CELEBRATION OF EXCELLENCE

ABSTRACTS

April 22, 2022
CONTENTS

Oral Presentations ......................................................... 3
Posters ................................................................. 9
CELEBRATION OF EXCELLENCE 2021
Abstracts

ORAL PRESENTATIONS

Examining the Impact of Spiritual Leadership on Career Calling Outcomes in a K-12 Educational Setting
Delani Dillard
Faculty Sponsor: Dr. Allison Burrus

The purpose of this project was to conduct a review of the career calling literature and develop hypotheses to test in the future. A specific focus of this research is the experiences of teachers working in a K-12 setting. The research specifically explored the relationship between leadership styles, the experience of career calling, and organizational outcomes related to career calling. Based on the research conducted, several hypotheses and research questions were identified and illustrated in a testable theoretical model. Hypothesis 1 states that living a calling will foster positive outcomes of job satisfaction and organizational commitment. The research on negative outcomes is less robust, so Research Question 1 asks if living a calling will lead to negative outcomes of workaholism, burnout and workplace exploitation. Based on research into several leadership styles, spiritual leadership was identified as the most likely to have a relationship with career calling. Spiritual leadership will act as a moderator to the direct relationships outlined above. Hypothesis 2 states that spiritual leadership will enhance the relationship between living a calling and positive outcomes. Research Question 2 asks if spiritual leadership will suppress the relationship between living a calling and negative outcomes. Future directions are discussed.

Exploring the Online Learning Needs of Educational Institutions: A Re-designed Innovative Online Whiteboard Application
Lucas Schultz, David Thompson, Renee Hartman, and Jarrett James
Faculty Sponsor: Dr. Zheng Huang

Due to the COVID-19 pandemic, most in-person educational activities have been significantly affected. Most educational institutions adopted online/hybrid learning as the main way to interact with staff and students. Therefore, converting the educational content to a more interactive and user-friendly format became especially important. A physical whiteboard/blackboard is an important tool to effectively deliver an interactive educational experience. However, the online whiteboard features provided by most mainstream online applications cannot perfectly replicate the advantages of the physical whiteboard. For example, it is hard to maintain and synchronize the digital content based on different views. In our project, we focused on developing a user-friendly and effective remote whiteboard application to create an optimal, interactive learning experience for both the teachers and the students. These features include 1) automatically organizing the random digital contents on the whiteboard for multiple users, 2) providing customized private/public whiteboard space for multiple users, and 3) allowing users to quickly scan and browse recorded video and digital contents on the whiteboard using AI-based image recognizing algorithms. To evaluate the usability of certain features, we conducted interviews to assess our application’s numerous iterations with various participants. This application has the potential to foster a new and improved online learning environment for students across the world.

Inclusive & Accessible: Illinois College Student Organization Collections
Ar’Mand Erving, Ren Parks
Faculty Sponsor: Samantha Sauer

“Inclusive and Accessible: Historic Student Organization Collections” is an ongoing multi-year project developed to document, record, and explore the history of student organizations at Illinois College and to make underrepresented groups’ histories more accessible to the campus and community at large. This process includes identifying the information currently preserved in the Khalaf Al Habtoor Archives at Illinois College, identifying the information and records we do not have, and putting together a plan to fill the gaps while also ensuring that they don’t happen again. The process to collect, preserve, and share an inclusive history of IC student organizations will span over many years. This presentation will include an overview of the initiative and include information on current activities as well as planned next steps. After putting the project’s history into context with a description of phases one and two, we’ll discuss phase three’s current efforts to share our work and information about the project with the campus and community at large.

Playwriting and Directing Theory and Samples
Greg Saiki
Faculty Sponsor: Dr. Aasne Daniels

I will be presenting a combination of directing and playwriting at the Celebration of Excellence. I will present a scene from my student directed one-act The Getaway containing a confrontation between a camp counselor and the main character, and I will present a written scene about a cold-war era nuclear-armed submarine that just discovered the Soviet Union and United States have gone to war, and the United States suffered a devastating lost. Their final order is to strike back at the Soviet Union, and the crew deals with the question of whether to retaliate with their nuclear weapons or not.
During the speech portion of this project, I will speak about the writing and directing process. Firstly, I plan to speak about acting principles and how they apply to both the writing and directing process. These principles include intentionality within speech, and the personal motivations of characters. Secondly, I will discuss the importance of conflict and how it can be elevated in both writing and directing. This includes the principle of the path of most resistance, and the principles of managing tension once it has been introduced. Thirdly, I will discuss the introduction of themes and abstract concepts in a scene and the various ways to write and direct them.

Augmented Reality Research for Mobile Authentication
David Thompson, Zihang Jiao
Faculty Sponsor: Dr. Zheng Huang

With modern day’s technology advancing at an unprecedented rate, it is important that we continue to develop security authentication methods. The advances of spatial information are ever-increasing, but the use of authentication approaches using this method is limited by a lack of development. We have chosen to research augmented reality on a mobile computing environment in order to develop a new method of authentication. There is a need to continue the maturation of augmented reality as it could be highly influential towards authentication in the future. In this, we discuss the advantages and disadvantages of previous authentication methods compared with our method; as well as, showcasing how future research may be done to continue to develop this technology.

The New Chicano/a/x: analyzing intergenerational differences and their interactions with society and self
Guadalupe Trejo
Faculty Sponsor: Dr. Diana Grullon-Garcia

“Quiero recordarle al gringo; yo no crucé la frontera, la frontera me cruzó”
- Los Tigres Del Norte

Today, the Mexican descent experience is not discussed widely in the US academia and society, nor is it extensively researched. The exclusion of these populations is detrimental to the equitable development of teaching practices that best serve this group of students. With Mexican descent populations overwhelmingly making up 61.4% of the overall Hispanic population in the United States (2019), my analysis aims to portray their experiences. Using Fernando Ortiz and Gloria Anzaldua’s theories of social and cultural identities, this paper will research three generations of Mexican/Mexican descent populations. This project will also define social concepts to understand a range of different generations’ cultural identities. The Mexican descent experience in the U.S. is unique; its population undergoes the effects of xenophobia despite having developed their communities’ histories on U.S. soil. As an outcome of my analysis when including these communities, I propose to draw distinctions between the experiences of Mexican descents across generational lines with a new sociological framework titled the Mexican Descendant Experience Model (MDEM), a tool I created to study intergenerational differences in self-perception and to translate them to socialization practices. This model fosters understanding about Mexican descents to best integrate these communities into academia.

Forever Blighted: The Impact of War
Mathew Jumamil Ragonjan
Faculty Sponsor: Samantha Sauer

“Forever Blighted: The Impact of War” is an interdisciplinary initiative exploring the WWII service and its impact on the life and work of Paul Findley ‘43 H’73 (1921-2019). The multiyear project explores Mr. Findley’s journey as an Illinois College student to enlistment as well as his wartime experience with collections including an expansive range of documents, artwork, photographs, textiles, scrapbooks, and 3D objects. This presentation will focus on project progress and products developed during the 2021-2022 academic year, highlighting Findley’s Experiences alongside project work and scholarship to interpret and preserve the collections.

Forte Open Mic Poetry and Fiction Reading
Ava Maria Mendoza, Ren Parks, Serenity Vasquez, Kendall McCalla, Jessamy Hintz, Abigail Weisner
Faculty Sponsor: Dr. Kara Dorris

Contributors and editors of IC’s literary journal, Forte, will read their own original creative poems and stories in an open mic fashion.

Theodore Roosevelt: Was He a Progressive?
Justin DeLeary
Faculty Advisor: Robert Kunath

Former United States President Theodore Roosevelt is consistently in the top five for Best Presidents Ever. This is because he made a name for himself in the way he handled many of the United States’ problems during his Presidency and because of how masculine he was. He was President during one of the most influential times in the United States: the Progressive Era. The Progressive Era in the United State of America was defined by reforms both politically and
The use of automated passive recorders to examine how abiotic factors including temperature, humidity, and barometric pressure affect bat activity

Lauren Sgambelluri  
Faculty Sponsor: Dr. Bryan Arnold

Many biotic and abiotic factors can influence bat activity - environmental conditions, prey activity, calendar day, and time of day. Specifically, previous studies suggest that forest bat activity increases with an increase in temperature and peaks at 20-30°C. In addition, studies show a general pattern of seasonal variation in bat activity, with the highest levels of activity in August and September, although on a nightly basis, activity can vary by species. Previous studies show inconsistent patterns, however, for the effects of temperature change, humidity, and barometric pressure. As part of an ongoing research project investigating the effect of prescribed burns on bat activity which began in 2019, this study aims to investigate the effects of environmental conditions on forest bat activity using passive acoustic recorders placed in both upland and riparian habitats in Siloam Springs State Park in Clayton Illinois. Humidity, temperature, and barometric pressure were recorded in 10-minute intervals using a Kestrel data logger attached to each passive recorder. Recordings were analyzed to determine bat passes per hour as well as identifying the echolocation calls to species, depending on the quality of the recording. Preliminary results suggest a positive correlation between bat activity and temperature and bat activity and humidity.

World War One Experience through Film

Isaac Schreacke  
Faculty Sponsor: Bernd Estabrook

The presentation focuses on World War One being the first major global event that was filmed in any capacity, thus there was an immense quantity of films made on varying subjects surrounding the war. A large portion of the films from the Allies perspective have been studied and are widely known and used in academic settings, however, this is not the same for the German films. The goal of this project is to understand how these materials, of the German perspective, can be pedagogically used in academic courses and to understand the values they may add to our perceptions of the war. Through an analysis of the role of film culturally, politically, and historically in the First World War; the pedagogical value of the material, in correlation to specific topics surrounding the war, is understood. The German perspective of the war is largely ignored, and these films create more dimensionality in the documentation of the war, enhancing our understanding of the war by shedding light on aspects that may not have been documented otherwise. The project involved viewing the films, from the German Bundesarchiv, analyzing them, then categorizing them into a database, for future reference as an educational material.

Directing and Scriptwriting: Communication is Key

Gina Taylor, Paige Bolen, Cassidy Harvey, Sandra Norville  
Faculty Sponsor: Dr Nancy Taylor Porter

Within the last three and a half years at Illinois College, I have worked in every field available to me in the theatre program; however, through directing and scriptwriting, I flourish. There is one major aspect of this field that many gloss over, but I find has a huge significance, not only on the stage but also off: communication. Communication is key in both directing and scriptwriting. In this presentation, I will share some of the methods and guidelines that are most helpful to me in my work. For directing, I mostly rely on Meisner technique and Stanislavski’s method, both utilized to increase the authenticity of performances. For playwriting, I learned the value of drawing characters and speech patterns from live observations while also developing them for theatrical purposes. I will present one recorded scene from my one act, With Love, as well as a live performance of a self-written scene titled, “I Would Do Anything for You, and discuss the aforementioned applications.

The effect of prescribed burns on bat activity and species composition in riparian and upland habitats of Siloam Springs

Myles Genrich  
Faculty Sponsor: Dr. Bryan Arnold

A prescribed burn is a habitat management technique routinely used to burn the understory of forested areas. Benefits of prescribed burns include removal of invasive species to promote the growth of native species. However, while prescribed burns benefit forest habitats, their effect on bats is largely unknown. Given the decline of forest dwelling bat populations due to White Nose Syndrome and development factors, understanding the effects of prescribed burns are more important than ever. The purpose of this ongoing research project is to track bat activity throughout different areas of Siloam Springs State Park in Clayton, Illinois. The locations studied are forested upland and riparian habitats in areas that were burned in the calendar year of data collection, burned the previous year, and areas never burned. Bat activity was measured acoustically using six recorders (Wildlife Acoustics SM4) placed at a unique site in each burn category. Every two weeks, recordings were collected and the recorders were moved to new sites. Kaleidoscope Pro 5 software was used to determine bat passes and species identification per two-week period. Our preliminary results indicate that bat activity increases in burned areas, although it will require further study to reinforce these hypotheses.
AI Mid-Air Gesture Authentication for Mobile Devices
David Salazar
Faculty Sponsor: Dr. Zheng Huang

In our daily lives, many different gestures are used to help each other to understand different intentions. For example, waving/pointing in a different direction could be used to direct traffic in a busy intersection. With the rapid development of AI image recognition, more and more Gesture-based digital commands are introduced into different areas, such as mid-air gestures to help the drivers to operate without distraction. However, some gestures are only meaningful or unique to a specific group of individuals (e.g., people who have hearing impairments). Inspired by exclusive gestures, we propose a new gesture-based authentication approach to help users to authenticate efficiently and smoothly to adapt to the uniqueness of mid-air gestures. This approach aims to effectively prevent the common attacks of current authentication (i.e., Shoulder Surfing, Smudge Attacks, and Reliability on high-end authentication).

Creating Equity in the Science Classroom
Adam Reed
Faculty Sponsor: Penny Haase-Wittler

STEM fields contain some of the most sought after jobs for children in the United States Education system. Even though this is the case, STEM fields are still seeing massive demographic disparities today. According to research published in the Journal of Education Psychology, women now make up the majority of medical and health science degrees and occupations in the United States. However, women are much less likely to enter STEM fields that utilize mathematics. Additionally, a study published in The Professional Counselor has stated that there are many disparities between, and even within, ethnic groups when it comes to STEM fields. On top of the disproportionate demographics of gender and racial background in STEM, another issue is socioeconomic status. This presentation will look at ways to combat the inequities of gender, race and economic status within a science classroom.

Exploring Santa Clara and Hopi Pottery: An Examination of Southwestern Native American Pottery
Kyler Kantor
Faculty Sponsor: Dr. Lisa Udel

This project is a website exploring the pottery of two different Southwestern Native American tribes, The Santa Clara and Hopi tribes. Different pages on the site describe the histories, styles, and potters of each tribe. There is also a page comparing and contrasting the tribes, as well as a gallery.

https://sites.google.com/ic.edu/icnativeceramics/home

The Final Show
Jillian Powell, Adam Enz, Matthew Hill
Faculty Sponsor: Dr. Aasne Daniels

Theatre is a critical part of society. I have learned about acting techniques and everything it takes to make a successful production. I am passionate about acting and have learned how to present myself at an audition using various outrageous situations. I held a crucial role in "Theory of Relativity," in which I dove deep into the world of the play and my character. The most interesting class I have taken at IC has been "theatre on the edge," which challenged me and I enjoyed the art interpretation. I used lines, shapes and color to motivate my sound and movement. Finally, as a part of the theatre major I was required to direct a one-act. I enjoyed collaborating with my actors and learning the process of a production. In this presentation, I will present what I have learned in acting and directing.

Expression of Wnt/Beta Catenin Inhibitors in Lens Regeneration
Radricka Kelly-Olden
Faculty Sponsor: Dr. Paul Hamilton

*Xenopus laevis* has the ability to regenerate its lens via the cornea epithelium, otherwise known as de novo regeneration. Previous work has demonstrated that Wnt signaling must be suppressed in order for lens regeneration to occur in *Xenopus laevis* tadpoles. Dkks and Sfrps are inhibitors of the Wnt signaling pathway; once they bind to the Wnt receptor, it activates a degradation complex that will degrade β-catenin and prevent it from entering the nucleus. Here, we are aiming to assess the expression of Dkks and Sfrps during the regeneration process to understand their timing. Numerous Sfrps (*sfrp1, sfrp2, sfrp3, sfrp4, and sfrp5*) and Dkks (*dkk1, dkk2, and dkk3*) were investigated in this study. As a positive control, all primer sets were assessed and proved to be expressed in a whole embryo sample. Further testing was completed in a whole eye sample, including the cornea, to analyze gene expression specifically in eye tissue. *sfrp1, sfrp2, sfrp3, sfrp5,* and *dkk2* all presented with expression the whole eye sample. Upon testing *sfrp1, sfrp2, sfrp3, sfrp5,* and *dkk2* in both regenerating and non-regenerating cornea, *dkk2* has proved to be the best candidate for further testing due to it being the only gene to present expression in regenerating cornea. Further testing will quantitatively reveal the expression of Sfrps and Dkks during cornea-lens regeneration.
What happened to Stephanie Smith? A homicide investigation.
Drake Lewis, Bri Lockwood, Samantha Sabo
Faculty Sponsor: Angela Gonzales Bale
This presentation will discuss how our laws and legal system go into effect when investigating cases. Given our criminal justice system, there are many actions that have to be fulfilled when the act of crime is present. We will dive into five cases and take a look how they played out along with the actus reus that was present. We also will discuss how not having every detail or invalid information can make an impact on the court systems and prosecution. This information and research were obtained through the Codified law of Illinois and our textbook *Criminal Investigation, 11th Edition* by Christine H Orthmann and Karen M. Hess. This allowed for us to approach our investigation through principles and practices grounded from current research. In our presentation, we will explain our cases in full detail and present our entire investigation along with our results from it.

Class Subject’s Effect on Teacher Immediacy Behaviors
Julie Butler; Abigail Stockton
Faculty Sponsor: Dr. Anna Wright
The behaviors that professors exemplify in the classroom have the ability to affect the learning of their students. In this study, quantitative methods are used to explore how perceptions of teacher immediacy vary by course taught. Specifically, immediacy levels were compared in four different areas: hard sciences and math, human sciences, humanities, and miscellaneous (which consisted of education and first-year seminar courses). Results revealed that the subject a professor teaches does have an impact on student perceptions of immediacy behaviors. The miscellaneous group had the highest overall rating of perceived immediacy; whereas, the hard sciences and math group scored the lowest, overall. Additionally, the authors used qualitative methods to analyze open-ended questions that students answered, which help contextualize the quantitative findings. This paper reports findings and discusses implications for students and instructors.

Antibiotic Resistance in the Soil of Central Illinois
Emily Baalman and Mikaela Kalaskie
Faculty Sponsor: Dr. Gwendowlyn Knapp
The misuse of antibiotics in both clinical and agricultural settings has contributed to the global spread of multidrug-resistant (MDR) bacteria. MDR bacteria are wide-spread and identifying specifically where MDR bacteria live in the environment, as well as developing new treatments are both important to tackling the MDR problem. We have been working to survey the local environment for antibiotic resistance, as well as identifying microbes that can produce potentially new antimicrobials.

Soil samples were collected over time from the Meredosia National Wildlife Refuge and various local agriculture sites and the level of resistance to medically relevant antibiotics was determined. It was concluded that antibiotic resistance was present at each site, whether or not there was direct human contact. Kirby-Bauer assays suggest that a subset are MDR-bacteria.

Antibiotics come from many sources such as soil bacteria and fungi. To identify potential new sources of antibiotics, unknown strains of bacteria isolated from environmental samples were tested for the ability to inhibit growth against the ESKAPE pathogens and several antimicrobial producing strains isolated. We are currently working to identify the strains using classical microbiological techniques, as well as 16s rRNA sequencing.

Freshwater diatom genera as indicators of eutrophication in Central Illinois
Lauren Sgambelluri
Faculty Sponsors: Dr. Bryan Arnold and Dr. Jocelyn Lanorio
Studies have shown that nitrogen and phosphorus concentrations can greatly impact aquatic systems by promoting growth of primary producers (commonly known as algal blooms). Unfortunately, aquatic systems that provide valuable ecosystem services are now exposed to increasing levels of nitrogen and phosphorus. Eutrophication of aquatic systems can have many effects – most notably, toxic algal blooms, massive die-offs of aquatic organisms, and poor visibility and aesthetic value. Proper monitoring of these ecosystems is the first step in preserving these valuable resources and mitigating water pollution. While EPA water quality monitoring is efficient, it does not provide evidence of the effects of poor water quality. A 2007 study published by Potapova and Charles successfully used diatoms, an aquatic indicator species, to pinpoint the cause of poor water quality to excess nitrogen and phosphorus concentrations. While this method is less efficient than EPA protocols, it provides tangible evidence of eutrophication effects along with eutrophication levels. This study was designed to fill in gaps of Midwest water quality knowledge while assessing the effectiveness of Potapova and Charles in measuring eutrophication. Siloam Creek, a small stream in the Illinois River watershed, was sampled in spring for nitrate, phosphorus, and periphyton via EPA sampling protocols. Water quality and eutrophication levels were then recorded via Potapova and Charles methodology and compared to EPA methodology.
Finding a Place to Belong  
Dillon Arens, Paige Bolen, Donyesha Calhoun, Lauren Cassady, Imani Gonnigan, Rojh Gordon, Cassidy Michele Harvey, Sandra Norville, Jillian Powell, Mickey Sanders, Anderson Tavares, Gina Taylor, Frankie Wahl  
Faculty Sponsor: Dr. Nancy Taylor Porter

The course Theatre on the Edge studies non-traditional means of theatre making, such as using the actor’s instrument (i.e., body and voice) as objects, elements in other art forms (i.e., music/soundscapes, visual art, film, etc.), and as abstract expressions of nature and humanity based largely on the theories and practices of actor and teacher Jacques Lecoq and director Anne Bogart. Students have also explored the political impetus behind much of the groundbreaking theatre practitioners’ work of the 1960s and 70s, including how those artists wanted to raise consciousness. Students have created a piece that examines how identities can change when thrust into new and unfamiliar environments. They will present this 20–25-minute montage that represents their research as well as emotional/visceral responses, culminating in a provocative theatrical performance.

The Illinois College Choral Legacy Initiative  
Abby Garrett  
Faculty Sponsors: Professor Samantha Sauer and Dr. Nichol DelGiorno

The Illinois College Choral Legacy Initiative is an interdisciplinary research project which aims to broaden individual, departmental, institutional, and community understanding of Illinois College music and student music groups. Started in Fall 2021, the Choral Legacy Initiative lifts up student-led coursework and scholarship conducted as part of MU/HI 465 Independent Research. Phase One of this initiative focused on creating a comprehensive timeline of music and music groups at IC. Due to the nature of the project and the scope of research, the timeline was narrowed from 1903 to 1928 to focus on the relationship between IC and the Illinois Conservatory of Music, and the formation of several new choral ensembles. This phase utilized several historic campus and community collections to track the creation, growth, and impact of these groups. Phase Two of the project is focused on public outreach and sharing this information with the campus and wider community. This presentation will provide a brief overview of the timeline and groups on campus and take a look at the methods used to share this information with the public, such as public programming, creation of a digital collection, and next steps for the project.
Examining Skull IC 005 Using Forensic Anthropology
Demari Anthony
Faculty Sponsor: Dr. Miranda Karban

This project uses the methods of forensic anthropology to study IC 005, a human skull housed in the Illinois College anatomy laboratory. The subject's sex, age at death, and geographic ancestry was estimated using visual observations and measurements. Sex was estimated by scoring sexually dimorphic traits, including the nuchal crest, mastoid process, supraorbital margin, glabella, and mental eminence. Logistic regression analysis of these scores resulted in 82-99% probability of IC 005 being male. The subject’s age at death was estimated by scoring the level of cranial suture closure. These scores were subjected to Transition Analysis using ABDOU software, resulting in an age at death estimate of 22.4-44 years (95% confidence interval). The skull was estimated to be of European descent based on dental and cranial traits, including spatulate incisors, angular eye orbit shape, and narrow nasal aperture shape. This research is useful because it explains the steps and process of forensic anthropology. This can allow for others to learn these methods as well and apply them. For future work, I would suggest obtaining more of the human skeleton to identify other crucial details and make existing details more concrete. Our approach for this research was novel because we did not have any prior information on our individual. However, we were still able to efficiently use our resources and knowledge on methods of forensic anthropology to gather and present our concrete data.

Molecular Cloning of a Top Regulated Cre-LoxP Transgenic Reporter
Annamarie Billingsley
Faculty Sponsor: Dr. Paul Hamilton

Regeneration, specifically of the lens, is limited to a few vertebrates. One vertebrate that shows regeneration in the lens is the frog, Xenopus laevis. When looking at regeneration of X. laevis, the cornea epithelium of the African clawed frog regenerates to form a new lens using inhibition within the conserved Wnt/-Catenin signaling pathway. Previous work has confirmed the involvement of the pathway, but spatially where the inhibition occurs remains unknown.

Using classic molecular cloning methods, work has been completed to further the knowledge surrounding this question by creating a TOP regulated CRE-Loxp transgenic reporter. The reporter uses a Cre-Loxp system that contains a Mcherry/GFP fluorescent gene interacting with the Wnt molecules present in the pathway. Methods included mapping a transgene, purifying plasmids, designing primers, transformation into competent cells, performing PCR, and analyzing gel electrophoresis results. While work is ongoing for the project, results have shown the designed primers for the specific plasmids allow amplification of the mapped DNA. Moving forward, once the reporter is complete, transgenesis into X. laevis embryos will occur providing further knowledge of lens regeneration in Xenopus laevis.

False Feedback, Flanker Task Performance, and Self-Efficacy in an MTurk Sample
Kellen Blum, Katelyn Scott
Faculty Sponsor: Dr. Alex Moore

The ability to excel in novel tasks is partially influenced by feedback and self-efficacy. The goals of this project are to examine how false normative feedback affects proficiency gains in a cognitive task that is difficult to self-assess in terms of performance. Pre- and post-test measures of general and task-specific self-efficacy were examined. 159 participants, recruited using Amazon’s Mechanical Turk, completed the pre- and post-test self-efficacy measures and 11 blocks of the Flanker Task. Congruent (e.g., “SSSSS”), incongruent (e.g., “HHSSH”) and neutral (e.g., “OOSOO”) trial types were presented. Participants completed the task and received false “worse-than-average”, “better-than-average”, or neutral feedback throughout the blocks of trials. Along with the flanker effect, those provided with false worse-than-average feedback responded significantly faster to the stimuli than those who received false better-than-average feedback without accuracy reductions. The false worse-than-average feedback led to slight increases in task-specific self-efficacy whereas a slight decrease in task-specific self-efficacy was observed for the false better-than-average group. These results may reflect increased motivation to achieve “average” performance by those who received worse-than-average feedback because the Flanker Task is novel, relatively easy to complete, and is difficult to assess in terms of performance relative to others.

Educational Attainment and Parental Divorce
Andrew Blue
Faculty Sponsor: Dr. Marilyn Markel

Changes in marital law in the United States from the late 20th into the 21st century have made it much easier to get a divorce. The divorce rate in the United States since 2000 has fluctuated between 2.7 and 4.0 per 1,000 total population, steadily maintaining one of the highest rates in the world (Marriage and Divorce 2021). By disrupting household responsibility and family income, divorce plays a role in the educational possibilities of the impacted children. Using pooled cross-sectional data from the General Social Survey for 2002-2018, we examine this relationship between parental divorce and the educational attainment of their children. Using Ordinal Logistic Regression, we estimate educational attainment in multiple specifications, including a model comparing
Correlations Between Cranial Angles and Classification of Malocclusion

Emily Bone
Faculty Sponsor: Dr. Miranda Karban

Dental malocclusion is caused by disproportionate growth of jaw bones during fetal development leading to the misalignment of the jaws and teeth. Measurements of cranial base angle and facial protrusion (SNA and SNB) angles were taken from a longitudinal sample of lateral human cephalograms. T-tests were performed to test for sexual dimorphism at each age group. T-tests were also used to assess differences in angle measurements between malocclusion groups. Few significant sexual dimorphism or developmental patterns were found. Significant sexual dimorphism was found in the SNA angle at the youngest age group. The only significant developmental angle change was the SNB angle, which differed significantly between the youngest and oldest age groups. Significant differences were found in the cranial base angle between individuals with Class III malocclusion compared to both Class I and Class II. Additionally, a significant difference was found in the SNA angle between individuals in Class I versus Class II and in Class II versus Class III. There were also significant differences in the SNB angle between each of the classes. The significant sexual dimorphism in SNA angle found in the youngest age group is likely due to the difference in incisor eruption timelines between the sexes.

Copper(II) sulfate as catalysts for bioconjugation of benzyl azides with various alkynes

Brooke Brinkman
Faculty Sponsor: Dr. Jocelyn Lanorio

Click chemistry is the connection of molecules in a simple, fast, easy, and efficient way. This type of reaction is important because it is useful for modifying biomolecules because of its high chemoselectivity. There are many biological applications such as the modification of lipids and carbohydrates and it can also be used with nucleic acids. To determine the utility of copper sulfate as a catalyst for bioconjugation reactions, four (4) different alkynes were used as starting materials on dilute tert-butyl alcohol solvent, Scheme 1. The reactions went to completion within hours and gave yields in the range of 23 to 88% after filtration. Reactions were monitored by thin layer chromatography (TLC), and triazole products were successfully obtained as confirmed by IR spectroscopic and GC-MS spectrophotometric methods.

Scheme 1. Bioconjugation of alkyne with benzyl azide

DG1 IR: Research on Cuba-US Relations

Elena T Carrera; Gladys Ramos
Faculty Sponsor: Dr. Diana Grullon-Garcia

The Cuban anthropologist Fernando Ortiz created the concept of transculturation by disagreeing with the term of acculturation. As Global Studies students with concentrations in Caribbean Studies and Spanish, we would like to build a better understanding of how culture and literature play an important role in Spanish-speaking countries in the Caribbean. The focus of our project is to comprehend how Ortiz uses literary devices to illustrate Cuban and Caribbean culture as opposed to the culture of the United States. To understand Ortiz’s metaphors, we have studied Ortiz’s central ideas of his work. Through this analysis, we will “decode” literary resources that form part of the authors’ main works. For this reason, in our poster, we would like to present the goals that we like to accomplish in Cuba. For example, we will research for evidence that shows Ortiz’s impossibility to separate himself from literature. His work in literature centers on the term of transculturation and its metaphorical scopes. Although it is difficult to find unpublished Ortiz’s texts because most of them are in Cuba, we will have the opportunity to investigate in Ortiz’s archives in La Habana, Cuba, where most of his unpublished work can be found. We will do archival research in The National Library of Cuba José Martí and the Institute of Literature and Linguistics. In our time in Cuba, we will collaborate with Faculty members and students from the University of Pinar del Rio (Cuba) as part of an agreement between this institution and Illinois College. We will be exchanging cultural differences that will strengthen our understanding of the diversity that is seen in the Caribbean, Latin America and the U.S.
Perceptions of Risk Taking in High School and College
Shannon Cadagin
Faculty Sponsor: Dr. Elizabeth Rellinger Zettler

David Elkind (1967) proposed that adolescents experience personal fables as part of their normal developmental progression. Laplesy et al., (1989) expanded on this and found that adolescents tend to have a specific form of egocentrism. This egocentrism results in adolescents expressing heightened levels of beliefs in their own uniqueness and immorality, along with heightened levels of narcissism. Furthermore, a strong personal fable is associated with a high level of risk taking during the adolescent years (Alberts et al., 2007). In this study, we used a retrospective approach to examine whether college students who had high levels of belief in the personal fable continued to express higher levels of egocentrism and risk taking which would support an individual difference model rather than Elkind’s developmental model. Participants in this study were college students who completed an online survey composed of The Personal Fable and Risk Taking Scales (Alberts et al., 2007), The New Imaginary Audience Scale (Lapsley et al., 1989), The Domain Specific Risk Taking Scale for Adult Populations (Blais & Weber, 2006), and demographic questions. Some questions asked about their behavior in high school and in college. Results and implications of this study will be discussed.

A Milder and Greener Hydration of Benzonitrile
Maggie Cockerill
Faculty Sponsor: Dr. Jocelyn Lanorio

Amides are very important class of organic molecules, used in everything from pharmaceuticals, natural products, and industrial materials. Current practices produce amides using harsh reagents and conditions such as sulfuric acid and high temperature that are unfavorable from an environmental standpoint. Over-hydrolysis, to produce carboxylic acid instead of amide, is also common. Hydration reactions are 100% atomic economic reactions and ruthenium complexes require significantly milder conditions. This study was designed to synthesize RuCl2(PTA)4 and investigate it and a variety of other ruthenium(II) complexes for use in hydration of nitrile to amide reactions, as well as examine catalysts recycling capabilities through biphasic reactions. Milder reaction conditions were used, and other metal complexes were also tried. Synthesis RuCl2(PTA)4 is not needed to achieve the same positive results. All ruthenium complexes showed positive results as well as one copper complex. Nickel complexes showed no positive results. Catalyst recycling capabilities were only observed in one complex due to catalyst stability.

Amino Acid and Carbohydrate Analysis of Honey via HPLC
Maggie Cockerill
Faculty Sponsor: Dr. Brent Chandler

Honey is a unique and nutritional substance created by bees in the Apis genus. The most common is Apis mellifera (Western Honeybee). Worker bees in the colony make honey from pollen and nectar collected from local sites to be used primarily as a food source. The quantity and quality of honey generated impacts bees’ health specifically impacting longevity, immunity, wound healing, cold tolerance, and ability to detoxify. Honey is composed of simple carbohydrates (76%) and water (18%) with the remaining portion consisting primarily of amino acids. The specific composition of honey correlates with the composition of the nectar collected by the bees. Therefore, by analyzing honey you can learn about the types of plants and the extent of biodiversity in a region. We analyzed 13 unique honey samples from Illinois and Florida, determined the concentration of carbohydrates and amino acids in these samples. We analyzed the composition of our samples using HPLC, for the amino acids we used a technique called OPA amino acid derivatization.

Inhibition of tyrosinase with 5-hydroxyindole
Patrick Combs, Suzie Green, Scott Huckabay, Kevin Marcus
Faculty Sponsor: Dr. Zvi Pasman

Tyrosinase is the catalyst in the first step of melanin biosynthesis. Studying inhibition of tyrosinase is important because the activity of tyrosinase is thought to not only be associated with melanoma and other skin diseases, but also is thought to be a factor in the nutritional value of food. Because tyrosinase is involved in the browning of fruits and vegetables, as well as the hyperpigmentation of skin, it produces undesirable effects that an inhibitor of tyrosinase may be able to reverse or completely prevent. Here, we tested the effect of 5-hydroxyindole, a candidate tyrosinase inhibitor, on the tyrosinase-catalyzed conversion of DOPA to dopachrome. Tyrosinase steady state kinetics experiments yielded a catalytic rate constant (kcat) of 8.0 s⁻¹ and an apparent Km of 0.49±0.10 mM in the absence of added inhibitor. In the presence of 5-hydroxyindole, kcat was not affected significantly, whereas Km was increased, arguing that 5-hydroxyindole acts as a competitive inhibitor of tyrosinase. The K_i calculated for 5-hydroxyindole was 0.13±0.02 µM, whereas the K_i of kojic acid, a known mixed inhibitor of tyrosinase, was 36±8 µM. Thus, we show that 5-hydroxyindole is a significantly stronger inhibitor of tyrosinase than kojic acid.

Is Art Therapy Effective in Reducing Stress and Anxiety in College Students?
Makayla Dulakis
Faculty Sponsor: Dr. Elizabeth Rellinger Zettler

Art therapy is a practice that often receives attention in the popular press, but the research on the use of many art therapy approaches has been mixed. The basis of art therapy is rooted in the idea that the creative process of craftsmanship can be life affirming and lead to healing (Hajra & Saleem, 2021). The approaches used can include photography, pottery, coloring, drawing, collage making, and more (Boucher, 2016). In this project, recent research on the
Perception of Time as a Function of Anticipated Interval Outcome
Karissa Duncan; Greg Saiki
Faculty Sponsor: Dr. Alex Moore

Our perception of time is a variable and malleable process; internal and external factors have been shown to alter the perception of time including the anticipation of a reward (Failing & Theeuwes, 2016), anxious or depressive states (Gable, Neal, & Poole, 2016; Mella & Pouthas, 2011), and being deeply immersed in an activity (Rudd, Vohs, Aaker, 2012). Although we know that our explicit or implicit monitoring of the passage of time is informed by distributed neural activity (Bermudez & Schultz, 2014) and by our 24-hour circadian rhythm (Eagleman, Tse, Buonomano, Janssen, Nobre, & Holcombe, 2005), the precise mechanisms of time perception are poorly understood. This study investigated the relationship between perception of time and the prospect of a reward in a sample of 80 participants recruited from Amazon's Mechanical Turk. Participants viewed the presentation of stimuli whereby multiple “standard” visual objects were presented for 500ms and had to judge if one “oddball” stimulus was presented for a shorter or longer period than the standard. Participants completed this task in one of two groups which could either gain monetary reward for correct answers or be at risk of losing the monetary reward with incorrect responses. Measures of state, trait, and mathematics anxiety were also assessed. While all measures of anxiety correlated with task engagement, no significant differences in time perception were found between groups. This may be due to complications in data collection that compromised our data quality.

Maternal Gatekeeping as a Function of Relationship Stability and Child Reactivity
Jacob Fedderke and Allison Woosley
Faculty Sponsors: Dr. Elizabeth Rellinger Zettler and Dr. T. Caitlin Vasquez-O’Brien

Maternal gatekeeping includes the beliefs and behaviors that support or limit a partner’s engagement with their children (Allen & Hawkins, 1999). Among factor related to higher levels of maternal gate closing is perceived relationship instability (Schoppe-Sullivan et al., 2015). It was hypothesized that relationship instability and child reactivity are stressors which interact to make it more likely that mothers will engage in more gatekeeping. During the summer of 2022, Amazon Mechanical Turk (Litman & Robinson, 2020) was used to recruit 200 females with children to serve as participants. Of the 89 viable participants, 70% identified as White. The median income reported was between $400,00-$60,000. Separate analyses were run to predict gatekeeping using the Maternal Gatekeeping Measure (MGM), Gate Closing using the Parental Regulation Inventory (PRI), and Gate Opening using the PRI. The model including the predictors of relationship stability and child reactivity to predict MGM and Gate Closing on the PRI were similar and significant: when children were rated higher on negative reactivity, mothers reported higher levels of gatekeeping. The model to predict Gate Opening using the PRI was significant, but only the path from relationship instability was significant. Overall, this study expands on the existing literature by supporting the importance of perceived relationship stability and by considering infant reactivity as a potential predictor of maternal gatekeeping.

Understanding The Relationship Between Child Inhibitory Control and Sharing Behaviors
Jacob Fedderke and Allison Woosley
Faculty Sponsors: Dr. Elizabeth Rellinger Zettler and Dr. T. Caitlin Vasquez-O’Brien

As part of the Developing an Understanding of Childhood Knowledge (DUCK) study, we tested three hypotheses: 1) socioeconomic status, child temperament, and adult temperament would be correlated with child self-regulation (as assessed on the “Marshmallow Task”); 2) socioeconomic status (SES) would be the strongest predictor of self-regulation; and 3) child self-regulation would be a significant predictor of sharing behavior. In this longitudinal laboratory project, 212 family triads with two children aged 4-12 (53% male; 86% Caucasian) and one primary caregiver (93% mother) were interviewed during 60–90-minute sessions. Overall, the first hypothesis was not supported: there was not a significant relationship between self-regulation behaviors and sharing behaviors. In terms of predicting self-regulation, only SES was significant. While the lack of other significant correlations was surprising, we had expected that SES would be the strongest correlation because it serves as a marker variable for many forms of social privilege. The finding that males shared less than females was not surprising because it fits with social norms and expectations which encourage girls to share more and be more cooperative (Eagly, 2009). This study adds to the existing literature by using behavioral assessments of parents and children instead of relying on self or parent reports.

The Pedagogical Effects of a Special Relativity Video Game
Nathan Garnett
Faculty Sponsor: Dr. Josiah Kunz

Special relativity is a topic that, while not mathematically cumbersome, can be difficult for students to grasp. One reason is that there are no perfect analogies and very few ways to convey the topic in a laboratory setting. This project attempts to overcome the experiential problem with special relativity by developing a physics-based special relativity video game. The simulation utilizes simple video game “fetch” quests along with basic relativistic equations to engage students of all levels.
Comparing Copper Catalysts in the Synthesis of 1,2,3-Triazoles via Click Chemistry

Emma Green
Faculty Sponsor: Dr. Jocelyn Lanorio

1,2,3-Triazoles have several biopharmaceutical functions such as antiviral and antiallergic behaviors. The process to create these molecules involves the cycloaddition of an azide, an alkyne, and a catalyst. However, many catalysts contain rare metals that are costly and dangerous. The purpose of this study was to determine if copper is a viable replacement for these metals, and if so, what reaction conditions are the most favorable.

The copper catalysts were examined under a few conditions. These were reactions containing solvent, neat (no solvent), with heat, and at room temperature. Additionally, the effect of the charge of copper was investigated. The importance of these variables was to find the most environmentally responsible combination of conditions; for example, a reaction not requiring solvent or heat would be considered ideal. The products were characterized by melting point, TLC, IR, and GCMS.

The results indicated that copper catalysts provide a high yield of pure product, with neat conditions being the most efficient reactions. Furthermore, it was observed that the cycloaddition reactions can also be run at room temperature. The charge of copper does not appear to affect the reaction, although the stability and sterics of the anion attached to the copper do.

Mind the Gap: A Qualitative Research Review of Racial and Ethnic Disparities in Education Fostered by the COVID-19 Pandemic

Jessamy Hintz
Faculty Sponsor: Dr. Elizabeth Rellinger Zettler

A qualitative review of research on differential effects of the COVID-19 pandemic was conducted to explore how COVID-19 has impacted education for students and parents. Studies that focused on the mental health and well-being of students throughout the shift in education because of COVID-19 were reviewed. Overall, researchers are finding that children and adolescents from marginalized communities have inequitable access to resources for succeeding in an online formatted classroom, are at a greater risk of getting the virus, and the disparity patterns they live under are further exacerbated by the pandemic. In regard to racial and ethnic disparities, families in endangered communities suffer greater risk of job loss, food insecurity, and health and mental health issues derived from the pandemic, although these realities already existed in society. The impacts of COVID-19 and its connection to racial and ethnic disparities in education will be discussed.

Longitudinal Study of Sexual Dimorphism of the Gonial Angle

Sydney Hood, Chloe Vacca
Faculty Sponsor: Dr. Miranda Karban

Previous researchers have come to conflicting conclusions as to whether the human gonial (mandibular) angle is sexually dimorphic. The purpose of this study was to determine whether significant variation exists in the gonial angle measurement between males and females, and whether this angle changes during puberty. Cephalograms of Euro-American descent were obtained from the AAOF Legacy Growth Collection. The gonial angle of each subject was measured at two age points (11.0-13.0 and 18.0-20.0 years) and t-tests were performed to determine the significance of gonial angle variation related to sex and development. The mean gonial angle in males was found to be very slightly smaller than in females, but this difference was not significant. The mean gonial angle in the older age group was found to be slightly smaller than in the younger age group, but again, this difference was not found to be statistically significant. We found that the gonial angle does not represent a reliable indicator of sexual dimorphism in this sample. This finding is relevant to the field of forensic anthropology, showing that this angle should not be used as a determining factor in forensic sex estimation.

Copper-Catalyzed Click Chemistry of Benzyl Azide and Phenylacetylene

Ethan Leitschuh
Faculty Sponsor: Dr. Jocelyn Lanorio

Click Chemistry reactions, also known as cycloaddition reactions, are attractive due to their high yield, ease of purification, and zero byproduct conversion. These reactions have a wide range of real-world applications and are utilized in various fields such as drug discovery, polymer chemistry, biochemistry, material science, and nanomaterials. A series of copper complexes were investigated as catalysts for the cycloaddition of benzyl azide and phenylacetylene. 1,2,3-Triazole product was obtained pure in solvent (water containing) or neat (non-water containing) reactions at room temperature and mild heat conditions. The identity of the product was confirmed by various techniques including infrared spectroscopy (IR), gas chromatography-mass spectrometry (GC-MS), and Thin Layer Chromatography (TLC).

Neat reactions proved to be more efficient, environmentally safe, reproducible, and provided products of higher purity and conversion compared to solvent reactions. In the homogeneous reactions, copper sulfate with sodium ascorbate, and copper iodide exhibited the same results. Results indicated that the size of the anions attached to copper play a role in the catalysis of cycloaddition reaction of benzyl azide and phenylacetylene.
Disruption of an Essential Protein in *E. coli* Using Peptide Fragments

Kevin Marcus  
*Faculty Sponsor: Dr. Gwendolyn Knapp*

The quaternary structure of proteins is essential for function of the protein and survival of an organism. We hypothesized that disruption of these interactions with protein fragments could yield new drug targets for antimicrobial therapeutics. PanB was chosen because it is a homopentameric protein and has been shown to be essential for pantothenate (vitamin B5) biosynthesis. Disruption of the *panB* gene in both *E. coli* and *M. tuberculosis* results in bacteria that are unable to grow without pantothenate supplementation in the media. A previous study suggested a fragment containing amino acids 26-136 was sufficient for oligomerization. This fragment was called an interacting sequence tag, or IST. We hypothesized that by overexpressing the IST in a negative-dominant assay, the native PanB structure could be poisoned, and we have tested this hypothesis using an arabinose-inducible system in *E. coli*.

Estimation of Sex, Age at Death, and Geographic Ancestry of Human Skull IC 003

Nomintsetseg Munkhjargal  
*Faculty Sponsor: Dr. Miranda Karban*

The main goal of this research project was to determine the demographics of a modern human skull (IC 003) housed in the Illinois College anatomy and physiology laboratory. The skull’s sex, age at death, and geographic ancestry were estimated using forensic anthropology analyses. Based on the scoring of sexually dimorphic cranial traits and use of logistic regression analysis, the sex of the skull was found to be indeterminate. The estimation found between 7-82% probability of being female and 18-93% probably of being male. Age at death was estimated to be between 21-43 years using Transition Analysis and ADBOU software, based on the scoring of cranial suture closure. The skull’s ancestry was estimated to be of either East Asian or Native American descent based on the scoring of macromorphoscopic facial and dental traits. The scientific importance of this study was to determine the demographics of the human skull IC 003. This study represents the first analysis of this particular skull. In doing so, students in the anatomy and physiology laboratory will be able to use these findings for educational purposes. While some demographic information was determined, more in-depth study of the individual would be possible if the postcranial skeleton could be found.

Examining Collagen Expression in *Xenopus cornea epithelium*

Devin Parker  
*Faculty Sponsor: Dr. Paul Hamilton*

*Xenopus laevis*, the African Clawed Frog, can regenerate its lens de novo prior to reaching metamorphosis. The lens can regenerate even in the absence of residual lens cells. The source of the newly generated lens is the cornea epithelium. Once metamorphosis occurs development of the cornea stroma also occurs. It is thought that the development of the stroma interferes with the cornea epithelium’s ability to regenerate the lens. Research was focused on a few different areas: 1) Primer Design 2) Tissue Collection 3) cDNA synthesis and 4) RT-PCR. These methods helped understand and identify collagen expression in multiple tissue samples from *Xenopus laevis*. With these results we were able to understand the different collagen that is expressed at varying stages in *Xenopus*. Understanding collagen expression will help identify which gene to disrupt in the stroma, in hopes to restore regenerative properties for the lens.

Nickel catalyzed cross-coupling reactions

Alexis Paskach  
*Faculty Sponsor: Dr. Jocelyn Lanorio*

Suzuki-Miyaura (SM) coupling is a metal-catalyzed carbon-carbon bond reaction between organoboron and organohalide under basic conditions. Cross-coupling reactions are typically catalyzed by the expensive palladium catalyst. This reaction is relevant in the synthesis of pharmaceuticals, polymers, and agrochemicals. Our objectives include the application of nickel-phosphine complexes, investigation of the efficiency of different nickel catalysts, and characterization of the products obtained. We synthesized the nickel-phosphine catalysts, where phosphine groups are triphenylphoshine, 1,2-bis(diphenylphosphino)ethane, 1,3,5-triaza-7-phosphaadamantane. The organic product was purified and characterized by $^1$H NMR, TLC, GCMS, IR, and UV-Vis spectroscopy.

The 5-bromopyrimidine and furan-3-boronic acid coupling exhibited the best results with the Ni(PCy$_3$)$_2$ catalyst compared to other reactions that we have investigated. GCMS and $^1$H NMR confirmed the purity of the product. The Ni(PCy$_3$)$_2$ catalyst proved to be most efficient, providing the highest yield of 76.6%.

Scheme 1. Suzuki-Miyaura Coupling of 5-bromopyrimidine and furan-3-boronic acid.
Development and Sexual Dimorphism of the Human Chin

Haylee Simmons  
Faculty Sponsor: Dr. Miranda Karban

This study investigates the development and sexual dimorphism of the human chin. Previous studies have shown chin size differs between males and females, but the timing and patterning of this difference are not well understood. Cephalograms from 30 subjects (15 male, 15 female) sampled from the AAOF Legacy Collection were measured at 4 longitudinal age groups, spanning from 3.0-20.6 years of age. Landmark (n=4) and sliding semilandmark (n=15) points were collected along the lateral profile of the mandible and the mandibular angle was measured from each cephalogram. Statistical analyses, including GPA, RWA, T-tests, and two-block partial least squares analysis were performed using R software. No clear patterns related to age were found when the entire mandibular profile was assessed. Significant sexual dimorphism was found in the mandibular angle at the oldest age group. The shape of the anterior chin was found to covary significantly with the shape of the inferior and posterior mandible. The mandibular angle was found to covary significantly with anterior chin shape, showing the close developmental ties between these two regions of the mandible. The significant sexual dimorphism in mandibular angle found here has important impacts on the forensic sex estimation of human skeletal remains.

Invisible Signature: An AI-Based Mobile Authentication

Eric Sustaita  
Faculty Sponsor: Dr. Zheng Huang

This study seeks to investigate and explore a new innovative authenticate approach through invisible gestures that are catered towards low end mobile devices. Our approach proposes an affordable, low cost approach that would allow for an effective means of authentication for people of low income and in developing countries. Our inspiration comes from reassessing the possibility of using a traditional method of authentication, signatures. Utilizing technology would allow signatures to become more resistant to forgery. By collecting more information with a touch screen, we are able to utilize pressure and turning points as means of authentication. Including the factor of invisibility would also provide an effective counter towards shoulder surfing. We accomplish this through utilizing three big components. These are utilizing a paint API, a Bitmap API, and utilizing a Super Vector Machine (SVM). The goal of this project is to create a sufficient and protective method of authentication for low end mobile devices.

Analysis of Human Skull IC 006

Yennifer Velazquez  
Faculty Sponsor: Dr. Miranda Karban

The main goal of this research project was to examine the human skull numbered IC 006 that is housed in the Illinois College anatomy and physiology laboratory. The skull’s sex, age at death, and geographic ancestry were estimated using methods of forensic anthropology. Based on the scoring of the sexually dimorphic cranial traits, such as the mastoid process and nuchal area, it was determined the skull was most likely female. Logistic regression analysis of these scores indicates a 58-96% probability of being female. Transition Analysis, run through the ABDOU software program and based on the scoring of cranial suture closure, estimated the skull to be between 28-62 years old at the time of death (with a 95% confidence interval). Macromorphoscopic analysis of the facial traits revealed both European and East Asian ancestral characteristics. This study was the first analysis of this skull, revealing some important demographic information about who the individual was during their lifetime. In the field of forensic anthropology, it is often necessary to develop biological profiles from fragmentary skeletal remains. The results reported here demonstrate the level of precision that can be obtained when analyzing an isolated skull, when the other skeletal elements are unavailable.

Cell Proliferation and Lung Tissue Regrowth in X. laevis lungs

Madigan Walsh, Suzie Green  
Faculty Sponsor: Dr. Paul Hamilton

Xenopus laevis tadpoles are incredibly plastic organisms. Their epithelium, limb buds, tails, and lenses of the eyes can all regenerate de novo. This brings into question whether other features possess the same regenerative properties. Lungs are generally less plastic organs in mammals, but the activation of local progenitor populations post-injury has been identified (Kotton and Morrissey, 2014). Using tadpoles to study this regenerative capability is beneficial as compared to a mammal model because the tadpoles externally develop, whereas to access the same system in a mammal is far more invasive. Another common externally developed model, fish, lack the lungs necessary for studying.

In addition to the discovery of the lungs’ ability to recover, it was also found that the center of mitotic activity is localized near the distal tip of the lung, which continues into maturity, although it loses some diversity in its capabilities (Rawlins, et al, 2009). Since the progenitor cells are localized around the tip, even though their exact location is not well studied, it provides a starting point for where the tip can be surgically removed and still retain regenerative properties from the progenitor population.
Reproductive Justice and Literature: Abstract
Abigail Weisner
Faculty Sponsor - Dr. Beth Capo
This presentation will overview a project I completed to gain editorial experience. For the project, I aided with a book project for the Palgrave Handbook of Reproductive Justice and Literature. The Handbook’s goal is to raise awareness of reproductive justice and the role of literature. Each contributor analyzed literature or film from all over the world with aspects of reproductive justice. Reproductive justice can be split into three universal rights: the right to have a child, the right to not have a child, and the right to parent children in a safe and healthy environment. The project was made up of 30 articles contributed by scholars which required copyediting and reading for content. This included reading for grammar errors, UK to US spelling changes, and undergraduate reading level understanding. I also regularized formatting and citation to house style. The final project came out to nearly 800 pages of content; I read all articles at least twice.

People With Transgender Parents
Madisyn Webster
Faculty Sponsor: Dr. Jaclyn Tabor
In our research, Dr. Tabor and I focused on people with transgender parents (PTP) in an attempt to understand this transitional relationship between parent and children, similar to that of divorce. We did this by having access to a private Facebook group made for people with transgender parents. Data from each individual post in this group were coded in order to account for common themes. We found these common themes to be role relational ambiguity, ambiguous loss, acceptance, support, and adjustments. We decided to use these themes in the context of Mother’s and Father’s Day posts, which seemed to be a particularly difficult time for PTPs. The themes we found suggested several issues as it relates to Mother’s and Father’s Day, including confusion about which holiday to celebrate after their parent’s transition, disagreements with their parents, questioning whether to celebrate Mother’s/Father’s Day at all.

Intergenerational Transmission of Maternal Gatekeeping: Avoidant Attachment as a Mediator between Grandmothers’ and Mothers’ Gatekeeping
Allison Woosley
Faculty Sponsor: Dr. Elizabeth Rellinger Zettler
Maternal gatekeeping involves complex behavioral interactions between parents in which one (typically the mother) influences the parenting behaviors of the other through their use of controlling, facilitative, and restrictive behavior (Puhlman & Pasley, 2013). The relational aspect of gatekeeping has been frequently explored with a focus on the partner (e.g., Seery & Crowley, 2000). Due to the intergenerational nature of parenting behaviors (Lomanoska et al., 2017), an exploration of the role of the grandmother in gatekeeping behaviors seemed warranted. We hypothesized that grandmother’s engagement in gatekeeping behaviors would foster an avoidant attachment in their daughters, who would later engage in higher rates of gatekeeping. Using survey data from 89 mothers, a model in which avoidant attachment mediated the relation between grandmothers’ and mothers’ gate closing behaviors was supported.

Effects of Gender and Socioeconomic Status on Compliance among Children
Allison Woosley
Faculty Sponsor: Dr. Elizabeth Rellinger Zettler
Socioeconomic status (SES) as a moderator of the effects of parental sensitivity and depression on compliance in children was examined. This model was based on studies showing that childhood morality is impacted by parents’ ability to create empathetic environments (Carlo et. al., 1999), depression and empathy are negatively correlated (Salo et. al., 2020, Bennik et al., 2019), parental sensitivity impacts children’s empathy and prosocial behaviors (Spinrad & Gal, 2018), and parents of lower socioeconomic status tend to teach more obedience compared to parents of a higher socioeconomic status (Park & Lau, 2016). Data was drawn from 189 families in an ongoing family study. The primary caregivers were predominantly female, with two children ages 4-12, and middle class. Parental warmth was significantly related with increased compliance in children ($B = 1.10$, $SE = 0.55$, $p = .047$). A logistical model found no significant difference between girls’ and boys’ likeness to comply, but girls in higher SES households were less likely to comply than were girls from low SES homes ($Wald = 5.33$, $p = .02$) and girls who complied were from households of a lower SES than boys who complied ($p = .02$).