AVE MARIA UNIVERSITY

Spring 2026

Interdisciplinary Student Research Symposium

Saturday, April 11, 2026

Abstracts

THE HONOR ΦΚΦ SOCIETY OF PHI KAPPA PHI

Student Presenters

Last Name	Name	Major(s)	Class Year	Faculty Research Mentor(s)
Misek	Andrew Misek	Applied Chemistry	Senior	Stephen Thong, Ph.D.
Lenci	Anika Lenci	Biochemistry	Freshman	Rodney Burton, Ph.D.
Delyon	Tyler Delyon	Biochemistry	Junior	Rodney Burton, Ph.D.
Gotlund	Michael Gotlund	Biochemistry	Junior	Tony Barbosa, Ph.D.
Breen	Gabriela Breen	Biochemistry	Senior	Rodney Burton, Ph.D.
Gonzales	Martin Gonzales	Biochemistry	Senior	Rodney Burton, Ph.D.
Jagels	Albert Jagels	Biochemistry	Senior	Rodney Burton, Ph.D.
Le	Tiffany Le	Biochemistry	Senior	Tony Barbosa, Ph.D.
McNeill	Clare McNeill	Biochemistry	Senior	Rodney Burton, Ph.D.
Yeh	Gracemarie Yeh	Biochemistry	Senior	Rodney Burton, Ph.D.
Freeze	Benjamin Freeze	Biochemistry	Sophomore	Ronald Freeze, Ph.D.
McAfee	Bree McAfee	Biochemistry	Sophomore	Stephen Thong, Ph.D.
Sielaff	Zofia Sielaff	Biochemistry	Sophomore	Tony Barbosa, Ph.D.
Kay	Killian Kay	Biochemistry	Senior	Stephen Thong, Ph.D.
Decembrini	Damien Decembrini	Biology	Freshman	Ronald Freeze, Ph.D.
Higgins	Gregory Higgins	Biology	Junior	Agnes Berki, Ph.D. and Ronald Freeze, Ph.D.

Cichon	Julia Cichon	Biology	Senior	Samuel Shephard, Ph.D.
Lang	Zachary Lang	Biology	Senior	Sandrea Tirado, Ph.D.
Le	Amanda Le	Biology	Senior	Agnes Berki, Ph.D.
Pawl	Jonathan Pawl	Biology	Senior	Stephen Cronin, Ph.D.
Baez	Andrea Baez	Biology	Sophomore	Samuel Shephard, Ph.D.
Puthumana	Angelina Puthumana	Biology	Sophomore	Sandrea Tirado, Ph.D.
Snyder	Isabela Snyder	Biology	Sophomore	Tony Barbosa, Ph.D.
Iijima	Antonio Iijima	Classics & Early Christian Literature; Computer Science; Mathematics	Senior	Saverio Perugini, Ph.D.
Randolph	Anne Marie Randolph	Communications	Junior	Justin Bonanno, Ph.D.
Perez	Noah Perez	Communications	Senior	John Jasso, Ph.D.
Martinez	Michael Martinez	Computer Science; History	Senior	Saverio Perugini, Ph.D.
Ford	Aidan Ford	Environmental Science	Sophomore	Sandrea Tirado, Ph.D.
Sabatino	Vincent Sabatino	Exercise Physiology	Senior	Sandrea Tirado, Ph.D.
Kutsch	Caroline Kutsch	Health Science	Freshman	Tony Barbosa, Ph.D.
Kubisova	Veronika Kubisova	Health Science	Junior	Ronald Freeze, Ph.D.
Pemrick	Amelia Pemrick	Health Science	Junior	Tony Barbosa, Ph.D.
DiMaio	Danielle DiMaio	Health Science	Senior	Agnes Berki, Ph.D.
McCarthy	Faith McCarthy	Health Science	Senior	Ronald Freeze, Ph.D.

Talafuse	Maria-Isabella Talafuse	Health Science	Senior	Stephen Cronin, Ph.D.
Szucs	Anna Szucs	Health Science	Sophomore	Agnes Berki, Ph.D.
Whiting	Adelina Whiting	Health Science	Sophomore	Tony Barbosa, Ph.D.
Campau	Emily Campau	Literature	Senior	Deana Basile Kelly, Ph.D.
Landry	Maria Landry	Literature	Senior	Jessica Schnepp, Ph.D.
Marchese	Juliana Marchese	Literature	Senior	Deana Basile Kelly, Ph.D.
Herber	Gabriel Herber	Marine Biology	Junior	Sandrea Tirado, Ph.D.
Samuel	Joy Samuel	Marine Biology	Junior	Samuel Shephard, Ph.D.
Palmer	Charlotte Palmer	Marine Biology	Senior	Samuel Shephard, Ph.D.
Beiter	Kyle Beiter	Marine Biology	Sophomore	Sandrea Tirado, Ph.D.
Chilson	Ashley Chilson	Marine Biology	Sophomore	Samuel Shephard, Ph.D.
Voce	Maria Voce	Mathematics; Physics	Sophomore	Daniel Sadasivan, Ph.D.
Basulto	Jelyssa Basulto	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Brookshire	Lillian Brookshire	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Chase	Zion Chase	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Clary	Kalia Clary	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Crantas	Jessica Crantas	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN

Crawford	Gianna Crawford	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
DeCleene	Maria DeCleene	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Donnett	Clare Donnett	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Egger	Sophia Egger	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Farrell	Katherine Farrell	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Frye	Grace Frye	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Gibbons	Grace Gibbons	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Grose	Abbey Grose	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Healy	Katia Healy	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Hicks	Sarah Hicks	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Legg	Celine Legg	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Leonardo	Olivia Leonardo	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Lewis	Elena Lewis	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Loizzo	Giovanna Loizzo	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Matista	Maryanna Matista	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Pilkington	Samuel Pilkington	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Roos	Timothy Roos	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN

Shahid	Eva Shahid	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Sjostedt	Gabby Sjostedt	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Troy	Grace Troy	Nursing	Senior	Patricia Hojnowski-Diaz, MS, MBA, RN
Horn	Hannah Horn	Philosophy; Communications	Sophomore	Maria Fedoryka, Ph.D.
Murdock	Maria Teresa Murdock	Philosophy; Theology	Junior	Justin Bonanno, Ph.D.
Kupcho	Daniel Kupcho	Physics	Junior	Daniel Sadasivan, Ph.D.
Mourad	Melana Mourad	Physics	Senior	Daniel Sadasivan, Ph.D.
Breen	Grace Breen	Politics	Freshman	Lidiya Zubytska, Ph.D.
Nguyen	Helen Nguyen	Politics	Junior	Seana McGuire, D.C.L.
Parks	Seth Parks	Politics	Sophomore	Lidiya Zubytska, Ph.D.
Malley	Theresa Malley	Psychology	Junior	Stefanie Morris, Ph.D.
Owen	Clare Owen	Psychology	Junior	Stefanie Morris, Ph.D.
Blaine	Justin Blaine	Psychology	Senior	Stefanie Morris, Ph.D.
Chase	Therese Chase	Psychology	Senior	Stefanie Morris, Ph.D.
Ching	Kennedy Ching	Theology	Senior	Agnes Berki, Ph.D.

Applied Chemistry

Andrew Misek and Killian Kay

Evaluation of Anti-inflammatory and Analgesic Efficacy in a Topical O/W Emulsion Incorporating Arnica Montana, Lidocaine, and Cera alba

Description:

Chronic systemic inflammation is a contributing factor in the development of various malignancies and degenerative conditions, including Type 2 diabetes, Arthritis, and Atherosclerosis. This study investigates the formulation and therapeutic efficacy of a topical oil-in-water (O/W) emulsion incorporating Arnica montana, lidocaine, and Cera alba (beeswax) as synergistic anti-inflammatory and analgesic agents. The delivery vehicle was developed using an emulsion system optimized via the Hydrophilic-Lipophilic Balance (HLB) method to ensure stability and prevent phase separation of the aqueous and lipid components. Following the integration of active ingredients at FDA-compliant concentrations, the formulation's efficacy was evaluated using porcine skin models. Quantitative analysis of inflammatory biomarkers was conducted via Enzyme-Linked Immunosorbent Assay (ELISA) to measure shifts in pro-inflammatory cytokine expression. The results demonstrate that a stabilized O/W emulsion can effectively deliver complex active agents to target inflammation, providing a potential therapeutic strategy for pain management and the relief of long-term systemic issues associated with chronic inflammatory states.

Biochemistry

Tiffany Le

The Optimization of Synthesizing Small Compound Derivatives of 4-amino-7-nitrobenzofurazan Associated with AEP Inhibition in Alzheimer's Disease

Description:

Alzheimer's disease is a neurodegenerative disorder that slowly declines cognitive abilities. Previous research studies have found the presence of tangled Tau fibers and amyloid beta plaques in the brain, along with activity of asparagine endopeptidase (AEP) (aka. delta-secretase) in patients with Alzheimer's disease. This research targeted a possible treatment of Alzheimer's disease through synthesis of 4-amino-7-nitrobenzofurazan derivatives to inhibit AEP, a previously studied novel compound associated with AEP inhibition. After synthesizing the compound, reduction of the formed nitro-amine was tested with iron fillings and sodium dithionite. Nuclear Magnetic Resonance (NMR) analysis of the compound helped determine production of any by-products during the synthesis process. Previous results showed that sodium dithionite was more effective in forming less by-products after the reduction step. Therefore, we are testing the optimization and effectiveness of

using sodium dithionite as a reducing agent. Alongside synthesis optimization, the purity of small molecule derivatives were tested following purification using Liquid Chromatography - Mass Spectrometry (LCMS) analysis. These results will help in providing a more efficient method in synthesizing small compound inhibitors for Alzheimer's disease.

Anika Lenci

Major Vault Protein Reassembly with INT tags

Description:

In vitro scaffold-coordinated refolding of denatured major vault protein monomers into assembled vault-like nanoparticles was attempted by adding DNA or hyaluronic acid-binding tags to MVP monomers, allowing the MVP to align rotationally and translationally along these linear molecules. This was proposed to mimic the polyribosome assembly in vivo. MVP variants tagged with INT-CFP, INT being a well established fusion tag, were expressed in E. coli and purified under denaturing conditions. Dynamic light scattering showed the formation of nanoparticles with a hydrodynamic radius of ~26 nm, consistent with the formation of vault-like nanoparticles. Transmission electron microscopy and FRET analysis confirmed the presence of vault-like particles as the fluorescence intensity was consistent with intact INT binding sites and the absence of aggregation-caused quenching or burying of the INT. This is the first successful instance of bioengineering of homogenous and heterogeneous vault-like nanoparticles, and at a potentially much larger scale than current protocols.

Tyler Delyon, Gabriela Breen, Clare McNeill, Anika Lenci, Martin Gonzales, Gracemarie Yeh, and Albert Jagels

Understanding Synthetic Vault Refolding

Description:

We examined how factors of the refolding environment of major vault protein (MVP) monomers with scaffold-binding MARY tags would independently contribute to successful vault nanoparticle refolding. Denatured MVP monomers were exposed to refolding buffer conditions. Under normal buffer conditions, organized vault nanoparticle formation is little to none. Using a novel scaffolding system introduced to the MVP monomers, researchers have demonstrated that more organized and distinct vault-like nanoparticles refold. Further research sought to elucidate the behavior of the MARY tag that is pre-eminent in the scaffold refolding protocol. The refolding buffer pH, salt concentration, and DNA scaffold size were investigated for their impact on nanoparticle formation. Vault-like nanoparticles can be analyzed for ideal and homogenous size by a Dynamic Light Scattering system as well as functional assays. The function of the vault complex remains largely unknown, though it is highly prevalent in protein expression in human cells. By optimizing MARY MVP refolding conditions, proper vault-like nanoparticles can be made and their biological effects examined. This research optimizes the engineering of vault nanoparticles, allowing mass biological functional tests as well as translational application to areas such as drug discovery.

Benjamin Freeze

Monitoring a Classroom for Illness Through the Use of Intrinsic Fluorescence

Description:

The COVID-19 pandemic exposed the urgent need for faster and easier ways to detect infectious threats before they spread. Testing is still mainly aimed at people who show symptoms, which means early detection and responses are limited, and those who spread the infection without symptoms may not be identified at all. An advancing area of research—airborne pathogen detection—aims to fill this gap by continuously monitoring shared spaces like hospitals, airports, and schools for airborne pathogens. This project uses a typical classroom as a test environment to explore how light-based sensing, specifically fluorescence, can accurately detect biological signals generated by people in a busy setting, a classroom. Measurements were collected with and without people present to understand what "normal" background conditions look like and how human activity influences airborne markers. The study also looked at Far-UVC lighting as complementary technology that can activate automatically when certain biological markers rise above normal levels. Together, these methods point toward new ways to help communities identify and respond to invisible infectious risks—before the outbreak spreads.

Bree McAfee

Optimization of Mineral-Based Sunscreen: Integrating Zinc Oxide and Titanium Dioxide into a Highly Stable Emulsion for Enhanced UV Protection

Description:

For this research, multiple mineral based sunscreen formulations were developed. This was done by continuing the past research of creating an oil-in-water moisturizing emulsion optimized for stability, aesthetics, and moisturization, and using this as a base for the sunscreens. These sunscreens were developed by adding inorganic mineral based UV filters including: Zinc Oxide (ZnO) and Titanium Dioxide (TiO2), to the pre-optimized base moisturizing emulsion. Nine different sunscreen emulsions were created consisting of a variety of ranges according to FDA monograph levels. The range maxed at 25%, which is the FDA limit for these chemicals. The formulations created included: Zinc Oxide (ZnO), or Titanium Dioxide (TiO2) with a range of 15-25%, and a 50/50 mixture of both ZnO and TiO2 with the same ranges. Currently, a UVA-UVB absorption method is being developed in the laboratory to assess the performance of these sunscreens to test their UV broad spectrum protection levels, transparency (white cast), and photo-stability.

Zofia Sielaff

The Boc Breakthrough: Successful Nitro Substitution and Reduction Reactions with a Challenging Nucleophile

Description:

This study focused on three experiments investigating the nucleophilic substitution and subsequent nitro-reduction reactions of 4-chloro-7-nitrobenzofurazan (the chloro compound) with 1-Boc-piperazine (the amine). The substitution reaction between the amine, chloro compound, DMF, and the pyridine base (Py) was highly successful in producing a mostly pure, intermediate product with few issues during the experimental process. However, the reduction experiment presented persistent challenges, particularly with several conventional reduction conditions and the Boc group on the amine; previous attempts frequently resulted in the group "falling off" the amine. To overcome this recurring issue, a modified reduction protocol was adapted through collaborative efforts from the Asian Journal of Chemistry. Implementation of this procedure enabled the first successful reduction of this amine with the preservation of the Boc group. However, two trials of this reduction reaction were required; despite purification, the first trial yielded an impure product. In the second trial, the product was not purified through column chromatography, but it nonetheless appeared on the mass spectrometer with an experimental molecular weight value equivalent to that of the theoretical weight, confirming product formation. This was the first time a nitro-reduction product has appeared on the mass spectrometer—a breakthrough for the lab, and for further steps towards biological testing.

Michael Gotlund

Organic Synthesis of AEP Inhibitors to Combat Alzheimer's Disease

Description:

Alzheimer's disease (AD) remains a devastating neurodegenerative disorder, primarily impacting the elderly population and their loved ones. A critical driver of AD pathology is the aggregation of amyloid-beta and tau proteins in the brain, which lead to synaptic loss and cognitive decline. Research has identified asparagine endopeptidase (AEP) as a key protein responsible for the proteolytic cleavage of these proteins, thereby triggering their toxic accumulation in the brain. Small-molecule inhibitors that disrupt the aggregation process are potential treatments for AD. Compound 11 was found to inhibit AEP and reduce Alzheimer's pathology in mice. This poster details the novel synthesis of structural analogs to compound 11 which may better prevent aggregation. The synthetic route explores aromatic nucleophilic substitution on a 4-Chloro-7-nitrobenzofurazan core using diverse amines: 2-pyridylethylamine, 3-phenylpiperidine, tetrahydropyran-2-ylmethylamine, and 1-methylpiperazine. Subsequent nitro reduction of these intermediates yielded an array of pure analogs. These compounds represent a promising step toward potent therapeutics for the treatment of Alzheimer's disease.

Biology

Amanda Le and Kennedy Ching

Evaluating the Effect of Caffeine on Menstrual Pain Using the Myometrial Cell Line as a Model System

Description:

At least one in four women who menstruate experience severe menstrual pain (dysmenorrhea) that can lead to increased absenteeism every month. One study found caffeine consumption to negatively impact the female reproductive function. It implicated hormonal imbalance, change in organ structure, and pain (MDA). Other studies indicated positive effects such as muscle relaxation. We want to investigate whether or not caffeine has a positive or negative effect on menstrual symptoms. An in vitro model system, namely, myometrial cell culture will be used. The effect of a caffeine metabolite, the paraxanthine, will be evaluated. The myometrial cells will be maintained in a supplemented DMEM medium at 37oC in 95% oxygen and 5% carbon dioxide. It will be grown in the presence or absence of a paraxanthine which will mimic caffeine's absorption in the uterine tissue. High levels of prostaglandins (PGF2α and PGE2), malondialdehyde (MDA), and intracellular calcium are directly correlated to uterine contraction pain. We will evaluate the amounts of these markers using High-performance liquid chromatography (HPLC) and Mass Spectrometry (MS). We expect that the presence of paraxanthine will worsen symptoms which can be detected by the increased levels of these markers.

Gregory Higgins

Adsorption Efficacy of SDS-Modified Zeolite for Micropollutant Removal

Description:

The presence of endocrine-disrupting compounds (EDCs) like estradiol in aqueous environments poses ecological and public health risks.This research explores the application of surfactant-modified zeolite (SMZ) for the adsorption of estradiol from contaminated water. Natural zeolite underwent a two-stage modification process: a 2M NaCl pretreatment followed by exposure to 10 mM Sodium Dodecyl Sulfate (SDS) to create a hydrophobic surface layer. To overcome challenges with zeolite being too fine for filtration, centrifugation at 3,500 RPM was used during preparation to ensure material consistency.

The ability of the modified zeolite to extract EDCs from water was evaluated using an aqueous 0.003 mg/mL 17B-estradiol standard solution. Results are compared against unmodified zeolite controls to quantify the improvement in adsorption provided by the SDS layer. This study demonstrates a scalable and cost-effective method for enhancing the utility of natural minerals in water purification, specifically targeting the removal of micropollutants through chemical optimization.

Damien Decembrini and Benjamin Freeze

Characterizing Bioaerosols Through Fluorescence Spectroscopy

Description:

Early detection of airborne infectious viruses remains a persistent challenge in public health and environmental monitoring. This project evaluates whether intrinsic fluorescence signatures can provide a biochemical basis for real-time airborne pathogen detection and identification. Using optical excitation across the UVA and UVB range, we characterized absorbance and emission profiles of pure aromatic amino acids, established linear ranges using UV spectroscopy and fluorometry, and analyzed mixtures to begin constructing a spectral library capable of distinguishing composite biological signals from environmental interferents. We also evaluated how the fluorescence signatures can be coupled with real-time particle sizing of the airborne particulate. This work supports further development of air-monitoring technologies. By correlating fluorescence intensity, spectral ratios ("brightness"), and ultimately particle size distribution, we aim to discriminate biological aerosols from non-biological sources such as cleaning agents, dust, and other interferers. Long-term objectives include identifying spectral patterns associated with "sick" versus "healthy" environments and progressing toward differentiation of bacterial, viral, and fungal signatures in occupied spaces.

Zachary Lang

Assessing the Allelopathic Effect of Brazilian Pepper (Schinus terebinthifolius) on Native Plant Microbial Rhizospheres

Description:

Brazilian Pepper (Schinus terebinthifolius) is one of the most widespread invasive species in Florida and is classified as a category 1 invasive plant, meaning it significantly alters native ecosystems. Its ability to tolerate a wide range of habitats, produce abundant seeds with high germination rates, and grow as a liana or epiphyte has facilitated its prolific spread. Additionally, Brazilian Pepper (BP) has been shown to exhibit allelopathic properties that may influence the microbial communities of native plant rhizospheres. This study hypothesizes that BP alters bacterial composition within these rhizospheres. To test this, BP will be grown under greenhouse conditions alongside White Beggarticks (Bidens alba), a widespread native species that co-occurs with BP and has previously been shown to respond to its presence. Rhizosphere samples will be collected, and bacterial community composition and abundance will be analyzed using quantitative real-time PCR targeting 16S rDNA. Comparisons will be made between plants grown individually and those grown together to determine whether BP affects native rhizosphere bacterial communities through allelopathic interactions.

Jonathan Pawl

Construction and Expression of RAD52-GFP Fusion Gene in Yeast as a Biosensor of DNA Damage

Description:

Construction and Expression of RAD52-GFP Fusion Gene in Yeast as a Biosensor of DNA Damage. Jonathan Pawl and Stephen Cronin. Ave Maria University, 5050 Ave Maria Boulevard, Ave Maria, Florida 34142. Environmental conditions and chemicals that damage DNA induce a DNA damage response in cells. In the yeast Saccharomyces cerevisiae, the RAD52 gene is involved in the repair of double stranded DNA breaks and is activated in response to replication stress and ionizing radiation. The human homolog of RAD52 becomes essential for cancer cells which have defects in the BRCA1 and BRCA2 genes. Consequently, RAD52 is a potential target for cancer treatment. RAD52 is also of interest because of its change in expression in response to DNA damage, which could make it a useful indicator of exposure to mutagens. Accordingly, we set out: 1. to design and construct a C-terminal RAD52-GFP fusion protein, suitable for use in an undergraduate genetics lab looking at DNA repair in Saccharomyces cerevisiae. 2. Develop a protocol for gene editing in yeast suitable for use in an undergraduate molecular biology lab. 3. Make a eukaryotic biosensor suitable for detection of DNA damaging agents in environmental samples. We report on the construction of the RAD52-GFP fusion by Golden Gate assembly, replacement of the native RAD52 by CRISPR-Cas9 in yeast, and expression of RAD52-GFP in response to known mutagens and environmental samples. Keywords: DNA repair, Saccharomyces cerevisiae, biosensor, classroom lab

Angelina Puthumana

The Effects of Plant Extract Formulations on Antibacterial Activity and Oral Antibacterial Persistence Against Oral Pathogens

Description:

As part of an ongoing study to address a major worldwide health crisis, we study here the effects of plant extract formulations on antibacterial activity and oral antibacterial persistence against oral pathogens. This study aimed to evaluate how various plant extract formulations affect the antibacterial performance, biofilm disruption, stability, and oral antibacterial persistence of plant-derived compounds against bacteria such as Streptococcus salivarius and Lyophilized Lactobacillus. Extracts will be made of three plants including Thymus vulgaris, Moringa Oleifera, and Magnolia grandiflora. Each plant extract will be integrated into multiple formulations including aqueous-based, glycerin-based, and gel-based. Culture tubes containing Brain Heart Infusion broth, bacteria, and their respective antibacterial formulation will be incubated. Bacterial growth and formulation efficiency will be quantified through turbidity measurements. Following this preliminary testing, biofilm formation will be quantified with staining procedures. The three most effective formulations will then be tested on saliva-coated hydroxyapatite discs to mimic the oral pellicle. The discs will be rinsed with saliva, and the saliva will be collected and measured to assess antibacterial persistence. The results of this study may help to provide a foundation for future studies on plant-derived antimicrobials as alternatives to conventional oral antimicrobials.

Isabela Snyder

Alzheimer's Disease Research Methoxyethylamine Synthesis and Nitro-Reduction Reactions

Description:

Alzheimer's disease is a neurodegenerative disorder caused by the formation of amyloid plaques and tangles in the brain. However, specific amine groups such as Methoxyethylamine can be combined with amine-based compounds to act as inhibitor proteins. This is used to prevent the formation of plaques in the brain. A known benefit of this amine includes "cognitive enhancement" in Alzheimer's patients. The main reactions performed were synthesis and nitro-reduction reactions to turn the amine into a solid. First, different synthesis reactions were performed using different solvents which would reveal the properties of the amine and its ability to interact with plaques. The first synthesis reaction used Dichloromethane and the second used Acetonitrile. The first was consistent but the second was not. Then, two Nitro-reduction reactions were performed. The first used Tin Chloride as a reducing agent to turn the nitro group to the amine group while the other used Dichloromethane and Sodium Dithionite. Further Synthesis and Nitro-reduction reactions will be performed with different solvents to see where Methoxyethylamine is the most soluble.

Classics & Early Christian Literature; Computer Science; Mathematics

Antonio Iijima:

Constructing an NPDA Parser Generator for Modular Attribute Grammars

Description:

In 1966, Noam Chomsky first introduced the idea of a hierarchical division of formal grammars. This was further developed and codified in later research as the Chomsky Hierarchy, an ordering of classes of formal grammars by the complexity of the languages they describe and the type of automaton required to recognize them. Most modern programming languages are in the class of context-free languages (CFL) and are recognized in practice by parsing algorithms modeled on nondeterministic pushdown automata (NPDA). The array of tools available to transform a formal grammar (usually in BNF or some related metasyntax) into a working parser is extensive; nonetheless working with these parser generators often requires syntactic manipulation of the standard BNF syntax to embed the grammar into a program readable by the parser generator, and may result in an undesirable entangling of syntax and semantics (as in standard attribute grammars). The current project simplifies this through multi-stage syntax and semantics processing, eliminating

the need for invasive syntax requirements and strictly separating syntax specification from semantics. This results in a fully modular, minimalist programming language implementation system which automates much of the boilerplate found in other parser generators, yet retains the expressive power of more complex systems.

Communications

Anne Marie Randolph

To Conceal or Reveal: The Power of Therapeutic Language and the Danger of Losing Sight of the Person

Description:

This research focuses on the question of whether modern therapeutic language further reveals or conceals the human person. Using Martin Buber's writing, I and Thou, as the framework for my response, I seek to show that therapeutic language often not only conceals the person but also shifts our perspective of reality and causes us to view others as an 'it' rather than a 'thou.' By exploring authors Byung-Chul Han, Kenneth Burke, Walker Percy, Walter Ong, Thomas Szasz, and many others, this research presents a broad picture of how the rhetoric surrounding mental health has led to both viewing unique and personal situations in a systematic way while also creating an environment that allows the breaking of decorum and the creation of a false reality. The paper ends with a proposal of the revelatory power of dialogue as an antidote to the concealment of the person in therapeutic language.

Noah Perez

Psychagogia along the Via Negativa: The Building of a Rhetoric of Apophasis with Nicholas of Cusa, T. S. Eliot, and Mark Rothko

Description:

This paper provides a rhetoric of apophatic language (that of negation, contradiction, and silence) retrieved from the Platonic tradition, primarily through the figure of Nicholas of Cusa. This treatment of apophatic rhetoric combats two contemporary trends in academic discourse: a reduction of rhetoric to a mere means of power and a lack of grounding in the rhetorical tradition. Nicholas of Cusa's rhetorical movement from negation to contradiction, ultimately residing in silence, is found in a variety of poetic and artistic pieces. After formulating this apophatic rhetoric, this paper illustrates its tripartite movement in T. S. Eliot's "Ash-Wednesday" poem and Mark Rothko's "Black and Grey" paintings. This application demonstrates the rhetorical and poetic grasp and breadth such a theory of criticism can have, as well as the relevance. First backwards, allowing

more investigation into the Platonic apophatic, rhetorical tradition before Cusanus such as Proclus, Pseudo-Dionysius, or St. Bonaventure. Second, forward-facing; having new terms and a new rhetoric, future scholarship can construct new formulations and speeches to negate the oversaturated world of words and images in the contemporary political climate.

Computer Science; History

Michael Martinez

Hashing, Rehashing, and Fractal-Hashing

Description:

One of the fastest data structures for insertion, indexing, and deletion is the hash table. By deriving an ideally-unique number using a key ('hashing'), all of these operations can be performed with O(1) time complexity. However, two keys can sometimes result in the same hash value, causing a 'collision' that must be dealt with using a slower solution, often separate chaining, which in the worst case can result in O(n) time. The fractal-hash table handles these collisions in a more efficient manner, keeping closer to O(1) than algorithms such as open addressing and separate chaining. This table, instead of following the standard approach, creates a new hash table which will likely have reduced collisions. This results in O(m) time, where m is the number of collisions, while significantly sacrificing space complexity. In cases where there are too many collisions, the fractal-hash table can fall back to separate chaining, which solves the worst edge cases. This table can also accept any amount of data, recursing to fit demand until the fallback is reached. Fractal-hash tables maintain the best-case performance and only slightly impact the worst-case as a result of its recursive and adaptive nature.

Exercise Physiology

Vincent Sabatino

Effects of Blueberry Extract on C2C12 Skeletal Muscle Cell Viability and Metabolic Response

Description:

Skeletal muscle fatigue and metabolic stress are closely associated with oxidative damage and lactic acid accumulation at the cellular level. Blueberries are rich in polyphenols and anthocyanins, compounds known for their antioxidant and anti-inflammatory properties. This study investigates the effects of blueberry extract on C2C12 murine skeletal muscle cells to evaluate potential protective or metabolic-modulating effects. Cultured C2C12 cells were maintained in DMEM supplemented with penicillin under standard incubation conditions and treated with controlled concentrations of blueberry extract. Cellular responses were assessed through observations of morphology, viability, and overall cellular health following treatment exposure. It was hypothesized that blueberry extract would promote improved cellular resilience by reducing oxidative stress–related damage and supporting metabolic stability. Data were recorded and compared between treated and untreated control groups to assess differences in cell condition and response. This study aims to contribute to a broader understanding of how naturally occurring antioxidants may influence skeletal muscle cell health and recovery at the cellular level.

Health Science

Danielle DiMaio

Delayed Expression of Cytokines After Reperfused Myocardial Infarction

Description:

According to the CDC, nearly 1 million people died from cardiovascular disease in 2023 alone. Moro et al., 2026, studied the immune system responses post-heart attacks. They hypothesized that signaling proteins (cytokines) released by the immune system may harm the cardiac tissue during recovery. The scientists studied several cytokines, including TNF-alpha, IL-1beta, CINC2, and CINC3. They evaluated the cytokines using ELISA and ChemiArray. Male Wistar rats were used as model organisms and subjected to coronary occlusion before blood flow was restored to the heart in order to mimic heart attacks. The cardiac function and tissue integrity in the rats were examined five, seven, eight, and 10 days after the induced heart attack. They observed marked deteriorations including thinning of the left ventricular free-wall and cavity dilation. Additionally, heart function had decreased. The ELISA and ChemiArray results indicated that overexpression of proinflammatory cytokines can lead to early cardiac dysfunction and failure.

Anna Szucs

The Study of Toothbrush Types and Toothpaste on Tooth Whitening

Description:

Tooth discoloration is a common aesthetic concern influenced by factors such as diet, oral hygiene, genetics, and aging. While professional whitening treatments are effective, many individuals rely on store-bought products for more accessible and affordable solutions. As a result, understanding how everyday oral hygiene tools contribute to tooth whitening is important for consumers and dental professionals. This study investigates the impact of different toothbrush types and toothpaste formulations on the effectiveness of tooth whitening. The primary objective of this research is to compare whitening effects of manual versus electric toothbrushes when used with fluoride-based and abrasive whitening toothpastes. The different brushing mechanisms of toothbrushes may influence stain removal and enamel appearance. Fluoride-based toothpastes primarily focus on enamel protection and remineralization. By strengthening the enamel, fluoride-based toothpastes attempt to maintain a brighter, healthier tooth appearance. Abrasive toothpastes aim to remove surface stains through mechanical action. By examining these variables together, this study seeks to determine which combination yields the most noticeable improvement by comparing tooth shade over a defined period.

Veronika Kubisova and Faith McCarthy

Effectiveness of Silica-rich Water Reducing High Concentrations of Aluminum

Description:

Aluminum exposure from water, consumer products, and certain medications can lead to overaccumulation in the body, potentially contributing to neurological conditions such as Alzheimer's disease, dementia, and autism-related disorders. Current evidence highlights a potential role for silica (SiO_2) in promoting the removal of aluminum through the formation of hydroxyaluminosilicate—an easily excretable compound. This study investigates the effectiveness of silica-rich beverages in binding and removing aluminum from solution. Six common water sources —Fiji water (88 mg/L SiO_2), purified water, tap water, distilled water, and Waterloo water—were tested to detect any amounts of silica present. The samples will then be tested against a known aluminum concentration. We hypothesize that silica will effectively bind to aluminum when present in excess, forming stable complexes that can be efficiently excreted through renal pathways. Preliminary findings are expected to support that beverages with higher silica concentrations, particularly Fiji water, have a greater capacity for aluminum binding. These results could inform future dietary recommendations and public health approaches for mitigating aluminum accumulation in humans using natural, accessible interventions.

Maria-Isabella Talafuse

Copy Number Variation in the Human Genome

Description:

Designing an experiment to detect copy number variation for an undergraduate genetics laboratory assignment using qPCR M.R. TALAFUSE and S. CRONIN. Department of Biology, Ave Maria University, Ave Maria, FL 34142. While most protein-coding genes are present in two copies, other sequences are present in 1 to 1000s of copies. These sequences in multiple copies are known as copy number variations (CNVs). Some CNVs in the human genome contribute to traits and diseases in the human genome and some CNVs may have no influence on phenotypes. The purpose of the research is to develop an undergraduate laboratory to assess CNVs in students in a Genetics course. The goal of the experiment is to detect CNVs in humans. We hypothesized that variation in copy numbers can be detected in an undergraduate lab class using qPCR. The sequences we are looking at are present in multiple copies in the human genome. We have developed and are testing methods to quantify relative copy numbers of five sequences: Mitochondrial MT-ATP6, LINE-1, ALU-1, OPN1MW, and OPN1LW. We are using SCN2A as the control sample, as it is an autosomal gene. MT-ATP6 is a mitochondrial gene which forms a protein that is a subunit of ATP synthase. LINE-1 sequences are active, or remnant transposons present in half a million copies in the human genome. ALU-1 is another transposon of interest, and it is estimated to be present in over a million copies. OPN1MW and OPN1LW produce the green cone opsin in the human eye, and it is anticipated the CNV will vary on the biological sex of the individual. When the experiment is concluded, we expect to find successful results in detecting the CNVs of these gene sequences.
Keywords: Copy number variation, sequences, qPCR, gene, human genome.

Adelina Whiting, Amelia Pemrick, and Caroline Kutsch

Targeting the Tangle: Synthesis of 4-Chloro-7-Nitrobenzofurazan Derivatives to Inhibit Tau Cleavage

Description:

Alzheimer's disease is a progressive neurodegenerative disease known for cognitive decline with age. Two defining pathological features are amyloid-B plaques and neurofibrillary tangles composed of a protein called tau. In past studies, deposition of the amyloid-B plaques was the main target of research, new evidence shows that the abnormal degradation of tau plays a more critical role in the disease progression. In unaffected neural tissue, tau stabilizes the neuronal microtubules and supports intracellular transport. When the tau becomes proteolytically cleaved, the protein can fold incorrectly and become tangled and heavily disrupt cell signaling, which leads to eventual neuron death. Preventing the degradation and fragmentation represents a promising strategy for slowing the progression of Alzheimer's. This research focuses on the synthesis of a 4-chloro-7-nitrobenzofurazan substituted with an amine compound that can interfere with the tau cleavage. This compound was prepared through amine substitution, reduction and purification in order to isolate the final product. Through targeting the tau tangling at a molecular level, this research seeks to reduce tangle formation before it occurs.

Literature

Emily Campau

"Seeming and being have merged": Art as a Sacramental Mediator in Dante's Purgatorio

Description:

Many scholars have argued that Dante's discourse on artistic representation on Purgatorio's terrace of pride is his prideful poetic imitation of God's art. Yet scholars also bestow an interactive, and as I demonstrate, a sacramental, quality onto God's art, where His sculptures are both a sign of and make present the reality they portray. Thus, in this paper I will argue that Dante the poet does not pridefully imitate God's art but uses the bas-relief sculptures, the Our Father prayer, and the tombstone carvings on the Terrace of Pride as sacramental mediators which sculpts one's soul to prepare them for grace, purging both the sins of the terrace's shades and the pilgrim's own soul. First, when the pilgrim sees God's bas-relief sculptures of the Virgin Mary, King David, and Emperor Trajan in Canto X, the poet transforms art into a sacramental mediator through the sculptures' speech and movement, as the souls themselves also become like corbel-sculptures. Next, the poet mimics God's art and sets up the next step of the sacramental process, the request for God's grace, as he places a modified Our Father prayer in the mouths of the corbel-like shades in the opening of Canto XI, which prepares the pilgrim to become like a corbel himself, facing his own pride when he meets the illuminator Oderisi, who critiques the desire for glory in poets and artists. Lastly, as the pilgrim walks on God's tombstone carvings, the examples of pride in Canto XII, the poet reveals that God's sacramental art is successful, allowing him to purge his sin of pride to be worthy of the Beatific Vision in Paradiso. Through these examples, my paper will contribute a sacramental interpretation of art in Dante's Purgatorio, showing how Dante's imitation of God's art is not an act of pride, but a discussion on how man's creation of art is an expression of the Imago Dei.

Maria Landry

The Terrible Speed of Wholeness: Integrative Violence in the Child Characters of The Violent Bear It Away

Description:

Drawing on C. G. Jung's "Psychology of the Child Archetype," this paper will argue in favor of viewing O'Connor's child characters in The Violent Bear It Away as figures who dramatize the often brutal process of psychological and spiritual integration. As both a figure of "primordial origin" and "teleological futurity," Jung argues that the child archetype, in its fullness, functions as the model of the wholeness of the "self" and its conscious and unconscious forces. While Jungian influence can be found throughout the personal and published writings of Flannery O'Connor, the archetype of the child is a specific framework that I argue aids the reader in understanding the violence that occurs to and through the child characters in the novel. By comparing O'Connor's child characters with Jung's child archetypal theory, I will trace the progression of two subsections of the archetype to illuminate O'Connor's Catholic perception of the child, in its fullness, as a model of ontological wholeness. While Francis Tarwater embodies Jung's "child-god" in his integrative struggle through violence, Bishop personifies the "child-god," who maintains wholeness despite violence. Once these child characters are understood according to the Jungian lens, I will then turn to St. Thomas' Aquinas, a theologian loved by O'Connor, to act as a Beatrician guide in interpreting this integrative violence according to the struggle of the human soul towards its Final End.

Juliana Marchese

"If I lie down in Sheol, you are there": The Trinitarian Presence of God in Dante's Hell

Description:

A keen Platonic eye will note many triads in Dante Alighieri's Inferno. These imagistic and formal triads incarnate the Trinity as both foundational to and existing in Hell. At first glance, this depiction appears heretical to Dante's Christian religion; for a God of all Goodness and Being cannot seem to exist in a place of all Evil and Privation. However, close attention to Biblical Scripture, Saint Augustine, and Dante's trinitarian inversions reveal the Inferno's consistency with and explication of Christian tradition. Namely, Psalm 139 says, "if I lie down in Sheol, there you [God] are," and Augustine says that "If by sinning I go down to the depths of wickednesses... there also You [God] are present, to punish." With this understanding of God and Hell, Dante's Trinitarian inversions become both more lucid and poignant: Dante is attempting to convey how a Christian God may be said to exist in Hell. With Dante scholars such as Flack and Glending, a better understanding of how Dante approaches this concept and explicates its implications in his Inferno may be formed. Through images of Trinitarian inversions and invocations of Trinitarian Persons, Dante successfully illustrates the presence of God in Hell.

Marine Biology

Kyle Beiter, Gabriel Herber, and Aidan Ford

Diversity of Herpetofauna on Ave Maria University Land

Description:

Southwest Florida faces habitat alteration due to land development, contributing to declines in biodiversity and ecosystem fragmentation; a vulnerability pronounced in rapidly developing rural areas like Collier County. This study aims to conduct a survey of herpetofauna species and their populations on Ave Maria University lands. Targeted species include natives such as the Eastern Black Racer (Coluber constrictor) and Green Anole (Anolis carolinensis), among others. By documenting biodiversity, population density, and dispersion patterns, the survey will establish a dataset for ongoing monitoring. Comparative surveys at nearby Audubon's Corkscrew Swamp Sanctuary—a protected wetland with abundant herpetofauna communities—will provide a reference for evaluating ecosystem health and identifying conservation needs. This will provide an informative baseline to be referenced and consulted as more investigation is done into the populations within Ave Maria. This survey seeks to enhance understanding of local diversity and dynamics and inform conservation strategies.
The methods that we will use to accomplish this goal are as follows:

1.Drift fence feeding into a capture box for snakes, lizards, and land-dwelling amphibians
2, Aquatic funnel traps for aquatic herpetofauna
3. Ground cover in the form of plywood boards to provide refuge for herpetofauna

Charlotte Palmer, Julia Cichon, and Andrea Baez

Parasitic Abundance in Freshwater Fish Species in Ave Maria, Florida

Description:

This study investigates parasitic infections in freshwater fish species collected from aquatic systems in Ave Maria, Florida. The objective was to examine parasite prevalence among native and non-native fish species and compare infection levels between two local environments: referred to as Site A and Site B. The primary target species were bluegill and tilapia. Each specimen was dissected and analyzed for parasite abundance in the gills, skin, and intestines. Fish were collected using rod-and-reel methods with a variety of bait. Species collected from Site A included bluegill, tilapia, Mayan cichlid, golden shiner, and armored catfish, while fish collected from Site B included Mayan cichlid and Florida bass. There was a primary focus on bluegill and tilapia due to their higher catch frequency and availability for analysis. Preliminary observations indicate that there was no significant difference in parasitic infection between native and non-native fish species. Observations also found that fish collected from Site A exhibited a higher parasite load compared to those collected from Site B. These findings contribute to a broader understanding of parasite distribution across freshwater ecosystems and among native and non-native fish species.

Mathematics; Physics

Maria Voce, Daniel Kupcho, and Melana Mourad

Deep Neural Network Driven Simulation Based Inference Method for Pole Position Estimation under Model Misspecification

Description:

The method of Simulation Based Inference is shown to lead to a more accurate resonance parameter estimation than traditional $\chi 2$ minimization in certain cases of model misspecification in a case-study of $\pi\pi$ scattering and the $\varrho(770)$-resonance. Models fit to certain data sets using $\chi 2$ minimization can make inaccurate predictions for the pole position of the $\varrho(770)$. SBI is shown to make more robust predictions for the pole position for the pole positions on these models and data sets. This is significant, both as a proof of concept that the SBI method can be used in cases of model misspecification, and because models of $\pi\pi$ scattering are crucial part to many physical systems of contemporary interest ($a1(1260)$, $\omega(782)$ etc.).

Nursing

Zion Chase, Elena Lewis, Clare Donnett, and Katia Healy

Improving Wound Healing Outcomes: A Nursing Education Approach to Dressing Effectiveness

Description:

Research shows that various types of wounds require different types of dressings, and therefore, both hydrocolloid dressings and standard gauze are effective in wound care. In our research, we focused on qualitative data and found that there are not always clear guidelines on hospital units regarding the different types of dressings that provide the best outcomes for patient satisfaction and wound healing. The nurses' lack of knowledge leads to waste of hospital supplies, poorer quality of care, and delayed wound healing. Our conclusion is that nurses require further education to be implemented in a way that is simple and accessible on the units. Based on this research we recommend implementing the use of standard guidelines for use of dressings on the units. These guidelines would be in the form of little placards or posters around the floor that list when to use HC dressings and when to use standard gauze. By using these placards, which could easily be clipped to their badge, nurses would have reliable guidance for choosing the best dressing for the type of wound the patient has. The anticipated outcome is to provide the best and most efficient patient care while saving resources, time, and money for the hospitals.

Gianna Crawford, Maria DeCleene, Katherine Farrell, and Olivia Leonardo

Effectiveness of Classical Music Therapy on Psychiatric Illnesses

Description:

In many adult mental health crisis units, patients are often negatively impacted by the high-stress and high-anxiety environment. Through various studies, it has been shown that improvements in patients' surroundings brought on by the use of classical music therapy (CMT) has a positive effect on patients' mood, symptoms, and physiological responses in relation to their mental health diagnosis. Using set times of implementing (CMT) in a closed environment was determined to reduce negative mental health symptoms, leading to better patient outcomes. This intervention helps with practice excellence, leading to reduction of symptomatic events and escalations, which is the goal of mental health units. The proposed study is qualitative in nature in that it focuses on quality improvement in mental health patients. This mixed methods study utilizes qualitative and quantitative evidence.

Lillian Brookshire, Jessica Crantas, Sarah Hicks, Timothy Roos, and Grace Troy

Labor Technique Intervention: Does it Work as a C-Section Prevention?

Description:

To enhance patient delivery outcomes, reduce cesarean rates, and improve labor experiences, this study investigates whether specialized labor technique training for nurses increases vaginal delivery rates in first-time mothers compared to standard care. Using an evidence-based approach, the project integrates structured techniques—such as positioning, breathing guidance, and hands-on support—into nursing practice. A quantitative methodology will assess how effective is the specialized labor technique training for nurses by the change in vaginal birth rates for first-time mothers. This initiative supports practice excellence by strengthening nursing competencies and promoting patient-centered care, offering valuable insights for optimizing maternal and neonatal health outcomes.

Gabby Sjostedt, Grace Frye, Kalia Clary, and Sophia Egger

Preventing Pressure Injuries in Patients with Mobility Restrictions by Implementing Turn Teams in Hospitals

Description:

Hospital acquired pressure injuries (HAPIs) lead to many corresponding issues related to hospital stays and can worsen a patient's overall health. Patients in hospitals develop pressure injuries because they are immobile. These patients rely on hospital staff to help them mobilize and turn, which relieve pressures on their bony prominences. If the patients are not mobilized, they are at risk for developing pressure injuries. Implementing turn teams in hospitals could ensure that the patients are being mobilized, which can reduce hospital-acquired pressure injuries. Patient outcomes will be improved because they are receiving intentional care. Both qualitative and quantitative methods were utilized to describe and explore the process of implementing turn teams and to gather statistics.

Abbey Grose, Eva Shahid, Giovanna Loizzo, and Maryanna Matista

Implementing a Buddy System to Reduce Fatigue Among Nurses

Description:

Does the enforcement of 30-minute breaks within a 12-hour shift reduce the risk for fatigue-related errors by nurses in the hospital settings? The nursing profession is associated with high levels of fatigue, which has caused increased burnout in nurses and patient error rates. In current practice, nurses take breaks as they are able, which can contribute to the chaos of the nursing environment. Additionally, in current practice, some nurses feel that they cannot take rest breaks because there is no structured system that allows for anyone else to watch their patients. Implementing a unit-enforced buddy system allows and ensures nurses take rest breaks. Nurses are assigned a nurse buddy, and the pairs discuss when they are taking their breaks and hold each other accountable for taking their break. The goal of this implementation is to ensure nurses receive quality breaks, which will allow nurses to be more energized, experience less burnout, and better uphold patient safety in their practice.

Celine Legg, Samuel Pilkington, Jelyssa Basulto, and Grace Gibbons

The Role of Pre-Op Nursing Education in Cardiac Rehab After Open-Heart Surgery

Description:

Adherence to cardiac rehabilitation (CR) programs remains suboptimal, often due to insufficient patient understanding and motivation. An evidence-based practice approach was used to evaluate the effectiveness of preoperative nursing education in improving CR adherence. A systematic literature review was conducted using reliable databases. Studies were selected based on relevance to the PICO question. Data was analyzed to identify trends and effectiveness in patient participation and clinical outcomes. The review revealed that patients who received structured pre-operative education demonstrated significantly higher adherence rates to CR programs compared to those who received only post-operative education. Benefits included increased patient knowledge, reduced anxiety, improved self-efficacy, and enhanced motivation to participate in rehabilitation. Additionally, early education was associated with better functional recovery, reduced hospital readmissions, and

improved overall patient satisfaction. Preoperative nursing education on CR is an effective strategy to improve adherence, leading to better recovery outcomes in open-heart surgery patients. Integrating structured educational interventions before surgery can enhance patient engagement and optimize postoperative rehabilitation participation. Future research should focus on standardizing pre-operative education.

Philosophy; Communications

Hannah Horn

The Heart and the Spiritual Life: God's Use of Rational Affectivity in Seasons of Consolation and Desolation

Description:

Drawing from the Catholic personalist tradition, especially that of Dietrich von Hildebrand, this paper addresses the role of the heart in man's relationship with God. Through a framework of the soul's experience of affectivity, this paper focuses on the phenomenon of consolation and desolation, and the experiences and wisdom of the saints, notably, St. Ignatius of Loyola, St. Mother Teresa, and St. Catherine of Siena. There can be a tendency to devalue emotional experience, especially in the realm of faith. However, real experiences that range from profound consolation to intense desolation and spiritual dryness lead to questions about the role God has given to affectivity in the spiritual life. While failing to see the rationality of the emotions leads to a profound loss of vast treasures within the Catholic Church, a philosophical understanding of the value of the heart and the rational component of the emotions affirms the Church's spiritual tradition that is richly involved in the affective dimension of the person.

Philosophy; Theology

Maria Murdock

"I am thy father's spirit": The Key Role of the Nature of the Ghost

Description:

The figure of the Ghost who comes onto the stage in the first scene of Hamlet is one around which countless questions revolve. Is the ghost real? Where is he from? Hell? Purgatory? Hamlet's diseased imagination? It is not a mere speculative interest that looks for a response: it goes to the very heart of the play. The nature of the ghost has much to do with the essence of Hamlet's quest to avenge his father, and thus how the play is holding "the mirror up to nature". In this paper I argue that the ghost is a genuine apparition from the afterlife confirmed by both the information the Ghost provides and exterior witnesses. The imagery surrounding the ghost and the language used about it further indicate that it originates in hell. Hence Hamlet in his quest for revenge, while understandable, is bringing destruction upon himself and those around him.

Politics

Grace Breen

The Law and Religiosity: The Relationship Between Religious Language of States and Citizen Practice

Description:

The influence of religion in politics and vice versa has been a contentious site of inquiry in both academic and everyday discussion. How does the degree of religious language in a country's constitution or law code relate to the beliefs and personal practice of its citizens, based on views around marriage? I theorize that the religious context of a civilization shapes the way the law and constitution are written, which then in turn influences the practice of the country's citizens. The goal of this project is to determine how the religious language of a country's constitution and legal documents can impact personal belief, and how a country diverges from the beliefs it was founded upon. I first establish the degree of religious language in countries around the world, ranging from an established official religion, a confessed religion, to simply mentioning God. With these categories organized by region and religion, I then investigate the religious practice of its citizens, based on the individual belief and views around marriage. In this, the discrepancy between true religious belief, belief only in name, or culturally can be shown.

Helen Nguyen

Guarding the Constitution's Authority: Why Originalism Matters in Supreme Court Interpretation

Description:

The United States Constitution is the foundational document that has played a major role in shaping American law and government. Throughout the United States history, and most particularly beginning in the twentieth century. The Supreme Court justices have debated on how the Constitution should be interpreted. This debate focuses on whether the Constitution should be understood according to its original meaning at ratification during the Founding Fathers' time or should it be interpreted as a living document that has evolved with society. The Supreme Court does not have a uniform method of constitutional interpretation but they have different approaches depending on the constitutional issue that has been brought up to the Court. By looking at landmark Supreme Court decisions: Kennedy v. Bremerton School District, McDonald v. Chicago, Obergefell v. Hodges, and Dobbs v. Jackson Women's Health Organization. These landmark court cases provide a historical practice that tends to be read through originalism, while also broadly worded protections like liberty, dignity and punishment are usually interpreted with the living constitutional principles. By interpreting the Constitution based on its original meaning, this will help prevent any future justices from imposing their own personal values or political beliefs on interpreting the Constitution. As seen in cases like Obergefell and Atkins, using a living Constitution interpretation can actually lead to very inconsistent and unpredictable decisions that are moving away from what the Founding Fathers actually intended. Therefore, this thesis is trying to argue that originalism is a better approach and method to protect the Constitution's authority and ensures that the changes to the constitutional meaning are coming from the people through the amendments and not from the Supreme Court itself.

Seth Parks

Bismarckian Realpolitik: How to Wield Political Power

Description:

In my presentation, I will be going over my senior thesis topic of Bismarckian Realpolitik. From this tradition I will be promoting a conservative approach to pragmatism and realism in politics, particularly in foreign policy and international relations. I will primarily be focused on denying both liberal idealism as well as Machiavellianism and instead argue that one can be practical and pragmatic in politics while maintaining ethics and virtue. Realpolitik, in this view, is not the denial of morality in politics but the denial of baseless idealism in favor of striving for what is possible in the world rather than seeking to establish a utopia or falling into a survival of the fittest mindset. Politics, to Bismarck, is about striving towards noble ends so far as is possible while maintaining restraint and understanding of the limitations of human nature. In order to show this view in action I will be explaining the career of Bismarck, the impact he made on German and world history, how he dealt with other states during the Wars of Unification, how he maintained a new era of balance of power politics in Europe after 1871, and what modern conservatives can learn from his actions in foreign policy and in politics in general.

Psychology

Clare Owen

Study: Lingering unrest following the apparent resolution of interpersonal conflict: A descriptive-phenomenological study

Description:

This study seeks to understand the lived experience of lingering emotional unrest following the apparent resolution of an interpersonal conflict using Giorgi's (e.g., 2009) descriptive-phenomenological method of qualitative analysis. Extensive research has examined the nature of conflict, its relational effects, and resolution strategies; however, less attention has been given to the persistent subjective experiences that may follow a resolution that feels partial or insufficient. The application of Giorgi's method to written and spoken accounts of concrete, lived experiences of lingering unrest following the apparent resolution of interpersonal conflict revealed five common themes: 1) "spirals of analyzing," 2) feeling that one's perspective has not been truly understood or validated, 3) worsening of distress in response to continuous efforts to communicate one's perspective , 4) a sense that the way forward in the relationship is uncertain or unknown, and 5) carry-over effects into other relationships. By centering participants' subjective narratives, this study aims to deepen understanding of the emotional complexities that may remain following relational repair and to contribute to psychological insight into conflict resolution and emotional processing. This study is considered in the context of conflict resolution literature, including Georgakopoulos' (2004) work on the role of silence and avoidance in interpersonal conflict.

Therese Chase

From Acquaintance to Friend: A Phenomenological Study

Description:

This empirical study is a qualitative analysis of the lived (i.e., subjective) experience of the beginning of friendship. It uses Giorgi's descriptive-phenomenological method to identify general structures underlying the phenomenon of coming to reclassify an acquaintance as a friend. Ten themes or "moments" in this phenomenon emerged through the application of Giorgi's method to twelve rich descriptions of lived experiences: 1) observation of the other, 2) the appearance of the other as highlighted or standing out, 3) openness to a new friendship, 4) perceiving the other to be in a similar place in life in some domain, 5) chosen proximity to the other, 6) bids for connection, 7) experiencing the other as familiar, 8) familiarity of the other as comforting, 9) the other revealed as nuanced, and 10) wanting to be together. The results of this empirical study are considered in relation to existing research and theory on friendship from various disciplines.

Justin Blaine

All Eyes Are On You: A Descriptive-Phenomenological Analysis of Public Embarrassment

Description:

This ongoing qualitative study applies the Giorgi (e.g., 2009) method of phenomenological analysis to the phenomenon of public embarrassment to identify a general structural description of the lived subjective experience. The application of this method of analysis to eight naïve descriptions of public embarrassment has revealed four emergent themes: 1) the unveiling of one's persona, 2) judgment from others, 3) a need for escape, and 4) attention to the body as an object. These findings are considered in relation to prior studies on the objective and subjective experiences of embarrassment by Modigliani (1968), Kelter & Buswell (1997), and Robbins & Parlavecchio (2006). A descriptive phenomenological analysis stands to add to our understanding of the conditions necessary for public embarrassment to occur, the moments that constitute the experience as it unfolds over time, and the subject-world relations that are characteristic of the experience. This may lead to more effective mechanisms for coping with isolated experiences of public embarrassment and to insights into disrupting patterns leading to frequent experiences of this phenomenon. Of particular interest within this study are distinctions between pre-cursors to and experiences of embarrassment and of shame, two phenomena that are frequently conflated.

Theresa Malley

"Getting Into Character": The Lived Experience of Embodying a Theatrical Role

Description:

This empirical study applies Giorgi's descriptive-phenomenological method of analysis to actor-descriptions of embodying a theatrical role. This qualitative method is applied to ten accounts of concrete, subjective experiences of "getting into character" collected through interviews. The interviews covered experiences of casting, (e.g., a role is given to the actor to be received, first impressions of the character), rehearsal (e.g., initial disconnect with character, coming to view the character as a person, infusion of self into the character, awareness of interpretive power derived from the script/content of the production), and performance. The initial goal of this project was to identify a general structure of the phenomenon of "getting into character." Analysis of the interview data, however, suggests that the embodiment of a theatrical role is a complex phenomenon with opportunities for the pursuit of the general structure of a number of discrete experiences. This presentation will highlight, for example, the potential effects of audience presence on actors' experiences of their characters, including a deepened understanding of the significance of well-learned lines through a reversal of the desensitization that may result from repeated rehearsals.