeds and negative political advertising still proved to strengthen overall voter turnout.

Regardless, most of the data sets conducted, even the relatively new research can be considered out of date when factoring the sheer amount of data from the most recent presidential election which is not completely aggregated nor analyzed. In fact, most data sets of research were conducted prior to the 2012 election which does not properly represent an accurate illustration of social media's influence on voter turnout recently; especially with how rapidly social media has grown as a source of news outlet in the past five years. This paper will examine the usage of varying news outlets, from radio to cable to apps, and thereby compare their effects on voter turnout. The paper will uniquely present comparisons of varying news sources, depicting which source as the most likely to enhance voter turnout. Knowing which news outlets spur the greatest rates of voter turnout can be critical for maintaining high levels political participation; an imperative feature of any proper democracy.

77. Too Much Democracy?: Trends in American Public Opinion of Israel

Presenter(s): Alexander Thomas
Advisor(s): Dr. Ann Gordon

This paper analyzes the factors that influence the American electorate's support of Israel using data gleaned from the 2016 American National Election Study. Americans have formally recognized the state of Israel since 1948, starting 11 minutes after it declared its independence. Since then, American foreign policy has consistently endeavored to create and maintain a strong Israeli state in the Middle East. However, there is general agreement among foreign policy experts that such one-sided support for Israel has been both economically as well as strategically costly. According to experts, such support has at times contradicted the broader foreign policy goals and general national interest of the United States, and hinders the possibility of lasting peace in the Israel-Palestine region. However, public opinion has demonstrated overwhelming support for a strong Israel over the past 60 years. Although evidence suggests that the base of American support of a strong Israel has shifted over the past decades, it remains a majority, largely bipartisan stance. Situations such as this test the effectiveness of American democracy: what is to be done when majority public opinion goes against national interest? The findings of this paper will be instrumental in predicting the futures of American-Israeli relations as well as American foreign policy in the Middle East.

78. Within Boundaries: Who Will Get What and Why.

Presenter(s): Elizabeth Tostado
Advisor(s): Dr. Ann Gordon

There will always be the issue of distribution; who gets what and how much each individual should receive. This paper will utilize data from the 2012 American National Election Survey (ANES) to discuss the relationship between individuals level of support toward paid leave in the workplace. I am essentially addressing public opinion in regards to workfield policy and how certain demographics play into it. Demographics that will be closely paid attention to are income level, gender, single-parent, race, party identification, and education. There will be special attention placed on gender and how it bounds an individual to certain assigned benefits or needs in the work field. My focus on gender roles is due to the fact that it continues to be something assigned by society which works toward dictating the structure behind the distribution of benefits. The data analyzed in the ANES survey will point out the areas within the workfield that have the most public support and those that do not. For instance, there is quite a bit of evidence that demonstrates how one's gender determines the benefits assigned within work-family policy which is important because it alludes to the gender inequality still faced by individuals in society today. In the end, the results will either support or oppose whether or not gender inequality as well as other demographics take a toll on public opinion concerning the workfield and essentially questioning whether the United States is really as progressive as it portrays to be.

79. Living in Fear: Terrorism & Everyday Life

Presenter(s): Courtney Trott
Advisor(s): Dr. Ann Gordon

The terror attacks on September 11th changed the way Americans live; the attacks changed the sense of security Americans cherish and it targeted the very freedoms and liberties that separate the United States from other equally developed democracies. Terror attacks, by their very definition, aim to instill just that- terror or fear in the day-to-day lives of the communities and people that they target. This project studies not just the level of fear that Americans have surrounding terrorism, but examines the relationship that exist with heightened fear of terrorism and the behavioral and lifestyle changes that people make as a result of this fear. The aforementioned factors will be considered as they correlate to the level of fear of terrorism among the people surveyed in the Chapman University Survey on American Fears. It is important to gage the different characteristics that relate to increased and decreased fears of terrorism, because this information speaks to where information and more specifically what information is reaching particular areas of our population. The lifestyle and behavioral changes that result from increased fear of terrorism is an important inquiry, especially as the scope of the threat or the perceived threat increases, thus impacting even more areas of daily life.

80. The "Informed" Opinion: Education as a Determinant of Party Identification

Presenter(s): Gautama Unni
Advisor(s): Dr. Ann Gordon

My research paper explores the relationship between education and political ideology, specifically asking whether the quality and level of education obtained by an individual has a causal influence on his or her political ideology and self-assessed position on a left-right spectrum of political ideology, in the context of the United States.

Given the contemporary political landscape of the United States, exploring the influences of the American individual's political perspective rises in importance. The divisiveness of the American political landscape is exemplified by disagreements over controversial issues. Prominent among the many social factors that might influence these diverse opinions is political ideology, which can create umbrellas of common thought. However, in the political landscape of American democracy exists two such umbrellas of ideology that dispute the other on the majority of political questions. One of the more prominent factors affecting an individual's alignment to either of these positions is education.

Most findings, such as those of Dunn (2011), and Weakliem (2002), show a leftward shift in political ideology with a corresponding increase in education, while other studies, such as those of Meyer (2016), Bauer et al. (2015), actually question the empirical nature of such studies, pointing out potentially overlooked but relevant factors to this study. An example of this causal connection is the promotion of individualist values by some higher education institutions, values characteristic of a liberal ideology.

The present paper attempts to find a direct causal link from education to a tendency toward either end of the U.S. political spectrum, using data provided by the American National Election Study as well as the Chapman Survey of American Fears, while trying to account exogenous and endogenous factors that might affect this connection.

81. Dread in The Domestic Sphere: How Economics, Divine Law, and Education Fuels Fear

Presenter(s): Gabrielle Wolcott

Advisor(s): Dr. Ann Gordon

Domestic abuse, whether emotional, physical, sexual, or psychological, is explored in this paper in relation to its association with the demographics of those reporting their levels of this fear, in comparison to their other fears. I investigate the relationship between level of education and this fear of domestic violence, while also considering other important variables that could cause this fear. The focus is to analyze whether or not level of education and domestic abuse have a positive correlation. Previous research has shown that the correlation between education level and fear of domestic violence is statistically significant. The variables considered other than education are age, gender, religious affiliation, income, and whether or not those answering have children in the home. My hypothesis is that the highest level of domestic abuse will be found in less educated, less wealthy, more religious, younger female participants without children. The present study relies on studies done in these various areas, but focuses on the findings of the Chapman University National Survey of Fears.

Psychology

82. Effects of an Over-Bearing Parenting Style

Presenter(s): Laura Eiselman

Advisor(s): Dr. Steven Schandler

Over-bearing parenting, also known as “helicopter parenting” has become more prevalent in the United States. Helicopter parents often hover over their children and are there to resolve any problems that a child may have. This over-involvement in a child’s life has been shown to have detrimental effects to a child’s mental health, overall well-being, and their ability to be independent. It has been shown to cause higher levels of depression, anxiety, and decreased life satisfaction. The objective of this thesis was to understand the effects that helicopter parenting has on children. It was hypothesized that when a child is subjected to helicopter parenting they are more likely to have psychological harm and harm to their well being. Recent empirical studies were reviewed and assessed on the topic of over-bearing parenting. Overall, the studies supported the thesis hypothesis. When a child is subjected to over-parenting, they often do not have much freedom and are not able to learn from their mistakes and make their own choices. They become very dependent on their parents, which has negative outcomes. Parents often believe that the more support they provide for their child, the more they will succeed. However, they do not realize that negative outcomes that are actually coming from this over-involvement. It is causing children to lack self-efficacy, independence, and have low autonomy. Children notice these effects as they grow and try to gain independence without their parents. Future research should focus on life factors that cause these parents to feel the need to be overly-involved.

83. The Effects of Well-Being on Physical Activity

Presenter(s): Samantha Goulding, Michelle Nguyen
Advisor(s): Dr. Julia Boehm

Previous research has suggested that positive psychological well-being is associated with both engaging in healthier behaviors and overall improved health outcomes; however, the data supporting whether well-being directly causes these beneficial health behaviors is lacking. Thus, this research study aimed to determine if manipulating states of positive psychological well-being could produce an increase in the healthful behavior of physical activity. Adult community members participated in a three-week intervention, along with both a one-week and one-month follow up survey, in which the self-reported minutes and intensity of physical activity were assessed. Participants were randomly assigned to one of three conditions (optimism, positive emotion, or neutral control) with related written tasks designed to invoke the specified state of well-being. Questionnaires relating to participants' weekly physical activity habits were given at baseline, immediately following the intervention, at a one-week follow-up, and at a one-month follow-up. We hypothesized that minutes of physical activity performed would increase after the intervention for participants in the optimism and positive emotion conditions, compared to participants in the control condition. However, we did not find any significant differences in physical activity based on condition. Further data needs to be collected for more statistical power to detect statistically significant differences.

84. The Effects of Temperature on Perceived Social Attitude

Presenter(s): Aylin Gann
Advisor(s): Dr. Connie Shears

Describing a person as cold hearted, having cold feet, or giving a cold shoulder all denote feeling distant from another individual. However, these terms suggest that the individual is inherently cold. What are temperature's effects when we have sudden, temporary thermal change? This study investigated the connection between thermal change via tactile and environmental manipulations. Previous research shows that change in temperature leads to changes in how we close we feel to another person (Huang, Zhang, Hui, and Wyer, 2013). Participants enter a room temperature room and complete an IOS scale, which is a measure of social distance, in regards to another participant. Then participants are randomized to experience either a warmer, colder, or neutral temperature either through the temperature of the room or through a handheld hot/cold pack. After experiencing the temperature, the participants complete the scale again and complete a writing activity. The number of words is measured for social engagement to denote the participant's verbosity and willingness to stay and share their thoughts. Results showed a significant effect for the number of words written, F (4, 179)= 5.582, p<.004. Individuals wrote the most words when experiencing a colder temperature and the least words when experiencing warmer temperatures. Since this refuted the hypothesis, a post hoc analysis was conducted of the content that participants wrote. The writing was categorized as writing positively, negatively, factually, or with mixed emotions. There was a significant effect showing that when participants write negatively, they would feel closer to their partner, F (4, 179)= 1.937, p=.078. This raises questions for further investigation into whether temperature has an effect on more complex social dynamics, such as how much we are able to pay attention and if we are influenced to collaborate with another individual.

85. Optimal Visual Search Elements in Small Scale Map Design

Presenter(s): Steven Karrmann
Advisor(s): Dr. Connie Shears, Prof. Claudine Jaenichen, Dr. Steven Schandler

The redesign of elements in visual information improves retention of complex information (Jaenichen, 2011). Analyzing which design elements, such as color or symbols, result in the optimal processing and retention of information allows for precision in redesign. In a study, (n = 120) undergraduates were given a series of maps and tasks created to test the efficiency (speed) and effectiveness (accuracy) of colors and symbols in small scale map design as opposed to pre-existing elements (non-colored and numerals). After completing 10 tasks for a fictional baseline map (non-colored and numerals), participants were given a new set of tasks and the same map with either color or symbols introduced while the other element remained constant. Next, participants answered another set of tasks while using either the original Chapman University map or a revised map with both colors and symbols. Retention was measured when all participants were given a set of tasks a day later with the same maps they received the previously. Analyses show both the colored and symbolized fictional maps as significantly increasing the speed at which the maps were processed and tasks were completed, while only the symbolized map improved accuracy. The colored map has not resulted in improved response speed or accuracy when compared to its symbolized counterpart. There is no significant difference between the newly-designed and original Chapman maps in either speed or accuracy of response, either immediately or after a delay. We see that just because two elements increase speed and accuracy separately, does not necessarily mean they further augment speed and accuracy together. These results highlight the importance of design element analysis in information design. While these findings may be of only regional or temporal importance, they do illustrate that optimal elements exist for design scenarios and should not be neglected when seeking to redesign.

86. Hemisphere Differences for Negative Emotions

Presenter(s): Hye Rynn Lee, Samira Amirazizi, Kelsey Leavy, Lucie Jerome
Advisor(s): Dr. Connie Shears

The right hemisphere (RH) may process emotions more adaptively than the left hemisphere (LH) (Borod, 1992). More recent data has found this is not always the case. Borkenau and Mauer (2006) showed hemisphere advantages were dependent on emotion – inferencing of unpleasant words occurred in the RH and inferencing of pleasant words occurred in the LH. Moreover, Sauter, (2010) suggests individual perspectives on emotions can influence the formation of inferences. Shears et al (2015) found that if readers classified pride as a negative emotion, they did not form comprehension-based inferences from emotional language, if readers classified pride as a positive emotion, then they formed the inference. Considering readers have individual perceptions of potentially negative emotions (pride, boredom, awkwardness, regret, sympathy, resentment), we hypothesized hemisphere differences would reflect participants' personal perspectives. That is, we expected the RH to form more inferences for negative valences than the LH. Positive valences may show more LH inferencing. We presented simple English stories conveying these weird emotions in the center of a computer screen. After each story, four target words were displayed one at a time to either the left or right side of the computer screen. Readers made key press responses indicating whether the word had been in the stories. Half the words were in the stories and half the words were related to possible inferred information but not in the stories. Response times and accuracy were measured. Results indicate readers' individual perceptions influenced inferences. These findings are consistent with a RH advantage

for inferencing and demonstrate the importance of perception of valence. If one perceives sympathy as a positive emotion, then perhaps the LH will draw comprehension-based inferences.

87. The Relationship between Cortical Levels of Amyloid and Cognition

Presenter(s): Hye Rynn Lee
Advisor(s): Dr. Steven Schandler

Dementia, which affects a large population of the elderly community, results in cognitive decline and behavioral problems. The decline in working memory hinders the individual's ability to function on a daily basis. Among patients with dementia, those with severe symptoms of cognitive dysfunction are diagnosed with Alzheimer's disease. Research on neurodegenerative disorders (i.e. Alzheimer's disease, Parkinson's disease, Lewy Bodies, Huntington Disease) is still evident in the field of psychology and science. One plausible explanation to the diagnosis of neurodegenerative disease is the amyloid cascade hypothesis, which states that the buildup of amyloid-beta (Aβ) delays neuronal communication in the brain. While many research studies have supported the amyloid cascade hypothesis, there also have been many research studies that refuted the theory. The objective of this thesis research was to observe the relationship between the levels of Aβ and cognition. It was hypothesized that an adult with a high level of amyloid present in selective areas of their brain will show a decline in working memory and cortical atrophy than those with low level of amyloid. Empirical studies were researched and reviewed to analyze the thesis hypothesis. These studies tested the cognitive decline in elderly individuals (over the age of 65) using various cognitive assessments. The findings from the empirical studies provide mixed support for the thesis hypothesis. Studies have shown a direct association between levels of amyloid and cognition; however, other studies indicated not all elderly participants were diagnosed with cognitive impairment as they aged. Further empirical research on cognitive decline in the elderly community is needed to examine other possible influences on the diagnosis of neurodegenerative diseases.

88. The Effect of Grandparent Involvement on Infant Cognitive Development

Presenter(s): Gage Peterson
Advisor(s): Dr. Laura M. Glynn

Relatively little is known about the effects of grandparent involvement in child care, on child developmental outcomes. A few studies have examined the effects of grandparent care on socio-emotional and cognitive development, with mixed results. Several of these studies have documented positive associations between grandparent involvement and child academic outcomes in certain socioeconomic contexts (Augustine & Raley, 2012; Pilkauskas, 2014). The current study examined the effect of grandparent involvement in child care on infant cognitive development, with the hypothesis that grandparent involvement would be associated with enhanced infant cognitive development. The sample included 83 socioeconomically and ethnically diverse mother-infant pairs drawn from an ongoing prospective, longitudinal study of infant development. Mothers reported on grandparent involvement in child care when the infant was 6 and 12 months of age, and infant cognitive development was assessed at 12 months of age with the Bayley Scales of Infant Development, Third Edition (BSID-III; Bayley, 2006). Infants who received child care from their grandparents exhibited more advanced cognitive development ($M = 108.54$, $SD = 10.92$) as compared to infants who did not receive child care from their grandparents ($M = 104.06$, $SD = 10.04$), $t = -2.01$, $p = .04$. Demographic variables such as cohabitation with the child's father, maternal age, maternal ethnicity, and household income did not account for these effects. This finding suggests that grandparent

involvement may positively contribute to child developmental outcomes. Possible pathways which may mediate these effects are explored and discussed.

89. The Effects of System Justification and Social Dominance Orientation on the Temporal Discounting of Climate Change

Presenter(s): Gage Peterson
Advisor(s): Dr. Steven Schandler

Within the current political landscape, environmental issues such as global climate change are not without their controversies. Though novel relative to other physical sciences, climate and environmental sciences demonstrate opportunities within and beyond their formal disciplines to shape our ecological legacy. The fields of social psychology as well as environmental psychology, with its various subdisciplines including conservation psychology, ecopsychology and human ecology among others, promise relevance to political and social decision-making regarding our environmental health. This thesis isolates and examines factors affecting an individual's perceptions of climate change and its associated risks. Specifically this project examines the implications that social and ideological variables have on the temporal discounting of climate change. It was hypothesized that if an individual has high system justification relating to the current economic system or high social dominance orientation, then they will discount the future of climate change at a higher rate than an individual who has low system justification relating to the current economic system or lower social dominance orientation. The hypothesis was tested by locating and analyzing existing research within the fields of psychology and climate sciences. The thesis hypothesis was supported. The findings indicated that individuals with high system justification discounted climate change more than those with low system justification. There was a significant relationship between system justification and social dominance orientation, as well as a demonstration of social dominance orientation being a significant predictor of climate change denial. Overall, the findings show both system justification and social dominance orientation contributing to the discounting of climate change, with higher system justification and social dominance orientation corresponding with a greater discounting of such events.

90. Treatments of Trauma in Veteran Populations

Presenter(s): Sarah Rabin
Advisor(s): Dr. Steven Schandler

Recent wars have refocused public attention on the damaging effects of traumatic events, including increased risk for developing traumatic stress disorders, such as posttraumatic stress disorder and military sexual trauma. Members of the military are more susceptible to developing these trauma-related disorders than individuals who experience other trauma. Military personnel and veterans face a unique set of mental health challenges. Determining the most effective treatments for trauma disorders is crucial for the lasting health of active duty military personnel and veterans and for reducing the associated costs to society. Current evidence-based treatments, prolonged exposure therapy (PE), cognitive processing therapy (CPT) and imagery rehearsal therapy (IRT), are exposure-based therapies that involve patients reliving their traumas. While these therapies have been proven effective, reliving trauma can be counterproductive to healing and can cause patients to have their progress stunted and even terminate treatment. This thesis research compared PE, CPT and IRT to newly developed non-exposure-based therapies, like holographic reprocessing (HR) and renew therapy, which do not require reliving traumas. It was hypothesized that non-exposure-based therapies would be more effective in treating trauma

disorders in veterans than exposure-based therapies. Recent empirical studies were reviewed using meta-analytical techniques. The effectiveness of trauma disorder treatments in veterans was studied by comparing pre- and post-treatment changes in clinical trauma symptoms. Overall, the findings supported the hypothesis. However, the power of the findings was limited by the absence of substantial literature associated with the only recent development of non-exposure-based treatments. Future research should compare exposure-based and non-exposure-based therapies to precisely determine their short- and long-term effects on veterans. This would provide the most effective method for determining exactly which therapies are best suited to addressing trauma disorders in veterans.

91. Colour Blind: Race Representation in the Media

Presenter(s): Tonicia Williams
Advisor(s): Dr. Steven Schandler

The construct of race permeates almost every aspect of the society in which we live. Representations of race and ethnicity in various media forms can influence how we think of ourselves and other people and has real-world impacts. The objective of this thesis was to compare how White and non-White people are represented in different forms of media. Based on the history of race and ethnicity throughout the world and unequal distribution of power as it relates to who controls the media, it was hypothesized that non-White or coloured people would be more negatively represented in the media as compared to White people. Recent studies from various psychological databases were reviewed analysed. These studies observed race, ethnicity or other forms of minoritized groups related to race and ethnicity (e.g. religion) in the media. Findings overwhelming supported the hypothesis. Mixed findings or refuting findings typically found that if people of colour were not represented more negatively than White people, then they were accurately represented or represented as negatively as White people, providing weak refutation for the hypothesis. Studies typically focuses on differences between Black and White people and almost all studies come from a Western perspective. Future research is needed to focus on a range of races and ethnicities, non-Western perspectives and will consider the intersection of identities such as being a Black woman or a gay, Asian man.

Religious Studies

92. Islamophobia and Religion: Which Religions Fear Islam Most?

Presenter(s): Ahmad Al Bunnia
Advisor(s): Dr. Ann Gordon

It is evident today that the second largest religion in the world constitutes a noticeable fear in many Americans hearts. With no justifiable answers and negative bombardment by the media, some Americans have sought matters into their own hands causing some Muslims to fear for their lives in a country that was supposed to provide refuge from oppression. The religion of Islam has raised many questions all over the continent with limited variations of answers. Using the Chapman University Survey of American Fears (2016), the purpose of this paper is to quantitatively examine the data provided in an attempt to offer some answers to the big question of the causation of Islamophobia. By looking at which religious group is more Islamophobic than the other, a dimension to the big question might be revealed. This research paper will depend on multiple variables that will act as the indicator of

the level of Islamophobia in an individual, such as “Increased police in Muslim neighbourhoods”, “Cease all Muslim immigration” “Muslims are more likely to engage in terrorist activity than non-Muslims”. Through examining the following variables, I will present a conclusion on which religion(s) is more islamophobic and the possible reasoning behind that.

Software Engineering

93. Assassins Mobile

Presenter(s): Michael Brutsch, Abby Atchison, Daniel Cole, Jerry Martin
Advisor(s): Dr. Michael Fahy

Mobile applications are released daily, but many don't reach the entertainment value that they strive for. With Assassin's Mobile we aim to create an Augmented Reality Experience inlike any other. Assassins Mobile is based off the real life game of Assassins, in which players are assigned a target that they must hunt down and eliminate from the game, while being hunted down themselves. The catch is that the you, the player, would only know the identity of of your target, not who is hunting you down. Once you eliminate your target, whoever they were hunting becomes your new target and so on. Through the developers environment Android Studio we aim to create a digital recreation of Assassins on your mobile device. Through GPS data we will be able to track player's locations to a high degree of accuracy and display it visually on a map. When arriving within a certain radius of your target they will become visible and you will be able to see your target on your phone and strike against them, eliminating them from the game. With a simple game concept we hope to deliver to an untapped source of entertainment on the mobile app market.

94. PiHosting

Presenter(s): Brett Swan
Advisor(s): Dr. Michael Fahy

The purpose of my project is to utilize a Raspberry Pi as a $35 web server for hosting my personal website with the possibility of hosting multiple sites on the same machine through Apache virtual hosts. Through the process of configuring my web hosting system I'm learning about port forwarding, registering a domain name, connecting it to my home network's IP address, and getting additional experience with HTML and CSS.

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Quick Reference – Student /Poster # Session I

Poster Session II

Abstracts

Graduate Students

Communication Studies

1. **Social Media for Good? A Survey on Millennials' Inspirational Social Media Use**
   Presenter(s): Sophie Janicke, Anja Seng, Ava Narayan
   Advisor(s): Dr. Sophie Janicke

There is no doubt about the extensive use of social media by the millennial generation, but the study of the effects of such use is only at its infancy. Therefore, the current study sought to examine the effects of inspirational social media use for the millennial age group. This work is important because inspiration and associated self-transcendent emotions have been shown to predict well-being and prosocial behavior (i.e., Thrash et al., 2010; Lai, Haidt, & Nosek, 2014). Four primary questions guided our investigation: (1) What personality traits and viewer characteristics are associated with inspiring media consumption? (2) What does inspirational social media and online video content look like? (3) Does inspiring social media and online video use predict prosocial behavior? and (4) Is inspirational social media and online video consumption associated with well-being? To address these questions, we conducted an online survey recruiting overall 116 students from the millennial generation (Mean age: 19.95, SD = 2.11). The survey first measured potential personality predictors of inspirational social media use such as virtues of transcendence and humanity, need for affect and cognition, and spirituality. The second component consisted of questions assessing overall social media use and, more specifically, inspirational social media use. Lastly, we measured the extent to which their feelings and actions reflected prosociality and well-being as a result of inspirational social media consumption. As we predicted, our results indicated that gratitude, categorized under the virtue of transcendence, and spirituality, were strongly associated with exposure to inspiring social media. Furthermore, inspiring social media and online video use was associated with prosocial behavior as well as awe, gratitude and positive energy as indicators of well-being. Results are discussed in relation to inspirational social media use, prosociality and well-being for the millennial generation.

Food Science

2. **Garlic Paste Greening as Influenced by Water Activity and Pyruvic Acid Formation**
   Presenter(s): Brenda Hernandez, Alan Baquero Cedeno, Rashi Bhatnagar, Jennie Monfried
   Advisor(s): Dr. Lilian M. Were

Greening of garlic cloves, paste, and powder is a major quality concern during processing and storage of garlic as commercial utilization and economic value are reduced. A potential solution to reducing the unwanted greening of garlic products is by decreasing the water activity of the product. The strong interactions between sodium chloride (NaCl) and water can prevent the hydrolysis reaction of sulfoxides (alliin and isoalliin) and the enzyme alliinase to occur. Following hydrolysis, thiosulfinates and the byproducts, pyruvic acid and ammonium, undergo non-

enzymatic reactions that produce blue and yellow pigments leading to greening development. The rate of color change of acidified garlic paste at different water activities was investigated by increasing NaCl concentrations from 0%, 5%, 10%, 15% to 20% during cold temperature storage for 35 days. A difference of 0.08 water activity was observed between the control and 20% salted garlic paste. Greening (-a*) values increased rapidly in the control until day 7 and decreased thereafter. In all salted samples, greening increased slowly and decreased after day 14. Garlic paste with 10% and 15% NaCl exhibited the highest rate of greening, whereas control showed the lowest. While the addition of NaCl delayed the intensity of greening when compared to the control, all salted samples presented the same greening pattern where greening rate peaked at day 14 while the control peaked at day 7. Pyruvic acid was not detected in any of the samples, which could have been attributed to the rapid reaction between pyruvic acid and pigment precursors to produce a yellow color. The addition of NaCl in garlic paste did not entirely reduce the greening development and rate as expected. Subsequent studies should consider factors such as storage conditions, and improve sampling and garlic paste preparation for a better determination of the effects of NaCl in garlic greening.

3. **Postharvest Quality and Physiology of 'Fuji' Apples subjected to phytosanitary Irradiation**
   Presenter(s): Nasim Kheshti, Alan Baquero
   Advisor(s): Dr. Anderson Melo, Dr. Anuradha Prakash

Irradiation is an effective treatment to sterilize and destroy insect pests on fresh fruit. It serves as an alternative to cold treatment and to fumigation which are time consuming and ozone depleting, respectively. In this study, the postharvest quality of Fuji apples was evaluated after irradiation at 400 Gy and 800 Gy. The quality of the apples which were stored at 1˚C for 7 days to mimic ground transportation and distribution and then at ambient temperature for another 7 days to mimic retail storage and consumer use, was assessed. Irradiation caused an immediate decrease in firmness by 12% at 400 Gy and by 38% at 800 Gy; this difference remained throughout storage. Electrolyte leakage was higher (P<0.05) in the 800 Gy apples as compared to control and 400 Gy and malondialdehyde content was higher at the end of day 15 for 800 Gy. Irradiation initially elevated respiration rate by 27% at 800 Gy and 15% at 400 Gy. During storage at cold temperature there was no significant difference between control and 400 Gy while 800 Gy continued to be significantly higher. In contrast, ethylene decreased by 29% at 800 Gy and 18% at 400 Gy one day after treatment. During storage at room temperature, ethylene levels increased significantly in the control and 400 Gy, and remained constant and significantly lower at 800 Gy. The increase in respiration rate was not reflected in quality parameters such as internal color, browning index, total soluble solids, sugar content, organic acids, titratable acidity, polyphenol oxidase, and total phenolics, none of which were affected by irradiation. Irradiation at 400 and 800 Gy did not affect postharvest quality of the Fuji apples and could be used as an alternative to fumigation or cold treatment.

4. **Screening of Aflatoxins, Ochratoxin A, and Deoxynivalenol in Dry Pet Foods Using Enzyme-Linked Immunosorbent Assay**
   Presenter(s): Tara A.Okuma
   Advisor(s): Dr. Rosalee S. Hellberg

The United States pet food market is growing, and contaminants, such as mycotoxins are a food safety concern. However, there is a lack of research regarding the prevalence of mycotoxin-contaminated pet food. The study objective was to perform a market survey of dry pet foods and treats marketed for dogs, cats, birds, and rabbits

using enzyme-linked immunosorbent assay (ELISA) to detect and quantify total aflatoxins, ochratoxin A (OTA), and deoxynivalenol (DON). A total of 58 pet foods containing grain-based ingredients were purchased from retail stores in Orange County, California. Samples were finely ground and mycotoxins were extracted using 80% acetonitrile for aflatoxins and OTA or deionized water for DON. ELISA was performed on all samples in duplicate using commercial kits from Helica Biosystems, Inc. (Santa Ana, CA) and Neogen Corporation (Lansing, MI). Results were analyzed with a Molecular Devices SpectraMax M2e multi-mode microplate reader (Sunnyvale, CA) using SoftMax® Pro, version 6.4 and 4-parameter logistic curve fit. OTA and aflatoxins were detected in 2% and 3% of the 58 samples tested, respectively, however, none were above regulatory limits. DON was detected in 47% of the samples, with 16 samples having quantifiable levels of DON above the regulatory limit for grains and grain by-products for non-cattle and chicken animals. Bird and rabbit food products made up 75% of the 16 samples, and one rabbit food sample contained detectable levels of both OTA and DON. Overall, this study revealed that mycotoxins are detectable in dry pet foods, some of which may lead to adverse health effects in animals. Dog and cat food products had trace levels of mycotoxins, indicating that these foods may be less of a mycotoxin contamination concern. However, food marketed for birds and rabbits may require additional scrutiny to ensure safe levels of mycotoxins, specifically DON.

5. **Agaricus Bisporus Effect on Lipid and Protein Oxidation Products in Salted Bovine Top Round Muscle Myofibrillar Proteins.**
   Presenter(s): Luz Rivera, Natalie Tom, John Butz
   Advisor(s): Dr. Lilian Were

Lipid and protein oxidation products in bovine myofibrillar proteins (MP) were investigated in the presence of Agaricus bisporus mushrooms infusions (25, 50, 100 mg/mL) with added salt (0 or 0.1815%). To monitor the effect of mushrooms on lipid oxidation, malondialdehye (MDA) was measured using thiobarbituric acid reactive substances assay, while the effect of mushrooms on protein oxidation was monitored through changes in thiol (λEX 350 nm, λEM 400-500 nm) and tryptophan fluorescence (λEX 280 nm, λEM 340–345 nm) over 10 days of storage. The extraction for MP, probably resulted in no lipid present in the MP samples, as there was no lipid oxidation MDA product detected. There was a decrease in tryptophan fluorescence with increased storage time, however, there was no significant difference between the treatments and the control with the addition of mushrooms in MP, suggesting that, added mushroom did not promote or lower tryptophan oxidation. The reduction of thiol content was however significant in the MP sample with 100 mg/mL of mushrooms and salt compared to the control. The presence of salt in the samples significantly reduced thiol content, while MP with 50 and 100 mg/mL of mushroom infusions without the addition of salt inhibited the reduction of thiol content. These results suggest that high concentrations of mushrooms without added salt can reduce thiol oxidation in myofibrillar proteins. The results also suggested that mushrooms can decrease protein oxid.

6. **Greening-Induced Oxidation of Sunflower Butter Cookies as a Function of Temperature and Vegan Egg Replacers**
   Presenter(s): Amanda Rogers
   Advisor(s): Dr. Lilian Were

Sunflower seed butter is an alternative plant-based butter to the commonly allergenic peanut and tree-nut butters on the market. Sunflower butter can be an additional source of antioxidants, however, 70% of sunflower butter's phenolic compounds are chlorogenic acid (CGA). This CGA covalently binds to sunflower proteins in moist and

alkaline pH, causing protein denaturation and green pigmentation to occur. The resulting green color limits the use of sunflower butter in baked goods. Moisture was varied in sunflower butter cookies by use of various baking temperatures (168.2°C and 190.6°C) and egg replacers (egg (control), chia seeds, flax seeds, and banana). Moisture, greenness (-a*), and CGA content were determined. Cookies made with egg and baked at 162.8°C were 4.09% more moist, 3.62 times more green, and had 5.80 times less CGA than cookies made with banana and baked at 190.6°C. LC-MS was used to confirm the formation of CGA-protein adducts at m/z 700. Tryptophan (excitation of 280 nm, emission from 300-400 nm) and Schiff base fluorescence (excitation of 350 nm, emission from 400-500 nm) was normalized to the treatment with the highest fluorescence emission. Of the three egg replacers, cookies made with banana had the highest tryptophan fluorescence intensity, an indication of the lowest protein oxidation. When moisture is decreased, reactant mobility decreases so sunflower butter cookies undergo less greening. Less greening indicates higher free antioxidant CGA and protein content. Ultimately, cookies with less moisture have higher quality in color and nutrition.

7. **Concentration of Listeria Monocytogenes in Skim Milk and Soft Cheese through Microplate Immunocapture**
   Presenter(s): Steven Rogers
   Advisor(s): Dr. Rosalee Hellberg

The objective of this study was to determine the efficacy of microplate immunocapture as an alternative to traditional enrichment steps for concentrating L. monocytogenes to detectable levels. L. monocytogenes Types 1 and 4 were grown to levels of 10^0 to 10^6 CFU/ml and used to optimize the process of microplate immunocapture in broth, skim milk, and queso fresco samples. Following microplate immunocapture, the concentrated bacteria was streaked onto PALCAM agar, followed by incubation at 37 °C for 24 ± 2 h. The concentrated bacteria also underwent DNA extraction using the boiling method, followed by real-time PCR. The optimized method was tested in triplicate with each broth or food sample. L. monocytogenes was detected on PALCAM with starting levels as low as 10^0 CFU/mL in broth, 10^2 CFU/mL in skim milk, and 10^4 CFU/mL in queso fresco. Real-time PCR enabled identification of the pathogen at levels as low as 10^0 CFU/mL for all matrices tested. Overall, microplate immunocapture shows high potential to reduce the time required for detection using traditional methods, with concentration of L. monocytogenes to detectable levels within 1-4 hours. Further optimization and incorporation of a short enrichment step may increase the sensitivity of this method.

Health & Strategic Communication

8. **Perceptions of the Medical Marijuana Culture: An Exploratory Study**
   Presenter(s): Jacob Lopez, Juliette Atchekzai, Alexa Ferrante, Natinee Phornthanavarsit, Rina Sano
   Advisor(s): Dr. Michelle Miller-Day

In the United States, the number of medical marijuana patients is rapidly increasing in the US with currently more than two million patients with medical recommendations for legal marijuana use. The purposes of this study will be to qualitatively explore the attitudes and beliefs of legal medical marijuana users regarding medical marijuana use and explore legal users' perceptions of how the normalization and legalization of marijuana use have shaped the current "marijuana culture" in the US. There has been remarkably little research on how marijuana users interpret the ambiguous messages surrounding medical marijuana. A focus group interview was conducted with medical

marijuana users to explore their perceptions of the marijuana culture in the US. Results of the focus group interview will be analyzed and overarching themes will be reported with direct quotes provided to illustrate the findings from the participants' points of view.

Undergraduate Students

Biochemistry and Molecular Biology

9. **Effect of (WR)4KW as a Novel APE/Ref-1 Redox Inhibitor**
   Presenter(s): Sarah Chong, Shirley Fong
   Advisor(s): Dr. Sun Yang, Dr. Keykavous Parang

Human cutaneous melanoma is a distinctive cancer that has been marked by its high incidence rate in recent years, making this disease a rising public health concern. Malignant melanoma has been characterized by chronic oxidative stress and abnormal redox-regulated signaling pathways, both serving as important contributors to its pathogenesis. Down-regulation of APE/Ref-1, a multifunctional protein that serves as an adaptive response to reactive oxygen species (ROS) and reactive nitrogen species (RNS), has been shown to significantly reduce the metastatic potential of melanoma cells and increase susceptibility to chemo-treatment. APE/Ref-1 is uniquely sensitive to changes in intracellular redox activity and, therefore, its expression can be affected by the presence of ROS. It functions as a modulator of many nuclear transcription factors and maintains intracellular redox status. As such, APE/Ref-1 is a suitable drug target. Collaborating with Dr. Keykavous Parang (CUSP), we have successfully developed a novel APE/Ref-1 inhibitor (WR)4KW, which contains five tryptophan, four arginine and one lysine attached to a succinic acid. Results indicate promising anti-melanoma activities in vitro (IC50 value is 17μM) with this inhibitor. Notably, (WR)4KW sensitized human melanoma cells to low-dose cisplatin treatments and Western Blots demonstrate inhibited expression of APE/Ref-1 in a dose- and time-dependent manner when (WR)4KW was used as treatment. APE/Ref-1 levels were reduced to 14% of the control when cells were exposed to (WR)4KW at 50uM for 72 hours. Consistently, RT-PCR analysis showed that (WR)4KW treatment significantly decreased APE/Ref-1 mRNA level in melanoma A375 cells. Using a fluorescence probe H2-DCFDA which detects the generation of ROS intermediates in cells, we found that intracellular ROS levels were increased significantly after (WR)4KW treatment.

10. **Antithrombotic Potential of a Novel Tripeptide Isolated from Vious Snake Species: A Review of Literature**
    Presenter(s): Nicole Choy
    Advisor(s): Dr. Daniel Wellman

Thrombosis, or the coagulation or formation of a thrombus within a blood vessel, affects more than 900,000 individuals in the United States alone. Considered a public health concern by the Center of Disease Control, thrombosis (also referred to as deep vein thrombosis or coronary artery thrombosis depending on the location of the clot), or complications associated with the condition (such as pulmonary embolisms, coronary artery disease, or ischemic strokes), is responsible for 60,000 to 100,000 deaths in the United States every year. However many

anti-thrombotic agents available on the market have many high-risk side effects such as an increased risk of hemorrhaging. A novel anti-thrombotic agonist was isolated from the venom of various snake species. Identified as a tripeptide consisting of pyroGlu-Asn-Trp (pENW), several research studies have exhibited its effectiveness in inhibiting coagulation in both in vivo and in vitro models. Furthermore, all available research on pENW's anti-thrombotic properties have shown its effectiveness as comparable to anti-thrombotic agents currently on the market, with significantly decreased risks of hemorrhaging. The articles used in this review were obtained through a comprehensive literature search of various databases such as PubMed and ScienceDirect and the reference sections of selected literature. This is the first review of its kind, collecting all of the available research studying pENW and its anti-thrombotic effects in order to streamline and clarify the available research for further research into the production of a potential anti-thrombotic agent. The purpose of this research is intended to compile all available studies available on pENW's anti-thrombotic properties, which presents itself as an effective anticoagulant without the increased risk of hemorrhaging, in order to streamline further investigation of pENW, its mechanisms of action, and its potential drug development.

11. Association Between Cancer Exosomes and Prostate Field Cancerization

Presenter(s): Philip Pytak
Advisor(s): Dr. Marco Bisoffi

Field cancerization is the process where cells adjacent to adenocarcinomas experience molecular, genetic, and biochemical changes, including an over-expression of specific proteins. Field cancerization is viewed as a pre-malignant histological state. Tumor multifocality in the prostate has been associated with field cancerization, though the mechanism of this association is currently unknown. Identifying specific biomarkers of field cancerization and any of its causes would allow for clinical detection of tumor-adjacent tissue susceptible to tumorigenesis, potential targets in cancer therapy, and better grading and staging assessments of prostate cancer. Potential biomarkers for field cancerization in the prostate are exosomes: cell-secreted vesicles used for cellular communication, based on the hypothesis that exosomes secreted from tumor foci may prime nearby tissue for tumorigenesis, inducing field cancerization. In this work, markers for exosomes and field cancerization, such as CD9, CD63, and FASN, were detected with specific antibodies in human LNCaP prostate cancer cells. Specific detection was ensured by including isotype matched unspecific primary antibodies as negative controls. Our results set the stage for future work, in which we will determine the association of expression for CD9 and makers of field cancerization, such as EGR-1 in human tissue microarrays containing tumor, adjacent, and "disease-free" samples.

12. Structure Activity Relationship Studies of a Diarylpentanoid that Induces Reactive Oxygen Species in Prostate Cancer Cells

Presenter(s): Rima Sanyal
Advisor(s): Dr. Marco Bisoffi, Dr. Justin O'Neill

Prostate cancer, or prostatic adenocarcinoma, has been shown to thrive on the high concentrations of androgen secreted by the testicular and adrenal glands. Curcumin analog and diarylpentanoid ca27 (5-bis(2-hydroxylphenyl)-1,4-pentadien-3-one) has been shown to induce reactive oxygen species (ROS) which have been shown to down regulate the androgen receptor in prostate cancer cells and thus impede tumor progression. Curcumin, ca27, various other analogs with a hydroxyl (OH) group at different positions (ortho-meta-para) on the aryl rings, and analogs of ca27 without any OH groups or Michael acceptor groups were used to treat LNCaP prostate cancer cells

to determine the amount of ROS induced. LNCaP cells were incubated in black 96-well plates with the compounds at multiple concentrations alongside DMSO as a control and hydrogen peroxide as a standard ROS. ROS induction was determined via dichlorofluorescein (DCF) mediated fluorescence and glutathione (GSSG/GSG) detection assay. DCF data was normalized using Hoechst dye. Our data shows that the presence of Michael acceptors and the position of OH groups determine the potential of diarylpentanoids to induce ROS and down-regulate the androgen receptor. It was found that ca27 and c58 induced the highest amount of ROS due an OH group at or near the ortho position, while analogs without a Michael Acceptor and or any OH groups produced the least. It is expected that our structure activity relationship (SAR) studies will identify pharmacophores that can be used in further drug development efforts towards a therapeutic strategy against prostate cancer.

13. **Investigating the Molecular Mechanism of Inhibiting Epithelial to Mesenchymal Transition in Pancreatic Cancer Cells Treated with a Combination of Pomegranate Juice Extract and Caffeine**
    Presenter(s): Dina Zangwill
    Advisor(s): Dr. Melissa Rowland-Goldsmith

Pancreatic cancer is the fourth leading cause of cancer death in the US with the overall five-year survival rate approximately 8%. Non-surgical treatment for pancreatic cancer is limited partially by resistance to chemotherapy and the ability of these cells to metastasize. During the initiation of cancer cell metastasis, cells undergo epithelial to mesenchymal transition (EMT) in which cells lose their adhesive properties. This allows cells to migrate and invade other tissues. Previous research in our laboratory showed that the combination of Pomegranate Juice Extract (PJE) and caffeine inhibited pancreatic cancer cell invasion. This project studied how the combination treatment regulated the EMT promoting proteins (SNAI1, SLUG, and AJUBA). SNAI1 and SLUG are transcription factors, while AJUBA is a helper protein for SNAI1. All three proteins must operate in the nucleus to promote EMT. Since these proteins function in the nucleus, a Nuclear and Cytoplasmic Extraction Kit was used to isolate both cytoplasmic and nuclear proteins from cancer cells treated with or without the combination. Samples were analyzed using immunoblots. It was hypothesized that cells treated with the combination would lead to down-regulation of all three proteins in the nuclear extract. Immunoblot results show that both AJUBA and SLUG are down-regulated in the nuclear extract by the combination treatment therefore blocking EMT. The immunoblot results for SNAI1 are inconclusive. In addition, a protein used initially as a control for the experiment, Heat Shock Protein 90, was down-regulated by the combination treatment. Literature states that this protein should not be found in cells undergoing apoptosis. These novel results support the idea that this combination treatment can induce cancer cell apoptosis. With such poor long-term survivorship for pancreatic cancer, an effective combination dietary therapeutic could be instrumental in both extending life and improving quality-of-life for those patients affected by this disease.

14. **Temperature Regulation of Methanogenic Activity and Expression in Peatlands**
    Presenter(s): Zachary Ellis
    Advisor(s): Dr. Jason Keller, Dr. Marco Bisoffi

Peatlands, a specific type of wetland characterized by highly organic soils, are very important in the global carbon cycle. These ecosystems store approximately one-third of the total terrestrial soil carbon and are an important global source of the greenhouse gas methane (CH4). Peatlands are characterized by water-saturated soils with little to no oxygen. Previous studies suggest that under these anaerobic conditions, decomposition utilizes methanogenesis to break down organic carbon into inorganic CH4. Recent evidence suggests that temperature

plays a critical role in methanogenic activity and the expression of the mCRA methanogen gene. To investigate the effect of temperature on anaerobic microbial decomposition and methanogenic activity in Minnesota peatlands, soil samples were incubated at 5C and 18C and the CO2 and CH4 production was monitored and compared to mCRA gene expression over a 12 week period. Preliminary results suggests that temperature plays a critical role on methanogenic activity, evidenced by the greater amount of CH4 produced and mCRA gene present in the 18C compared to the 5C samples.

Biological Sciences

15. **Direct Temperature Effects on Humic Substance Reduction in a Northern Minnesota Peatland**
    Presenter(s): Jessica Rush, Emily Hanna
    Advisor(s): Dr. Cassandra Medvedeff Zalman, Dr. Jason Keller

Peatlands are important wetland ecosystems that store one-third of the global terrestrial soil carbon. Peatlands also release significant amounts of the potent greenhouse gas methane to the atmosphere with important consequences for the global climate. During microbial decomposition, microbes rely on varying terminal electron acceptors (TEAs) which affect the proportion of carbon dioxide and methane in peatland soils. Recent studies have shown that microbes can respire compounds found within the organic matter (i.e., humic substances) and that this process suppresses methane production. Our study explores direct temperature effects on greenhouse gas production (carbon dioxide and methane) and humic substance reduction in soils collected from a northern Minnesota peatland at 10-20 cm, 75-100 cm, and 175-200 cm depths. Samples were either chemically reduced using palladium pellets and hydrogen gas or biologically reduced by the active microbial community. We measured greenhouse gas production and humic substance reduction in soils incubated anaerobically at either 5 °C or 18 °C for 6 weeks. Humic substance reduction was not a dominant process at the shallow depth (10-20 cm); however, this process was important at the deeper depths (75-100 cm and 175-200 cm). Furthermore, at deeper depths soils incubated at 5 °C exhibited decreased rates of humic substance reduction, longer suppression of methane production, and lower capacity to accept electrons relative to soils incubated at 18 °C. Taken together, we conclude that temperature does play a direct role on humic substance reduction in a northern Minnesota peatland. Understanding how temperature affects humic substance reduction is crucial in understanding how the ongoing climate change will affect peatlands and subsequent greenhouse gas production.

16. **Effect of Whole Ecosystem Warming on Dominant Methanogenic Pathways in a Minnesota Peatland**
    Presenter(s): Carson Tinucci
    Advisor(s): Dr. Jason Keller, Dr. Cassandra Medvedeff Zalman, Glenn Woerndle

Peatlands are important ecosystems in the global carbon cycle, storing one-third of the total terrestrial soil carbon and producing the potent greenhouse gas methane as a byproduct of microbial decomposition. Methane is produced through the acetoclastic (acetate splitting) and hydrogenotrophic (reduction of carbon dioxide using hydrogen) pathways. Fractionation, a process that affects the relative abundance of stable isotopes, occurs when methane is produced, and can be used to identify the dominate pathway of methane production. There is more fractionation of carbon in the acetoclastic pathway than in the hydrogenotrophic pathway. Furthermore, the

dominant pathway of methane production, and corresponding isotope fractionation, have been shown to vary with depth. This study explored the effect of approximately two years of whole ecosystem warming on the dominant pathway of methane production in a peatland located in northern Minnesota (USA). Soil cores were collected from ten experimentally warmed (0-9 degrees C above ambient temperature) plots and were sectioned into various depths (30 cm, 50 cm, 75 cm, 125 cm, and 200 cm) in the field. Soils were then incubated anaerobically for four days and methanogenic pathways were determined using cavity ring down spectroscopy to quantify the isotopic signatures of methane and carbon dioxide. Preliminary data suggest that dominant methanogenic pathways are highly variable within the profile, across temperature gradients, and within the growing season. As the global climate continues to change, understanding how increasing temperatures may affect methane production is vital.

17. **The Mechanism Between Hagfish Slime Exudate And Seawater**
    Presenter(s): Dylan Blumberg, Ramteen Rafii
    Advisor(s): Dr. Douglas Fudge, Dr. Kevin Jagnandan

Hagfish are well-known for their ability to produce vast amounts of slime from specialized glands, allowing them to escape from predatory attacks. The exudate is comprised of two components, mucus vesicles and thread skeins. The precise mechanism in which the exudate interacts with seawater to produce the slime is unknown. To understand this mechanism, we observed slime formation under controlled conditions with a high-speed camera. We studied the interaction between the two components of hagfish exudate with seawater, and how it is able to entrap such large amounts of water in a complex web of fibers. We hypothesized that mucin vesicles swell and burst as the thread skeins unravel to form a complex network that entraps the water via viscous entrainment. Fresh exudate was extracted from an anesthetized hagfish and transferred to a tank that had a constant flow of water. As the exudate was put into the tank, we recorded the interactions of slime exudate with flowing seawater using a high speed camera filming at 240 fps. The amount of slime formation was measured from the video and compared to the flow rate of the seawater. The mechanism can then be examined on a frame by frame basis, specifically to observe how the mucus vesicles, thread skeins, and seawater interact on a macroscopic level. We then observed the interactions under a dissecting microscope. The dissecting microscope provided pictures of the mucus vesicles, thread skeins, and seawater interaction at a microscopic level. The macroscopic and microscopic images of the exudate and seawater interaction were analyzed between slime formation and flow rate, to identify the key component of the mechanism. The results of this experiment can be applied to a multitude of different fields including medicine as a clotting agent, food science as a hydrogel, and textiles as a synthetic thread.

18. **How Do Hagfishes Move in Burrows?**
    Presenter(s): Stacey Zuppa, Lauren Friend
    Advisor(s): Dr. Douglas Fudge

Hagfish are jawless marine pre-vertebrates who display unique locomotor capabilities by burrowing into the ocean floor and moving through tight spaces. They play a crucial role in benthic ecosystems and utilize their locomotor abilities to prey on benthic invertebrates, avoid predators, and feed on large carcasses. However, little is known about how they burrow and travel through tight channels. We investigated hagfish locomotion by observing the biomechanics of behaviors associated with burrowing and moving through tight spaces. A video camera was used to record the movements of hagfish at a frame rate of 60 fps from a dorsal view through a custom-built plexiglass chamber that mimicked various tunnel widths they may encounter in their natural habitat. At channel widths

considerably larger than the hagfish's diameter, the hagfish demonstrated the use of lateral undulation, with muscular waves travelling along alternate sides of the animal's body and generating swimming forces that propelled it forward. At smaller channel widths, the hagfish exhibited an "external concertina" behavior in which it adopted a wavelike morphology and used the chamber walls to brace itself and push forward. At the smallest channel diameters (i.e. equal to the hagfish's diameter), "internal concertina" patterns of movement were observed in which the body musculature took on a muscular wavy shape and braced against the walls within the loose skin of the hagfish. These results are consistent with research previously conducted on legless amphibians (i.e. caecilians), and implicates the flaccid subcutaneous sinus in the burrowing of hagfishes through narrow tunnels. This research provides insight into the behavior and ecology of hagfishes, as well as the evolution and biomechanics of burrowing in elongate animals.

19. Analysis of the Composition, Charge, and Mechanism of Swelling of Mucin Vesicles from Hagfish Slime

Presenter(s): Sara Siwiecki
Advisor(s): Dr. Douglas Fudge, Dr. Andrew Lyon

When under stress, such as predator attack, a Pacific hagfish (Eptatretus stoutii) releases slime as a defense mechanism. The slime is excreted rapidly and can temporarily clog the gills of a predator to allow the hagfish to escape. Hagfish slime consists of two types of cells: gland mucous cells that take in water and gland thread cells that hold the mucous cells together to form a fibrous gel. The mucous cells contain mucin vesicles that expand while taking in water to form the slippery gel component of the slime. The mechanism of formation of the slime in water is poorly understood. Previous research has suggested that mucin vesicles within the mucous cells undergo swelling to form slime via electrostatic repulsion between positively charged glycoproteins in the mucin vesicle. However, other data suggests that mucin vesicles are negatively charged. Because of these conflicting results, I analyzed the composition and charge of mucin vesicles using Atomic Force Microscopy, Zeta Potential and Dynamic Light Scattering, SDS-PAGE and native PAGE. I used Atomic Force Microscopy to image the swelling of the vesicles under various positively and negatively charged conditions. Zeta Potential and Dynamic Light Scattering was used to measure the mobility of a mucin vesicle while moving toward a positive or negative electrode. SDS-PAGE was then utilized to obtain protein weights of the mucin vesicles to allow for the charge to be calculated from the mobility measurements. Lastly, native PAGE was used to analyze mucin vesicle movement toward positive and negative poles in a gel. These experimental methods will give an indication of the charge of the mucin vesicles to better understand how mucin vesicles swell

20. Treating Ailments by Manipulating Microbes

Presenter(s): Diannia Demazeliere
Advisor(s): Dr. Jennifer Funk

Studies have shown that the microbiota can be used to cure obesity, increase dendritic and T cell activity as well as cause devastating diseases such as the black plague. There is a very delicate threshold for microbes that can make them harmful or helpful especially if they are opportunistic. Both model organism and human studies prove that microbes play a significant role in human nutrition and behavior. Likewise diet and environment determine which microbes are present and are in abundance. When these factors are manipulated, microbes inside and on the human body respond to this stimuli. This response can be used to treat ailments in the human body. This paper is

a review of previous studies to prove microbes can be manipulated through diet and environment to treat ailments in humans.

21. Heredity of Tameness in Common Loons (Gavia immer)

Presenter(s): Mina Ibrahim
Advisor(s): Dr. Walter Piper

Tameness is an important behavior in animals that measures the effects of human disturbance. Few studies have defined the main factors associated with intraspecific variations in tameness. An overlooked factor has been the possible evolutionary adaptation of tameness to promote survival and reproductive success. In this study we looked at similarities of tameness between parents and offspring in a population of common loons (Gavia immer) in Northern Wisconsin. Parent tameness was positively correlated with offspring tameness. This suggested that tameness in loons could be hereditary, enhancing their ability to cope with human disturbance via natural selection.

22. Density and Richness of Perennials on Alluvial Fan Topography

Presenter(s): Jayetha Panakkadan
Advisor(s): Dr. Melissa Rowland-Goldsmith

Alluvial fans are cone shaped deposits of sediment formed by the build up of streams and by the movement of water. Throughout the years, characteristics such as lobe shape, size, and vegetation of different alluvial fans have been studied. Similarly, in this study, transect and plot data were used to compare and analyze relative lobe ages and characteristics of the Springer/Zzyzx alluvial fans. The Springer/Zzyzx fans are overlapping fans located northwest of the Desert Studies Center in Zzyzx, California. Alluvial fan deposition in this area occurs only during major rain events which are irregular in the arid climate of the Mojave Desert. To look at relative ages of the lobes, desert varnish and pavement have been used as indicators. (Al Farraj and Harvey, 2000; Bull, 1977) Although previous work has been done on the Springer/Zzyzx fans, since alluvial fans are constantly changing, further studies could be helpful to determine vegetational, morphological, and erosional modifications. In this study, the different lobes of the Springer/Zzyzx fans were mapped and the density and cover of vegetation on each lobe was measured and analyzed. The fans consisted of four different aged lobes: the youngest (Qf4), intermediate (Qf3), old (Qf2), and very old (Qf1). Based on previous studies, it was hypothesized that the intermediate lobes (Qf3) of the Springer/Zzyzx fans will have a higher plant density compared to other lobes on the fans while the very old lobes (Qf1) would have the lowest plant density. It was also hypothesized that the distal portion of the lobes would have greater plant diversity because of higher water retention and nutrient availability.

Chemistry

23. Measuring the Photochemical Degradation of Oil in Seawater

Presenter(s): Daniel Chang, Tiffany Bui
Advisor(s): Dr. Warren de Bruyn

Salt Marshes are wetlands at the interface between terrestrial and marine ecosystems, and are key transformers of carbon as it is exported and exchanged in a number of forms including dissolved organic matter (DOM). Southern

California salt marshes are unusual in that they are often impacted by oil seeps. Little is known about the contribution of oil to the DOM pool in these systems. The goal of this project is to use optical properties of DOM to track the transformation of oil in these systems to help assess the contribution of oil to the DOM pool. A range of oil products dissolved in artificial seawater were irradiated for 6 to 8 hours in a solar simulator and optical properties of the solutions were monitored as a function of irradiation time. Optical properties include absorbance, fluorescence, associated indices, and three dimensional excitation emission matrix (EEM) spectra (excitation 400nm – 240 nm; emission 830nm-248nm). In general, fluorescence and absorbance decay exponentially with irradiation time and the higher density oils degraded faster than the lower density oils. The primary oil EEM peak shifts to longer excitation wavelengths and shorter emission wavelengths as the oil decays. In the future the effects of bacteria on the degradation rates of oil in seawater will be examined.

Communication Studies

24. Water Conservation Messaging, Views on Nature's Role, and Social Media Interactions
Presenter(s): Brennan Hobbs
Advisor(s): Dr. Kerk Kee, Dr. Yuhua Liang

In light of California's emergency drought situation that has been ongoing since 2011, the Strategic Environmental Communication lab studies what makes messaging and communication concerning water conservation effective. Previous studies conducted by the lab have identified common message strategies utilized in water conservation messaging and investigated which of those strategies are the most efficacious (Liang, et al., 2017). This study designed messages based on those findings and tested those messages through a survey with the goal of testing two competing hypotheses and one research question. The subjects were Chapman students. The first hypothesis is that subjects who believe that the drought is heavily impacted by natural causes will be made more angry by the messages than people who do not believe that the drought is heavily impacted by natural causes. Conversely, the second hypothesis is that subjects who do not believe that the drought is heavily impacted by natural causes will be made more angry by the messages than subjects who do believe that the drought is heavily impacted by natural causes. The research question is, what emotional responses to messaging (anger, threat to freedom, etc.) correlate with the likelihood of subjects interacting with a message on Facebook (by reacting, commenting, or sharing)?

25. Improving the Effectiveness of Water Conservation Message Impact on Facebook and Attitude towards Conservation
Presenter(s): Kiyoko Nakatsui
Advisor(s): Dr. Kerk Kee, Dr. Jake Liang

Since California has been colonized and become a state it has experienced an abnormally wet period in its climate. However, in the past decade we have experienced a drought that has left much of California with depleted fresh water resources. While there have been efforts to warn the public of the depleted stores, our ability to turn on the tap and have an abundance of clean fresh water at our finger tips made the efforts unsuccessful. Effective messaging and communication strategies must be created and disseminated in order to ensure more knowledge of efficient water use habits.

Three water conservation messages were displayed around campus and posted to Facebook during a water awareness event. At the conclusion of this event a survey was sent out to the student body to assess the effectiveness of the messaging. Through statistical analyses of the survey, the subject's propensity to view, react, or share the message on Facebook was analyzed. The subject's attitudes towards water conservation in accordance with how they pay their water bill were also examined. The results of the statistical analysis show the relation between different factors and how they influence the subject's attitude toward water conservation. The expectations of the results of this paper are to further influence the way in which water conservation messaging is presented to the public to be more effective.

26. A Healthy Dose of Media: Educating Parents About Positive Media Choices for Children

Presenter(s): Alexandra Hoffman, Nina Walther, Jillian Picado, Jennifer Wind, Cameron Stewart, Mary Russ

Advisor(s): Dr. Riva Tukachinsky

Previous research has found a relationship between common media practices and a variety of negative outcomes such as learning aggressive behaviors, fear, desensitization, increased risk of obesity, and sleep problems for children. To address this concern, a study was conducted to determine the efficacy of media literacy intervention aimed at increasing parents' knowledge in areas such as media effects, recommendations for media use, and general media knowledge. Previous media literacy programs have focused primarily on interventions for children whereas this program sought to educate parents. Parents of elementary school aged children at a local school in Orange County, California voluntarily attended the presentation. The researchers developed and presented a media literacy program. It consisted of a PowerPoint presentation applying existing knowledge on general media guidelines, statistics from past research studies on media effects, video clips illustrating harmful effects of violence/advertising and activities to engage the parents in learning how to make positive media choices. Parents attending the workshop were provided with take-home materials to discuss with their children and to establish future guidelines for the use of mediums and technology in their homes.

27. Judging Others and Yourself: Narcissism and Social Comparison Among Tinder Users

Presenter(s): Tyler Papera, Carsten Coombs, Lukas O'Connor, Alan Bagh

Advisor(s): Dr. Sam Dorros

The purpose of the study is to examine the use of mobile dating applications and individuals' levels of narcissism and social comparison. The research focuses on other social media sites such as Facebook, Instagram, and Twitter to prove the research questions in the literature review. Likert-type scales will be used for measuring both narcissism and social comparison while using online/mobile dating. A total of 217 individuals participated in the study by completing an online questionnaire and were recruited through word of mouth, email, and social media. The questionnaire examined 1.) seven items of narcissistic qualities, 2.) social comparison characteristics, 3.) the number of dating sites/apps used, 4.) preference of those sites/apps, 5.) and frequency of use of those sites/apps. Results showed that there was no significant difference in levels of narcissism or social comparison between men and women. Tinder users had higher levels of narcissism than non-Tinder users; however, levels of social comparison did not significantly differ between current Tinder and non-Tinder users. Finally, higher levels of narcissism were associated with higher levels of social comparison.

28. Pathways to Adopting Cyberinfrastructure (CI)

Presenter(s): Tyler Papera, Lydia Benjamin, Jamie McCain
Advisor(s): Dr. Kerk Kee, Andrew Schrock

The purpose of this research project is to create a website interface that clearly articulates pathways to adopting cyberinfrastructure (CI): the use of "big data," high-performance computing, and high-speed networks for collaboration on scientific projects. The Organizing, Communication, and Technology (OCT) research team interviewed technologists, scientist-developers, educators/liaisons, and administrators in the Extreme Science and Engineering Discovery Environment (XSEDE) academic community. Common practices of adopting CI were identified in order to establish credible methods used for implementing the technology within academic institutions. They were then categorized and simplified into different pathways for adopting CI and navigating institutional barriers. These pathways, illustrated by digital graphics, will be shown on the poster and as a web page on the OCT website. This web page can be utilized as a strategic tool to guide practitioners hoping to establish CI in their institution.

29. Tinder Usage, Addiction to Social Networking, and Their Relation to Mental Health Abstract

Presenter(s): Claire Underwood, Samantha Choy, Jackie Clark, Victoria Pazmany
Advisor(s): Dr. Sam Dorros

The purpose of this study was to explore the association between Tinder use and addiction to social media, and anxiety and depression levels, using the Uses and Gratifications Theory (Blumler & Katz, 1974) in predicting the relationship between Tinder usage and addiction to social media, as well as taking into account the levels of anxiety and depression. The survey included Addiction to Social Media Scale (SMDS) and Depression and Anxiety Scales, researchers aimed to create an assessment to help understand why and how people are affected by different types of media. A total of 217 individuals participated in an online questionnaire. They were recruited via email, in-person request, and through social media postings. The survey examined the participants' (1) usage of Tinder, (2) addiction to social media, (3) anxiety levels, and (4) depression levels, in order to identify the relationship each had with dating app usage. Results showed that higher levels of addiction to social media was associated with higher levels of anxiety and depression.

30. Online Dating Apps Impact on Relationship Contingent Self-Esteem and Self-Confidence

Presenter(s): Maya Vahid, Alyssa Ahle, Claudia Traina, Risa Homma
Advisor(s): Dr. Sam Dorros

The purpose of this study was to explore the associations between the use of mobile phone dating apps and individuals' level of perceived evaluation of their physical appearance and relationship success, as well as levels of relationship contingent self-esteem. Mobile phone dating apps have been increasing in popularity. Since its creation in 2012, Tinder has gradually increased in popularity with heterosexual singles (Timmermans & De Caluwé, 2017). A total of 217 individuals participated in a 20-30 minute online survey asking about their mobile phone dating app usage. Participants consisted of 27.2% (n = 59) male and 72.8% (n = 158) female between the ages of 18-50 years. The researchers expect that participants who use mobile phone dating apps will have higher levels of relationship contingent self-esteem (RCSE) as well as lower levels of perceived physical appearance on the PEI scale and lower levels of perceived relationship success on the PEI scale. Results indicated that people who currently use mobile

phone dating applications significantly differed from non-users in levels of their personal evaluation of relationship success. Individuals who do not use mobile phone dating apps had higher levels of PEI for relationships than individuals currently using mobile phone dating apps. All other results indicated no significant differences.

Computational Science

31. Understanding network based gaming by implementing the game of Battleship
Presenter(s): Rao Hamza Ali, Kevin Lisbin
Advisor(s): Dr. Michael Fahy

An online multiplayer game is a video game that can be played on any computer that is connected to a game server over the internet. Players play against each other on their own computers while the server does the job of sharing their moves and actions to others. Through this project, we explore the multiplayer gaming world by creating a multiplayer version of the popular Battleship game. The game server is always running and waits for players to connect to it. If two players have successfully connected to the server, a game of Battleship begins. We utilize the preexisting network libraries in the java programming language to build our server and player instances which communicate with each other via TCP. TCP, or Transmission Control Protocol, defines a set of rules that oversee the data transfer over the Internet. The use of this Internet Protocol results in a reliable connection between computers making our game more robust and error free. We also introduce a novel way of communicating moves and actions between players by adding additional procedures that aid in parsing and displaying each player's move to the other.

32. Examining Multi-Threading in Online Multiplayer Games
Presenter(s): Akash Arora, Chinmai Raman
Advisor(s): Dr. Michael Fahy

The purpose of this project is to examine multi-threading in online multiplayer games by creating our own network based game. Our game, Rock Paper Scissors Lizard Spock, is a multi-threaded, multiplayer, network based game that consists of a server and two to five clients that communicate through TCP. The server and clients will use multithreading to allow for the netcode to run simultaneously alongside the game's logic. The server will listen and handle data reliably and efficiently to conduct a single-elimination tournament of Rock Paper Scissors Lizard Spock between the clients.

33. An Extension of MedRec's Blockchain Based Decentralized Storage of Electronic Health Records Utilizing SAFE Network
Presenter(s): Austin Bohannon, Tristan Tran, Alexandru Vajiac, Alexander Barret
Advisor(s): Dr. M. Andrew Moshier

Currently, medical data is siloed in the databases of every hospital, clinic, and medical provider that a patient has ever visited; this makes it impractical for physicians and patients to get a holistic view of the patient's medical history. MedRec, a proposal from the MIT Media Lab, attempts to solve this problem by using a blockchain to handle permissions management, linking together hospital databases to provide data to users. However, this still leaves the network susceptible to dangers such as ransomware, and we would like to design a more comprehensive system

that accounts for MedRec's lack of data resiliency, as well as helping to mitigate problems with data standardization and patient control. We will design an implementation that utilizes both a blockchain and the SAFE Network. SAFE is a distributed file storage protocol that allows for cheap, secure file storage without the unnecessary levels of redundancy that a blockchain would suffer from. Building on top of MedRec's blockchain identity and permissions system, we will implement a backend that utilizes databases stored in private SAFE vaults to ensure data uptime, integrity, and control. Storing the data in a distributed and redundant network averts the threat of ransomware. In order to prove the efficacy of this implementation, we will construct a cost-benefit analysis comparing the cost of current storage infrastructure with that of the original MedRec paper and that of our solution. Going forward, we will construct an open/libre prototype to prove viability. This paper will demonstrate the benefits of adopting secure, decentralized systems.

34. Text-Messaging based Personal Assistant targeting Raspberry Pi Hardware

Presenter(s): Dylan Bowman
Advisor(s): Dr. Michael Fahy

The Raspberry Pi is a single-board computer that is known for its low price and small form factor. Being less than $100 for a complete kit and being about the size of a credit card, it's perfect for small projects and running basic software. The Personal Assistant project leverages this hardware to create a simple, always-active Personal Assistant available by text message. It focuses on three simple tenets: lowering price of hardware, leveraging already-existent technologies and improving quality of life for its users. The system texts the user every morning with a summary of the day: Weather, upcoming events and to-do items. The user can get information from the assistant about their calendar, current news headlines, and the weather in their home location or in another location. The system can give the user reminders based on location or time. It uses APIs from Yahoo and the New York Times as well as Google Calendar and Gmail to get weather, news, calendar events, and to communicate with the user.

35. Sushi Go! Card Game Online Implementation

Presenter(s): Brian Do, Dustin Liu, Marcus Chong
Advisor(s): Dr. Michael Fahy

With the transition from physical into digital entertainment, the trade-off between meeting up in real life to play board or card games and connecting to each other online grows increasingly prevalent. With this, the need arises to either create a game worth meeting in person to play, or to create a game which can bridge the gap between physical and digital.

Our project is taking a popular physical card game, Sushi Go! and create a version that can be played both on the computer as well as online with other people. The game itself will be coded using Java 8, and implemented with a multi-threaded server to allow users to play either on a local host or over a different server. The code will also be implemented into a graphical user interface (GUI) to keep the same picturesque appeal of the physical game and to help with the learning of the game, seeing as the images on each card are essential to recognizing and developing intuition and game knowledge.

This project should be able to accomplish two goals: to provide a way for players of Sushi Go! to enjoy the game without having to meet up nor own a physical copy of the game, and to contribute toward the eventual transition into digital entertainment as software moves forward.

36. Mafia

Presenter(s): Christopher Henderson
Advisor(s): Dr. Michael Fahy

Organized crime in Russia began in the imperial period of the Tsars, but it was not until the Soviet era that "thieves-in-law" emerged as leaders in crime. Mafia is a multiplayer network game that places you in Russian environment. You are randomly given roles such as: Doctor, Mafia Murder, Civilians, Judge, and so on. The Mafia is dangerous, you must work together to find the Mafia members and send to jail before they murder everyone. You must use communications and analyze every move if you have any hope of surviving the nights in these crime driven streets. If you are the Mafia member however, you better avoid being caught. Jails in Russia might not be so nice.

37. Modal Counter Point

Presenter(s): Robert Kain, John Ligon
Advisor(s): Dr. Michael Fahy

John and I are working on a computer science project that will allow two or more players to play a music based game. The first player will choose a set of notes or chords that they want to be the original piece. The first piece will be played back to both players, then the second player will have the opportunity to add the notes and chords to the piece that they think will harmonize well. We also hope to be able to give the second player suggestions, that we believe will harmonize very well. After the second player is finshed entering their part we will play back the updated piece to both players and give the second player a score on how well they did harmonizing. Currently everything is command line based, but we hope to add a gui soon.

38. Liars Dice

Presenter(s): Jed Klein, Connor Ford
Advisor(s): Dr. Michael Fahy

This project incorporates basic networking principles and techniques in order to implement the game of Liars Dice. Liars Dice is a multiplayer game that involves educated guesses on the total number of dice present, when a player only knows the results of their own dice. Each turn, a player has to either call the last players bluff or raise the bid. If a player calls the last players bluff and they are correct, the last player loses a die. If the player calls the last players bluff and is wrong, then that player loses a die. The game continues until only one player has die left – often times making for a very interesting last few rounds when less than five die remain in the game. Using probability and pattern recognition, players can develop a strategy that allows them to make effective decisions. In addition to being an entertaining game, this project will also incorporate such networking techniques such as multithreading, the client to server paradigm, data transfer, and others. The program will be coded in Java, and will focus on smooth gameplay that maximizes efficiency of data management and network congestion. This project will serve to increase the author’s network programming abilities and be an example of efficient code for others attempting network projects.

39. Mass Chaos: A Multiplayer Research Tool

Presenter(s): Jan Llanillo, Sofya Bochkareva, Shae Trimmer
Advisor(s): Dr. Michael Fahy

As social creatures, people are driven to interact in nearly any environment. The widespread nature of the Internet allows us to connect with individuals as close as those in our own homes to those on the other side of the globe. As a digital medium, the video game industry is no exception, and a major category in the video game industry involves multiplayer games. Our team is building a simpler multiplayer game that connects users through a Transmission Control Protocol (TCP), which is a reliable way to send messages over the Internet. The game also demonstrates the client/server paradigm in that each player has a unique client of the game running, while the server runs the game logic behind the scenes. The mechanics of the game are akin to the game "Dodgeball," which is to eliminate other players by throwing a ball, and remain in-game as long as possible. A player is out of the game when they are hit by a ball. When eliminated, the player can see how long they were able to survive in the arena through the use of a timer. The purpose of such a game could be to create a tool that can be used to observe the way people interact in such an environment, especially because each player is anonymous. An example of such data that could be collected and used for observation are whether or not the players implement strategies to remain in-game and what exactly these strategies are.

40. A Reliable Transport Layer Protocol Modelled After TCP

Presenter(s): Benjamin Seeley
Advisor(s): Dr. Michael Fahy

The Transmission Control Protocol(TCP) is a transport layer protocol that provides reliability measures. In order to better understand how this reliability is achieved, I have recreated certain aspects of TCP on top of the simpler and unreliable User Datagram Protocol(UDP). This new protocol replicates the TCP header, as well as sequence numbering, checksums, and acknowledgements used by TCP. I have written this protocol in Java using the UDP based classes of the java.net library. This protocol demonstrates the ideas behind TCP's reliability in a simple and lightweight format. It is useful for applications where some form of reliability is desired, but all the features of TCP are not necessary.

41. wowgManage_abstract

Presenter(s): Frieden Stone
Advisor(s): Dr. Michael Fahy

In the popular Blizzard game, World of Warcraft, guild managers are forced to rely on third party applications and various data collection sites in order to successfully keep track of member statistics and analysis. Utilizing World of Warcraft and Warcraftlogs APIs, I am designing a basic, easy to use, Python console program which will allow managers to effectively pull relevant data on their members from the game's databases. This information can be used directly from a command line in order to make effective, on the fly decisions regarding raiding and raid parties as well as player versus player (pvp) applications and more. In coding this program (wowgManage), I will demonstrate an understanding of network get requests, network programming, and API utilization. I will present a unique form of World of Warcraft data analysis within the python environment and will demonstrate various layers of the TCP/IP network paradigm as data will be passed across the internet medium.

42. Gravehunters: A Multiplayer Game

Presenter(s): Elizabeth Wang, Sarah Chong
Advisor(s): Dr. Michael Fahy

Gravehunters is a multiplayer network game in which players must overcome obstacles in an attempt to collect the most points scattered across an array. This project utilizes the abstract computer networking concepts of transmission control protocol (TCP) to create a game of up to four players. Players alternate turns by entering changes in their board-piece movements. This information is converted into bits of data known as packets, which is then sent across a local network. By definition, TCP will error-check moves performed by each player. Therefore, players' movements will ultimately depend on the reliability aspect of TCP—ensuring that all bits of data sent through the network remains uncorrupted and guaranteeing the safe arrival of the packet to its destination. The goal of this project is to use the networking concepts that are principle to TCP to create a multi-threaded server-client experience. Using the Java programming language, we have used authoritative architecture, in which two or more players will send input through their client program and receive feedback from a server. The server receives and processes client input, determines the win state, and updates clients with a visual representation of their actions. The resulting programs will show a practical application of concepts covered in our Data Communications and Computer Networks course, as well as create an entertaining program.

43. Schmid Grand Challenge Initiative: Eliminate Drunk, Drugged and Distracted Driving in the U.S

Presenter(s): Tiffany Vallejo, Collete Grubman, Michael Kolinsky, Savanah Schwager, Kayla Ziegler, Thang Nguyen
Advisor(s): Dr. Andrew Lyon

As part of the Schmid Grand Challenges Initiative solutions to combat drunk, drugged and distracted driving are being analyzed. A deeper understanding of the problems was developed in order to create a business plan of proposed solutions to alleviate the issue. In 2015, drunk and distracted driving accounted for 13,742 motor vehicle deaths, and marijuana users were 25% more likely to be involved in an accident. These statistics continue to increase with each following year. Currently, there are solutions being implemented that attempt to tackle the aforementioned problems. These solutions include apps, plug-in devices, rideshare services, and fines. However, they have not been successful in resolving the overarching issue at hand. This problem requires a broad spectrum approach ranging from social to economic issues. One of the most promising long-term solutions to combat all three of these issues is to implement autonomous vehicles. This is the solution that will be analyzed for this research project. The objective is to develop economic viability and social acceptance of the proposed solution.

English

44. An Ecological Application of Kleinian Theory to Political and Social Discourses as a Means to Extend Ecological Modernization Discourse

Presenter(s): Gage Peterson
Advisor(s): Dr. Brian Glaser

Though largely marginalized within its own discipline, Psychoanalytic theory, specifically object relation's theory, promises a breadth of value to ecological modernization (EM) discourse when appropriated interdisciplinarily as a rhetorical frame or lens. This project incorporates and extends the ecopsychological application of Kleinian object relations to the human-nature relationship, previously researched by Joseph Dodds (2011). Through the application of Kleinian theory to environmental rhetoric, both within political and social discourses, this paper explores the psychological processes that characterize political decision-making regarding the economy versus ecology debate, as well as exploring cultural ideologies that perpetuate the forgetting of our integral relations with and reliance upon the natural world. This project examines the political rhetoric of President Trump and President Obama's energy and conservation policy through the developmental phases of the depressive and the paranoid-schizoid positions that comprise Kleinian object relation's theory. Expanding outside of the political realm, this analysis applies the same psychoanalytic theories to two contemporary public art pieces, the first being Agnes Denes' Wheatfeild – A Confrontation grown in Manhattan (1982) and the second being Director Louie Psihoyos' video projection performance illumiNations (2014), at the UN headquarters. Framing the social and political domains, Schlosberg and Rinfret (2008) advocate for strong EM discourse that deliberates an impactful transformation among social and economic structures. In response to this exigency, this paper contributes to EM discourse by employing psychological principles as the frame for understanding the mechanics that underlie the perceived conflict between economic growth and environmental preservation, using political and social discourse as the subjects of analysis.

Environmental Science and Policy

45. Greenhouse Gas Footprint Reduction

Presenter(s): Kiana Smith, Sakthi Kasthurirengan, Robyn Wrey, Dana Hicks, Shana Marshall
Advisor(s): Dr. Andrew Lyon

This is a team effort based on Dean Lyon's class. In recent years, Chapman University has been falling increasingly behind in the field of sustainability, specifically greenhouse gas and CO2 emission capture. This project will aim to close the gap between Chapman's sustainability standards and the incomparable sustainability standards held by other top tier schools. To achieve this goal we plan to develop and implement policies and economic methods for reducing emissions within Chapman's main campus. We will work to accomplish this by reaching out to faculty members and experts in the field who have the resources to initiate change within Chapman and the knowledge to advance the project. Additionally, we seek to create a campus-wide conversation engaging the Chapman student population. The first step to solving a problem is to identify it, so we will start by reviewing an audit of Chapman's environmental footprint. Currently there is no information on the specifics of Chapman's greenhouse gas footprint, but we hope to use the environmental audits provided by the environmental science and policy program as a

placeholder. As Chapman's prestige continues to grow as an institution of higher education, it is our responsibility to contribute to modern conservation efforts.

46. Removing Plastics From Oceans

Presenter(s): Vanessa Stahel, Alec Madden, Destyni Travers, Kylie Miller
Advisor(s): Dr. Andrew Lyon

How can we eliminate plastics from oceans? This is a team based effort designed around Dean Lyon's Science Blender course. It is based on research and our hope is to inform outcomes in the future. To begin, we looked at the current approaches to solving this problem. For example, the Seabin is a bucket that can be placed in harbors and will filter plastics off of the surface of the water. Another major project has been the Ocean Cleanup Foundation's V-Shaped Array, which is a large floating screen that uses ocean currents to concentrate and collect plastics. As a team, we saw that most of the current methods focus on surface-level cleanup, and we wanted to go deeper. We created the concepts of two machines: The Planktonic Purifier and The Baleen and Clean. The Planktonic Purifier will attach to the bottom of boats, much like a net, and will gather everything from large pieces of plastics to microplastics as the boat moves through the water. Boat-owners who choose to participate in the removal of plastics by the Planktonic Purifier will be offered incentives, much like returning recyclables to a bottle-collecting facility. The next step will be the Baleen and Clean, which will roam the depths of the ocean, picking up trash from the twilight and midnight zones. The structure will be similar to that of a submarine and a whale, only it moves autonomously. The hollow area inside will be used to store the plastics retrieved. Once it is full, the Baleen and Clean will return to a plastic-receiving facility where it can be disposed of appropriately. Our final step is to enact policies to help reduce the amount of plastic used and discarded. We are confident that these steps will efficiently decrease, if not completely remove, harmful plastics from the world's oceans.

47. Transform Society for Maximum Sustainability

Presenter(s): Paul Titterton, Matt Raymond, Sabrina Dworkin, Alex Vajiac
Advisor(s): Dr. Andrew Lyon

Deteriorating infrastructure and anthropogenic climate change are major concerns for modern society. In order to combat these issues, this team-based academic research project from Dean Andrew Lyon's Science Blender course aims to transform urban construction practices. Our goal is to make sustainable, efficient, and responsibly sourced building materials a logical and financially viable choice for construction companies. We intend to concentrate on materials that are currently inefficient or difficult to repair; such as concrete, wood, and various forms of insulation. With a focus on broadening the scope of the availability and viability of materials that already exist, rather than developing new ones. We intend to lower the energy and environmental impact of urban living spaces in the near future, through the use of biological and self-healing materials in order to reduce non-biodegradable waste. In the long term, these materials will cut down on building, maintenance, and utilities costs, and their manufacturing and usage will have less of an environmental impact than traditional building materials.

48. Greenhouse Gas Fluxes from a Sediment Augmentation Project at Seal Beach National Wildlife Refuge

Presenter(s): Kyvan Elep, Haley Miller
Advisor(s): Dr. Jason Keller, Dr. Cassandra Medvedeff Zalman, Glenn Woerndle

Coastal wetland ecosystems efficiently store a vast amount of carbon despite their relatively small areal extent. Emerging carbon markets could capitalize on this carbon sequestration potential to drive wetland restoration and conservation efforts. However, soil carbon storage can be offset by the release of potent greenhouse gases like methane and nitrous oxide. We explored the importance of these greenhouse gas fluxes at the Seal Beach National Wildlife Refuge, which is home to a thin layer sediment augmentation project that added ~10 inches of dredge material to 10 acres of salt marsh in order to conserve the marsh in the face of projected sea level rise. Samples were collected from the augmentation site (and a control site) before and after the sediment augmentation. Pre-augmentation data from both sites 2 months prior to the project, suggest that the flux of methane and nitrous oxide were minimal. Additional samples collected 3, 5, 7, 8, 9, 10, 11, and 13 months post-augmentation suggest methane and nitrous oxide production do not change following the thin layer sediment augmentation. Carbon dioxide emissions from the augmentation site were significantly lower than the control site, likely because of decreased plant biomass as a result of sediment augmentation. Our data suggest that sediment augmentation is a good candidate for wetland restoration and conservation without any initial offsets to potential soil carbon sequestration.

49. Environmental Science and Policy Capstone Audit: Analysis of the Environmental Science & Policy Major

Presenter(s): Kyvan Elep
Advisor(s): Mackenzie Crigger

The Environmental Science & Policy major and Environmental Science minor were created in 2009 followed by the Environmental Studies minor in 2011. Since its creation, there has not been a significant change to the major's curriculum. In recent years, the environmental movement has gained momentum, and areas like environmental justice, policies, and natural disasters have developed – some of which are not reflected in the current curriculum of Environmental Science & Policy. This project compared Chapman University's Environmental Science & Policy major to aspirational and peer schools' curriculums, as well as gathered information from current students on their attitudes towards the major. The goal of this research is to highlight areas of the major that need improvements as well as areas where the major is succeeding. Data were also collected from alumni of the major to help guide recommendations to improve the major, such as a variety of certifications, more upper division statistics, excel, ecology, and other classes. Employment and graduate school information of alumni have also been collected to create a data base of what the major is preparing students for after graduation. The goal of this project is to guide growth and expansion of the Environmental Science & Policy major, as well as explore how the major is preparing students for life after graduation. From the survey, 97% of current Environmental Science & Policy students agree that the major is preparing them for their future goals and 92% of alumni believe that the major prepared them for their future goals. Some recommendations include restructuring class requirements, creating alumni connections, and publicizing the major. Results from the 2017 campus-wide Environmental Audit Survey help highlight where Environmental Science & Policy students are succeeding and where improvements are needed.

50. Preliminary Exploration of Methane Flux from the South Bay Salt Pond Restoration Project

Presenter(s): Haley Miller

Advisor(s): Dr. Jason Keller, Dr. Cassandra Medvedeff Zalman

Coastal wetland ecosystems are incredibly valuable environments due, in part, to their ability to sequester and store carbon over long periods of time. There is a growing interest among coastal managers to capitalize on this carbon storage capacity to drive restoration and conservation efforts in the context of emerging carbon markets. The South Bay Salt Pond Restoration Project (SBSPRP) is the largest tidal wetland restoration effort on the West Coast, launched in 2004 with an objective to restore 15,100 acres of industrial salt ponds in the south of the San Francisco Bay. While wetlands are extremely efficient carbon sinks, they also have the ability to produce and emit greenhouse gasses like methane. If the SBSPRP systems are releasing methane into the atmosphere, it would limit possibilities to design restorations efforts to maximize carbon storage. In order to monitor the production of methane in the SBSPRP, we deployed floating and fixed chambers in salt ponds undergoing various management regimes and an associated tidal marsh. To date, samples have been collected in November 2016, January 2017, and March 2017. Our results suggest that some ponds are releasing significant amounts of methane, but only during some portions of the year, indicating that methane fluxes may be subject to seasonal variability. We will continue to explore the seasonal dynamics that may drive methane fluxes from the SBSPRP to better understand the role that these coastal ecosystems play within global climate change.

51. Chapman Campus Earth Day Programing

Presenter(s): Haley Miller

Advisor(s): Mackenzie Crigger

The first Earth Day was on April 22, 1970. It was one of the largest civil protests in US history, with an estimated 20 million Americans in attendance at several marches and rallies held around the country. Every year since, people all over the world have celebrated the Earth on this day. Earth Week is a chance for citizens, and students in particular, to learn about environmental issues and come together as a community to make strides towards sustainability. While there has been some effort in planning Earth Day/Earth Week events on campus in the past few years, the number of events provided at Chapman University is relatively low in comparison to Earth Week programing at other of Chapman's peer and aspirational universities. This chapter is aimed at getting a comparison to larger-scale Earth Week programing at other peer universities. Doing so would generate some new ideas that we would be able to evaluate in feasibility of bringing to our own campus. This chapter also has the potential to provide analysis of past student, staff, and faculty interest in programing, as well as attendance data from previous years Earth Week events. This analysis will serve as a catalyst in creating effective programing for Earth Week at Chapman in the future.

52. 2017 Chapman University Environmental Audit: Transportation-Biking

Presenter(s): Sean Augustine

Advisor(s): Mackenzie Crigger

This purpose of this research is to assess the state of bicycling among the Chapman University commuter community, and to determine any alternative strategies that could be implemented to encourage more students, faculty, and staff to choose biking to campus over driving a personal vehicle. According to the 2013 Chapman

Environmental Sustainability Audit, about 70% of all off-campus students drove private vehicles to campus regularly, while only 24% walked or biked (2013); the goal of this research is to change those numbers and improve the university's sustainability. Data that was collected for this study included yearly number of participants in the university's bike voucher program, total number of bike permits issued by year, and costs for various recommendations to Chapman's bike policies. Also included in this research was a survey that was distributed to all students, faculty, and staff, which inquired about different aspects of the University's and each individual's views on sustainability, focusing on the topics of curriculum and transportation. Based on the responses received from the survey, as well as the data collected, a series of "easy/short-term" through "hard/long-term" recommendations were proposed to help improve the presence of biking on campus. Such suggestions included increasing publicity of sustainable transportation incentives, implementing a free or moderately-priced bike rental program, and improving bike infrastructure, such as bike paths and parking racks.

53. Simulated Physical Weathering Effects on Bioaccessiblilty and Speciation of Arsenic in Mine Tailings

Presenter(s): Nicolette Burtis
Advisor(s): Dr. Christopher Kim

Gold mining throughout the western United States has released arsenic into the environment, resulting in a number of contaminated areas surrounding historic mine sites. Often times, these waste materials are left untreated once mining is completed, posing harmful health effects towards nearby residents and visitors. There is a lack of thorough understanding of the long-term fate due to the weathering and dispersion of arsenic in mine tailings and the subsequent health consequences.

Samples from Empire Mine in northern California were sifted into different particle size fractions. Selected size fractions were pulverized using a ring mill to simulate physical weathering, and the reactive surface area of both the ground and unground samples were measured using BET analysis. Next, in vitro simulated gastric fluid (SGF) extractions were performed on the samples to determine and compare arsenic bioaccessibility. Synchrotron x-ray radiation was utilized to collect extended x-ray fine structure (EXAFS) spectra and micro X-ray fluorescence (μXRF) elemental maps. Linear combination fitting of the EXAFS spectra was applied to determine the speciation of arsenic present in the ground and unground materials, both pre- and post-extraction. The μXRF maps provided additional information regarding the distribution of arsenic species in pre-exposed unground mine tailings. These techniques reveal how physical weathering plays a role in the increased arsenic bioaccessibility of mine tailings. There is an apparent increase in arsenic bioaccessibility in the ground samples relative to the unground samples. Varying levels of bioaccessibility between sites can be explained through the existence of different arsenic species.

Acknowledging the location of arsenic within the particles as well as its speciation are extremely helpful when looking at future health and policy assessments for abandoned mines. Comparing the ground and unground samples allows a better assessment of the long-term risks of arsenic in tailings over time.

54. Environmental Science and Policy Capstone Audit: Integrating Sustainability Across Curriculum Workshops for Faculty

Presenter(s): Nicolette Burtis
Advisor(s): Mackenzie Crigger

When looking at the college experience as a whole, the most important aspect is the curriculum. Every student is affected by curriculum, because at its core the main reason for college is to learn and obtain a degree. Therefore, when auditing a university with regard to sustainability it is extremely important to take a deep look at curriculum and the different messages it is providing students that they will take with them past the point when they graduate. This project looked at how other universities are incorporating sustainability throughout their curriculums, gathered information from current faculty and students at Chapman, and sought help from overarching institutions focused on curriculum development within higher education. Another large component of this project was looking at the history of sustainability education at Chapman and how it has evolved since the 2013 audit that also looked at curriculum. All of this information was complied and analyzed to aid in the creation of recommendations for future years. The goal of this project is to use all of the collected information to develop a workshop for faculty of all disciplines that will occur at least once a semester to aid them with incorporating sustainability within their current courses, and to help them possibly develop new courses surrounding sustainability. A majority of current faculty that were surveyed during the 2017 campus-wide Environmental Audit survey were interested in incorporating sustainability and learning more about how to go about the process.

55. Sustainability Curriculum in the Argyros School of Business and Economics

Presenter(s): Hannah Francis
Advisor(s): Mackenzie Crigger

As part of the Environmental Science and Policy capstone audit of Chapman University, I am researching the curricular requirements within the Argyros School of Business and Economics undergraduate and graduate degree programs, and how they pertain to sustainability. I aim to uncover potential strengths and weaknesses regarding sustainability courses and determine an effective way to better incorporate sustainability topics into the curriculum. To evaluate the current status of sustainability curriculum, I have performed key word searches of current and historical course descriptions to reveal how many courses involve topics of the environment or sustainability and how this has changed over time. Furthermore, I have searched through current syllabi to find additional courses of relevance. In order to obtain qualitative data, I am meeting with professors to get a more in depth look at how certain courses incorporate sustainability. I will also be comparing the current status of sustainability curriculum in the Argyros School to that found in the business programs of aspirational schools. As a class, we have also created a survey for students and faculty, in which the results will be included and used to better inform my final recommendations. I will also be looking into the logistics and cost of adding new courses/ curriculum. I expect to make final recommendations that will include adding courses that revolve around sustainability management or environmental economics, how to improve sustainability discussion within current courses, and program wide initiatives that would help better accomplish these goals.

56. Cost Analysis of Parking Infrastructure at Chapman: A Study of Investing in Sustainable Transportation

Presenter(s): Cymbre Hoffman
Advisor(s): Mackenzie Crigger

Many people in the world today have a great attachment to a vehicle, and along with this attachment, comes an inherent belief that parking is an individual right as an automobile driver. A great deal of drivers are not aware of the costs associated with the infrastructure that they park in every day, largely due to the fact that these are sunk costs, and have no real impact on the drivers. These costs vary highly depending on the size, location, and amenities the structure provides. Typically, parking structures are located in prime locations for the parking structure to be convenient, and in turn, the value of the land that is covered in the structure drops to considerably lower levels. Shoup cites Cutter and Franco (2012, p. 919) to conclude, “minimum parking requirements lower site density, increase land consumption, oversupply parking and reduce profits per unit of covered land." Thus, land is devalued and sunk costs are being poured into an infrastructure that inadvertently contributes to global carbon emissions, while losing money that could contribute to sustainable transportation at Chapman University. Despite the fact that sustainable vehicles utilize the parking structures as well, the general progression towards a divestment in increasing the number of parking structures would contribute to reversing the trend of a car driven campus. This project explores the the costs associated with parking infrastructure, and addresses the issues with this positive feedback loop, where negative externalities continue to create larger negative externalities, thereby magnifying the problem. It will then assess costs of parking infrastructure, and will hopefully determine that these costs can supplement more sustainable alternatives of transportation that students, faculty, and staff would be likely to use.

57. 2017 Environmental Audit: Curriculum and Crean College

Presenter(s): Maria Hurtado
Advisor(s): Mackenzie Crigger

In 2012 the first environmental audit was conducted by the Environmental Science and Policy Major’s Capstone Course and focused on 10 different subject areas. One of the areas that it looked at was the status at the time of sustainability curriculum at Chapman. Since then, no audits have been conducted focusing on curriculum. There has been much progress since then and in this chapter, it lays out the current status and how much it has progressed since then. It also looks at the current interest of incorporating sustainability into curriculum, in specific Crean College. Currently there have been new classes added and experimental courses that incorporate sustainability into other majors such as business and economics. The main goal is to spread sustainability into all majors. In order to get input from staff and students, a survey was conducted and the majority of the data will be compiled from that survey. Analysis have been made followed by recommendations that have high, medium, and low cost. Ultimately this audit can serve to provide an insight of the current status and what can be improved. There are still many gaps to fill in and different recommendations will be established in order to strengthen curriculum requirements and build a bridge between sustainability and other majors.

58. Creating a Social Determinants of Health Index for Cross-National Comparison

Presenter(s): Derek Itagaki, Lauren Sato
Advisor(s): Dr. Georgiana Bostean

The social determinants of health (SDH) are the conditions in which people are born, grow, live, work, and age. An issue within the SDH is the inequality that exists among and across countries' populations, despite their economic growth. Countries such as the United States which excel economically, yet face population health inequality compared to other developed countries, poses the question as to what steps must be taken in order to improve health across all socioeconomic levels. Understanding why population health varies across developed countries is imperative for the reduction of inequality's impact on health and the creation and implementation of policies addressing inequality. The aim of this methodological study is to develop a social determinants of health index, using publicly available data, including measures of population health, social environment, and physical environment, as a means to compare developed countries. Our methodological contribution is two-fold: (1) comparing different weighting schemes for components of the index, and (2) examining cross-national differences in the social determinants of health index using varying data classification schemes. We used Geographic Information Systems to examine cross-national differences among developed countries in the SDH index. The results of the study will provide insight into approaches to index weighting and data classification, and will reveal cross-national differences between developed countries in the overall social determinants of health.

59. Impacts of Transportation Methods at Chapman University

Presenter(s): Derek Itagaki
Advisor(s): Mackenzie Crigger

Personal vehicle transportation at Chapman University dominates as the preferred transportation method despite its negative impact on the environment compared to alternative forms of transportation. Human powered transportation (walking, biking, etc.) or active transportation, and public transportation (buses, trains, etc.), provide benefits to the environment and human health comparatively to personal vehicle usage. This study aims to highlight the impacts of personal vehicle transportation compared to active and public transportation methods on the environment, personal savings, and human health for Chapman University's population. The impact on the environment that each transportation methods has was measured by calculating the carbon equivalents released by each transportation method. Monetary savings was measured by the amount of money saved by using active or public transportation methods compared with money used for personal vehicle usage. Human health benefits for active transportation were measured by calculating calories burned by different forms of active transportation. The results of the study show that personal vehicle transportation has high costs personally and to the environment, and active and public forms of transportation provide a more sustainable form of transportation to Chapman University. Moving forward, Chapman University should implement transportation initiatives that focus on increasing active and public transportation usage, and educating its students staff and faculty on the benefits that active and public transportation offer.

60. Improving the Integration of Sustainability and Environmental Curriculum Across Disciplinary Boundaries

Presenter(s): Kiyoko Nakatsui
Advisor(s): Mackenzie Crigger

Chapman University offers students the ability to create their own majors or minors and take experimental courses, yet few interdisciplinary courses are offered between the environmental science department and others. As part of the 2013 Sustainability Audit the current curriculum will be evaluated and suggestions will be offered that could benefit the future student body. The Environmental Science & Policy program was established in 2009, with a curriculum that strives to create "scientists who can communicate with policy makers and future policy makers who understand science" (Chapman University). In the Journal of Liberal Education's article Sustainability & Liberal Education: Partners by Nature author Neil B. Weissman quotes Cornell University President Frank Rhodes saying, "the concept of sustainability could provide a new foundation for the liberal arts and sciences [and be] the ultimate liberal art".

As sustainability and environmental issues have been brought to the forefront of media and news it has become more apparent how they intermingle with so many other facets of society. Therefore, it will be beneficial to work with all departments to understand their learning outcomes in order to effectively integrate sustainability and environmental topics into their curriculum where applicable. In doing this students will become well rounded and better prepared to address the effects our changing environment will have on their field of interest. Students can then become better prepared for post-graduation and for the job market. In order to reach students across disciplines a list of sustainability General Education (GE) and Freshman Foundation Courses (FFC) will be readily available, modifications to the GE program to include sustainability classes, and or sustainability courses will be added across departments.

61. Comparison of Sustainability in Curriculum: Schmid College of Science and Technology and Argyros School of Business and Economics

Presenter(s): Lauren Sato
Advisor(s): Mackenzie Crigger

In 2013, the first Chapman University Environmental Audit showed that less than 25% of the student population surveyed did not learn about sustainable concepts in any of their courses. Additionally, Chapman did not implement a Sustainability Policy until the fall of 2014, further illustrating the lack of exposure students had to sustainability. This study uses data from the 2013 and 2017 Environmental Audits and the Chapman online syllabi database to determine if student and faculty exposure to sustainable practices has increased since 2013. Historically, concern for the natural environment and corporate goals did not align. Today, however, the integration of sustainability into business practices remains a challenge for organizations. This study will also explore more in depth the differences in environmental responsibility awareness and perspectives among the undergraduate programs in the Schmid College of Science and Technology and the Argyros School of Business and Economics. Because sustainability is a multidisciplinary subject, there are advantages if the two schools work together in the future to focus on "short- and long-term social, economic, and environmental impacts of decisions before acting" (Chapman University Sustainability Policy). Chapman can continue to integrate sustainability components into all undergraduate and graduate programs, so that they become an inherent part of the institution. This would not only enhance the curriculum, it would also transform the culture at Chapman.

62. Parking Technology and Efficiency

Presenter(s): Lotus Thai
Advisor(s): Mackenzie Crigger

Transportation is the second largest source of greenhouse gas emissions with 28% of total U.S. greenhouse gas emissions coming from this sector. The U.S. Department of Energy states that light vehicles consume the most energy, about 59% of transportation's energy. In order to reduce CO2 emissions and truly make a conscience effort for a greener campus, Chapman University must address sustainable transportation technology and increase parking efficiency. Student satisfaction plays a key role in determining what needs to be focused on at Chapman University. Every other year, the University conducts the Noel-Levitz Student Satisfaction Inventory (SSI), a nationally recognized survey developed to assess student satisfaction and the importance of campus issues to students. Every time the survey is conducted, parking is shown to be one of the least satisfied areas with the largest performance gap. Analyzing results from the Environmental Audit Survey, SSI, and student demographic data guided recommendations to better parking at Chapman University. As Chapman University's population continues to grow, parking will become more and more impacted. Time taken to find a parking spot will continue to increase, leading to a higher usage of fossil fuels. In the last few years, parking technology has caught up, allowing colleges and universities to upgrade systems and infrastructure. This parking technology will not only save students' time in finding a parking spot, but will also reduce the university's carbon emissions. One example of parking technology is the creation of parking guidance systems, specially sensors that indicate which spots are unoccupied. Another recommendation is further developing Chapman's parking app. Currently, the app only shows how many spots are available at the current time. Adding trends of high and low occupancy, online parking payments, and locations of Panther Shuttles will assist in increasing parking efficiency.

63. ES&P Capstone Curriculum Analysis: Wilkinson College

Presenter(s): Leah Thomas
Advisor(s): Mackenzie Crigger

Chapman University prides itself on being progressive and promoting global citizenship. One could argue that a component of being a global citizen is living sustainably for the benefit of generations to come. As such, sustainability should flow throughout Chapman's curriculum in order to truly provide students with the opportunity to become environmentally conscious global citizens. As The Environmental Science & Policy program continues to grow so does the demand for more related course materials.

There is disconnection between majors and how they interact with each other at Chapman. Administratively, cross-listing classes of interdisciplinary course material can be difficult for professors. Students are also often left in the dark about classes outside of their major. To continue a path towards interdisciplinary education, Chapman should encourage cross-major partnerships. A great starting point would be with environmental curriculum after the success of Corporate Sustainability, a Business & ES&P cross-over, and several others.

The Sociology department and many other Wilkinson majors have already been discussing environmentalism in course materials from a sociological perspective. For that reason, this researcher analyzes the potential for growth of sustainability infused Wilkinson classes.

64. Chapman Student Residence Distribution and Sustainable Transportation Alternatives

Presenter(s): Sara Wanous
Advisor(s): Mackenzie Crigger

Chapman University is located in suburban Orange, CA and has a student population just over 8000. Of these students, 32% live in on-campus housing and 68% live off campus. Students living on campus are either within walking distance of campus or have the structured commuting option of a shuttle service, however commuting patterns and needs of students living off campus are largely unknown. Understanding these commuting patterns is meaningful for Chapman University as parking is identified as a consistently significant concern and performance gap on Chapman's Student Satisfaction Survey and commuting has been identified as a major source of carbon emissions for many university campuses. Using student residential address data collected through the PeopleSoft data management platform, this study aims to develop a series of maps highlighting the distribution of students off campus in comparison with transportation options to highlight what opportunities for improvement are available. Complementary student survey data illuminates what options students are most interested in and top concerns that can be addressed. The ultimate goal of this study is to develop a set of short and long term transportation development recommendations for Chapman University that will be successful by identifying thoroughly meeting student needs. Implementation of these recommendations will relieve parking stress at Chapman and reduce third tier carbon emissions.

65. The Practicality and Need for Improved Ridesharing at Chapman University

Presenter(s): Allison Scavo
Advisor(s): Mackenzie Crigger

The students, faculty, and staff at Chapman University adhere to a strong campus-wide commuter culture. As a result, the university is plagued with single rider vehicles and serious parking issues. These conditions decrease both student satisfaction and environmental quality at Chapman. Ridesharing acts as a powerful strategy to resolve these issues as it reduces the number of vehicles needed by travelling Panthers. Less vehicles commuting to campus would lead to reduced emissions, less traffic congestion, and more campus parking. Individually, ridesharing can reduce travel time, transportation cost, and commute stress. To assess the viability and need for ridesharing at Chapman University, a campus-wide survey was conducted not only to understand the commuting habits of the Chapman community, but to also gauge its satisfaction with such habits. The current ridesharing strategies of Chapman and its peer institutions were then evaluated. To best remedy current university transportation issues, we suggest increased ridesharing incentives, the implementation of a vanpool or carpool program, and a Chapman partnership with a private ridesharing service such as Uber or Lyft. To better connect Chapman drivers and riders, we also recommend that the university update its ride matching software on the CU Experience app, or implement a new program provided by a ride matching vendor.

66. Do Marine Fish on the East and West Coasts of the United States Respond Differently to Climate Change?

Presenter(s): Allison Scavo
Advisor(s): Dr. Ramesh Singh

The impact of climate change has been linked to changes in marine species distribution and productivity. As a result, the size, spatial range, and seasonal abundance of fish populations are expected to shift in the future. To study the response of different fish populations to climatic changes at a large scale, we comparatively analyzed the landings of albacore tuna (Thunnus alalunga) and Pacific and Atlantic bonito (Sarda chiliensis and Sarda sarda, respectively) on the east and west coasts of the United States. We used simple linear regressions to investigate the responses of these fish populations to changes in sea temperature, salinity, and chlorophyll-a concentration measured from satellite sensors for the period 2005 to 2014. We found that bonito landings on both U.S. coasts were most responsive to changes in sea surface temperature. Albacore tuna landings on the west coast were also most responsive to sea surface temperature, but albacore landings on the east coast responded most to changes in chlorophyll-a concentration. However, our linear regressions indicated that the three studied climate parameters all were poor predictors of fish landings. Despite the poor predictive power provided by sea surface temperature, salinity, and chlorophyll-a concentration, we found that fish populations on the east and west coasts of the United States do have unique responses to climate change.

Food Science

67. An Investigation into Commercial Shark Products using DNA Barcoding

Presenter(s): Rachel Isaacs
Advisor(s): Dr. Rosalee Hellberg

The demand for shark products has risen significantly over the years due to the popularity of items such as shark cartilage pills, shark fin soup, and shark meats. However, shark species are particularly vulnerable to overfishing and many are protected or endangered. Thus, the objective of this study was to use a DNA sequencing method called DNA barcoding to identify the species in a variety of commercial shark products. Due to the potential for DNA degradation during processing, the products were also tested with a shorter region of the DNA barcode called a mini-barcode. Thirty-five products were collected for this study, including filets, jerky, soup, and cartilage pills. DNA was extracted from each sample using the DNeasy Blood and Tissue Kit (Qiagen). The DNA extracts underwent full and mini-barcoding of the cytochrome c oxidase subunit I gene. Multiple primer sets were used to maximize amplification success. Sequenced samples were identified to the species level through the Barcode of Life Database. When the results of all primer sets were combined, 71% of the products were identified. Mini-barcoding and mammalian full-barcoding resulted in the highest identification success rate (51%). Three of the identified samples were mislabeled: two bottles of shark cartilage pills and one jerky. The shark cartilage pill bottles were found to contain winter skate, an endangered species. The mislabeled jerky sample was identified as thresher shark instead of mako. It is important to identify the species in commercial shark products in order to determine whether the products are mislabeled and whether protected or endangered species are being illegally harvested. Overall, this study revealed that DNA-barcoding using a combination of primer sets can be used to identify species in shark

products, even after extreme processing. This could allow for improved regulation and testing of commercial shark products.

Health Sciences and Kinesiology

68. AMPK Activation Increases the Expression of Interleukin-15

Presenter(s): Anton Pham
Advisor(s): Dr. Marcia Abbott

Obesity remains one of the leading preventable causes of death worldwide, with increasing prevalence in both adults and children. Although decreasing caloric intake and increasing expenditure counteracts the effects of obesity, lifestyle changes are difficult to maintain. Consequently, alternative treatments on a cellular and molecular level are being identified. Recent research reveals that the skeletal muscle (SKM) can behave as an endocrine organ, releasing proteins called myokines for cell signaling; one of which is called Interleukin-15 (IL-15). Historically, IL-15 is known to have similar biological activity to IL-2 and plays a significant role in the immune system by enhancing natural-killer cell cytotoxicity, B-cell proliferation, and protection by T-cells. However, recent studies reveal that this myokine also contributes to metabolism by stimulating glucose uptake, lipid oxidation, and mitochondrial activity, thus reducing adiposity. The challenge at hand is to further investigate IL-15 signaling, and determine the upstream regulators that mediate the expression and secretion of the myokine. Here we used the mouse SKM C2C12 cell line to examine potential upstream regulators of IL-15. After the cells were differentiated, they were treated with AICAR, an exercise mimetic, to stimulate the energy sensing enzyme AMP-activated protein kinase. Treatment with AICAR increased the phosphorylated AMPK levels, indicating activation of the enzyme. Activation of AMPK resulted in increases in mRNA levels of IL-15. Taken together, our data suggests that AMPK increases the expression of IL-15. Future studies aimed at uncovering the mechanism by which AMPK acts to increase IL-15 expression will bring the scientific community closer to developing future therapies for obesity.

Interdisciplinary

69. The Musical Tradition and Provincial Identity of Newfoundland, Canada

Presenter(s): Jacqueline Ewens
Advisor(s): Dr. Sean Heim

Newfoundland, an island province in Eastern Canada, from its first settlements into the twenty first century, has developed and maintained a unique musical tradition, a strong sense of provincial pride, and a spirit of independence. The literature on Newfoundland music and culture examines the history, influences, evolution, and subcategories of the music within the context of unfavorable stereotypes and assimilation pressure from mainland Canada. In my own research, I draw connections between how the thriving musical tradition is practiced, and Newfoundlanders' sentiments towards the music and the island's culture as a whole, in order to explain how the musical tradition contributes to a uniquely Newfoundland identity. I interviewed eight Newfoundlanders, who consider music to be important in their lives, inquiring about their experiences with music, what it means to them, and how it fits into their personal and cultural identity as a Newfoundlander. Based on my results, I argue that because of its defining characteristics, its repurposing of stereotypes, and the social processes through which it is

practiced and shared, Newfoundland music is one of the underlying supports of the Newfoundland separatist identity. In turn, this identity has allowed Newfoundland music to remain relevant and enjoyed by both Newfoundlanders and mainland Canadians.

Mathematics

70. Do You Know What Your Phone is Doing to You? - Analysis on Phone Usage Data Over an Entire Semester

Presenter(s): Jawa El-Shanti
Advisor(s): Dr. Sandy Oliver Lopez

Like many teens today, I am a victim of cell phone addiction. Over the course of the spring 2017 semester I recorded my phone usage with the aim to quantify the degree of my addiction. I am using an iPhone application called Moment, which records the amount of time I spend on each application, the number of times I pick up my phone, and when I first and last used my phone during the day. I decided to keep track of the applications I want to minimize my time on which include Snapchat, Instagram, Netflix, YouTube and Messages. I am also tracking my usage of an application called LINE which is how I communicate with my parents since I am out of my home country. This is the only application I wish to use more. Along with application tracking, I am also keeping record of my mood during the day on a scale from 1-5, 1 being “horrible” and 5 being “amazing”. I keep track of my sleeping times by using the first and last used information, information provided by Moment.

My research questions are:

- Is there a relationship between mood, sleep and total phone use time?
- Are there other correlations between these variables?

I hope to take what I learn by observing my phone habits to help other people, especially my 17-year-old cousin, who may be suffering from the same addiction.

Peace Studies

71. Rwanda's Health Crisis: How to Access Clean, Safe Water?

Presenter(s): Robert Nelsen
Advisor(s): Dr. Arthur Blaser

Rwanda is consistently ranked as one of 10 countries in the world with the worst access to clean, safe water. Rwanda is a densely-populated nation in east-central Africa that is rich in water resources but lacks infrastructure to deliver clean, disease-free water to its people in rural villages. At least 500 Rwandan children under-5 die every year from diarrhea caused by diseased water and poor sanitation. A lack of safe water constantly threatens all Rwandans with cholera, typhoid, yellow fever, and other diseases. Every single day nearly one-third of Rwanda's 12 million people don't have access to clean, safe water. At its United Nations World Water Day conference on March 22 at the University of Rwanda, the Rwandan government supported the development of a comprehensive national water infrastructure system to improve the nation's health. The government is now encouraging private investment in the water sector while continuing its partnerships with NGO's and religious-based humanitarian organizations. In July 2016, I personally traveled for 11 days with a translator to several remote villages hundreds of miles from the Kigali

capitol. I first-hand witnessed the disease and struggle families go through to survive without safe water. I helped Rwandan volunteers install water filtration systems at their churches to provide clean, disease-free water. My humanitarian mission trip was set up by PEACEwater: No Thirsty Child! from Saddleback Church, which has successfully installed more than 250 water filtration systems in numerous rural Rwandan villages. I am humbled to have participated in this project because I know that I have helped hundreds of Rwandan villagers bring clean, disease-free water to their families. It's incredible to realize that half way around our world I made a permanent difference in the lives of people I had never met before!

72. Male Victims of Rape as a Weapon of War in the DRC

Presenter(s): Audrey Reedy
Advisor(s): Dr. Richard Ruppel

Men are almost completely overlooked when it comes to being victims of rape as a weapon of war. The media, international policies, donors, nongovernmental organizations, legal framework, and even scholars neglect to include men in their portrayals of victims of rape as a weapon of war. I examine the case study of male victims of rape as a weapon of war in the Democratic Republic of Congo (DRC) to examine this phenomenon and the complex range of issues that result from the lack of acknowledgment of male victims. This is done through a review of literature surrounding the conflict, policies of international governmental and nongovernmental organizations, and consulting existing literature about gender-based violence. The goal of this paper is to use the conflict in the DRC as a case study to illuminate the complex issues of rape as a weapon of war and of the consequences of a focus solely on female victims rather than a focus that includes male victims. Furthermore, I address key actors and agents of change and offer recommendations for how to approach this problem in other global conflicts and reduce the reality of gendered violence and victims of rape as a weapon of war.

Physics

73. Qhord: Gamifying the Quantum through Music

Presenter(s): Aaron Grisez
Advisor(s): Dr. Justin Dressel

The purpose of the Qhord project is to let users interact with a quantum mechanical system in an intuitive way with the hopes of increasing accessibility to the word quantum. Qhord is a flexible and portable interface for musical improvisation that is governed by a quantum simulation. The current prototype simulates a quantum system in a 7-dimensional pitch space which partially collapses due to user input following the quantum theory of generalized measurements. The system is subjected to unitary evolution through an oscillatory Hamiltonian. This Hamiltonian is determined by an atomic chord containing the most prevalent intervals in a user-provided probability spectrum over the pitch space. My goal is to create a fully operational, cross-platform mobile application which realizes this interactivity. Gamified physics has been an open area of research for years, with a particular increase as mobile applications have become so popular. This gamifying approach to seemingly arcane concepts will help future generations of scientists gain an intuitive understanding of the physical system being implemented. Additionally, games can help reduce the stigma about the impossibility of understanding quantum phenomena.

74. Analog Simulation of a Quantum Computing Circuit

Presenter(s): Paul Titterton
Advisor(s): Dr. Justin Dressel

Analog simulation of quantum computers is a promising middle ground between the robustness and price of a classical computer and computational advantages of a quantum computer. The goal of this project is to simulate two quantum bits using “off the shelf” analog electrical components paired with two Arduino computers. We use DC voltages to independently represent the real and imaginary parts of the complex amplitudes for the quantum state vector of each quantum bit and a tunable analog circuit to perform unitary gate operations. These operations can be used to entangle the two quantum bits. On a medium scale, around ten simulated quantum bits, this approach is potentially faster than a classical computer and more accurate than current quantum computing circuits of a similar size. To test the build we plan to implement the Bernstein-Vazirani algorithm, and compare our results against the IBM “Quantum Experience” cloud quantum computer, a computer with five quantum bits arranged with star connectivity. The IBM quantum computer identifies the function correctly about 90% of the time. We want to match the accuracy of the IBM computer, but identifying the function over 50% is an improvement over known digital, classical algorithms.

Political Science

75. How Has Our United States K-12 Education System Affected Democracy and Civic Engagement?

Presenter(s): Andrew Calloway
Advisor(s): Dr. John Compton

It is hard to tell what creates voter apathy, public opinion to shift, and our views toward our elected officials. The United States being a republican democracy, our vote is seen to be an essential part of how our representatives set an agenda and push for a topic to be debated. According to Achen and Bartels, they are a lot of contributing factors that can lead to how people vote for officials, look on certain issues, and what political party they affiliate themselves with. In Achen and Bartels' work, they describe what is known as the theory of retrospective voting. The retrospective theory is the normative appeal, "to save voters from the charge that they are too uninformed or too disengaged to play a meaningful role in the democratic process." (Achen and Bartels 90-91). This can lead to blind voting, or blind retrospection, in which the voter will either reward or punish the official that is running for reelection. The paradoxes and arguments still lead to the question if voters are informed or not when participating in a democracy? This can lead to the areas of research in looking at the media and the journalism industry, but one thing that is overlooked would be our education system. Does the United States education system inform younger generations of how our democratic society works?

Psychology

76. Happiness and Sleep: Dynamic duo?

Presenter(s): Moriah Geller, Aylin Gann
Advisor(s): Dr. Julia Boehm

Cross-sectional evidence suggests that individuals with positive outlooks and a sense of well-being are more likely to engage in healthier behaviors than their less happy peers (Boehm, Vie, & Kubzansky, 2012). In this study, we examined whether experimentally manipulating well-being is related to the quantity and quality of sleep that individuals get. We hypothesized that people who completed positive well-being inducing tasks would report higher quality of sleep than those in a neutral comparison group. 63 community members ages 42-85 were randomly assigned to writing tasks designed to improve either optimism, which focuses on future goals, positive emotion, which focuses on past happy events, or on their daily events, which serves as a neutral control. Participants also completed self-report questionnaires about their sleep quality and quantity on four separate occasions throughout the duration of the seven-week experiment. Initial analyses examined whether the intervention had an effect on reported positivity and showed that those who participated in the optimism and positive emotion conditions reported higher levels of positivity than those who participated in the control condition. However, there was no significant effect of the intervention on sleep quality or sleep hours, nor was there an interaction between condition and time. This may be due to limitations such as small sample size, use of self-report measures rather than objective measures, and strength of the intervention. The results of the study have implications for future research such that they encourage us to use more specific sleep measures to further investigate mechanisms by which well-being may affect sleep.

77. To invest or not to invest? Exploring psychological moderators of maternal investment strategies in non-ideal environments.

Presenter(s): Christina Korth
Advisor(s): Dr. Jennifer Hahn-Holbrook

Mothers tailor the degree of maternal investment they provide their children based on environmental and offspring quality and their current and future reproductive potential. In humans, many studies have found that mothers who live in poor environments are more likely to experience postpartum depression, which is associated with decreased maternal investment. Studies with rodents and other primates, however, suggest that mothers in bad environments may actually invest more in their offspring, in an attempt to keep those infants they have alive despite poor conditions. We tested whether anxiety in response to cues of poor environmental quality predicts heightened maternal investment, while specific symptoms of depression, like anhedonia, predict reduced maternal investment. 54 mother-infant pairs were video-taped during a play session to assess the quality of maternal-infant interaction and mothers filled out questionnaires related to psychological stress, anxiety, depressive symptoms, environmental quality, and availability of alloparenting support. Salivary cortisol measures were also taken in mothers and infants before and after the play session. Echoing previous research, poverty and poor alloparenting support predicted both heightened depression and anxiety. In line with our prediction that anxiety may promote maternal investment, we found that mothers who self-reported more anxiety or who had higher cortisol levels at baseline exhibited more sensitivity towards their infants' cues and more positive regard during the play session than mothers with lower

anxiety or cortisol. Also in line with the prediction that subtypes of depressive symptoms would correlate with decreased maternal investment, mothers who self-reported more anhedonia, low mood and thoughts of self-harm exhibited less maternal sensitivity in the lab. These results suggest that maternal psychological distress is a heterogenous concept and that poor environmental conditions may have a polarizing impact on maternal investment-heightening investment for some and eroding investment for others.

Software Engineering

78. Magic Mirror

Presenter(s): Aaron Weinberg, Christina Berardi, Kevin Hewitt, Donovan Tetsuka
Advisor(s): Dr. Erik Linstead

The goal of the Magic Mirror is to create a mirror interface that connects to a database to create a virtual closet for the user. Using an attached camera, the mirror scans the user's outfits, and adds them to the database. This database, viewed through the accompanied mobile app, allows the user to search for clothing in the future with both built in tags and meta-data added by the user. We hope to add functionality and versatility to a mirror, an everyday tool that everyone has access to, which until now has only had a single use. Furthermore, using the outfit recognizing algorithm, the mirror will benefit those with various disabilities. We chose to focus on autism, as it is a disease that affects 1 in 68 children (CDC), and can complicate everyday tasks, such as choosing an outfit. Our mirror will make getting ready in the morning and keeping track of your wardrobe easier. The outfit recognizing algorithm allows the mirror to recommend the best outfit, based on the current weather and the best match to what the user is currently wearing. Both choosing weather appropriate clothing and matching clothing together to create an outfit are tasks that children with autism tend to struggle with. The mirror hopes to alleviate some of the stress involved in these decisions and create a more pleasant experience for the user. We plan to test the finished product on both those with disabilities, and the general consumer to guarantee a product that allows for the most efficient organization and best user experience.

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