



Albion College

ELKIN R. ISAAC

Student Research Symposium



April 22, 2021



Elkin R. Isaac

Student Research Symposium

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FORUM #1 – POSTER PRESENTATIONS (LIVE Q&A ONLY)

MORNING SESSION

9:30	Samantha Emerson, Eryn Lewis, Kirk Myers, Danielle Rineman, Liam Smith (Cousins)	Sleep Quality, Sleep Duration, and Mental Health in College Athletes
9:35	Christina Rafail (Cousins)	The Association Between Physical Activity, GPA, and Sleep in College Students
9:40	Austin Begley, Jacqueline Espinosa, Allison Haspel, Nicole Sweetland (Cousins)	Association of Physical Activity and Sleep Quality in College Students, Faculty, and Staff
9:45	Marcelle Collares (Henke)	Enhancing Water Literacy for Teenagers Using the Ludic Method
9:50	Luis Angel Ramirez Galvan (Henke)	Understanding the Effects of the COVID-19 Pandemic on Community Youth Programs
9:55	Angela Meyers (Kennedy)	Biases in Studies of Animal Communication and Impacts on Conservation
10:00	Jessica Garcia-Lopez (Cahill)	Environmental Bioindicators in South Central Michigan
10:05	Breh Ruger, Bach Tran, Rosemary Hernandez, Saige Jost (Cahill)	Macroinvertebrate Species Diversity in the Maple River Salt Marsh
10:10	Alexis Moss, Vedha Reddy, Noelle Robert (Streu)	Synthesis of Hemithioindigo Compounds as Potential Tubulin Polymerization Inhibitors
10:15	Samantha Dye (Streu)	Synthesis of an Azologue of a Known Smoothed Inhibitor

FORUM #2 – PLATFORM PRESENTATIONS

AFTERNOON SESSION

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| 1:00 | Lauren Bergeron (Sacks) | “This Insolent and Inhuman Race”: White U.S. Soldiers’ Thoughts about White Southerners during the Civil War |
| 1:15 | Rebecca Wagener (Wickre) | Chancay Style Graves in Central Peru: Artifacts and Burial Traditions from the Chancay Culture |
| 1:30 | Hannah Gracin (Roberts) | Romantic Interests and Female Agency in YA Dystopian Novels |
| 1:45 | Marlo Scholten (Harnish) | The Way Social Movements and Anxieties Present Themselves on Screen (Specifically in the History of Horror and Current Children’s Cartoons) |
| 2:00 | Akaiia Ridley (Dick) | Black Teachers Matter - The Story of Albion Public Schools Going South to Historically Black Colleges and Universities to Create a Teaching Faculty That Looks Like Its Students |
| 2:15 | Anthony Avouris (Riedel) | Exploring Cultural Continuity Between Ancient Greece and the Byzantine Empire |
| 2:30 | Victoria Wiese (Webb) | Iskay Simipi Runapanakuy Yachachina: The Role of Intercultural Bilingual Education in the Preservation and Appreciation of Quechua in Peru |
| 2:45 | Abigail Amat (Guenin-Lelle, Yewah, Mesa) | Translations of <i>Paroles d’honneur Écrits de Créoles de couleur néo-orléanais</i> |
| 3:00 | Annette Varga (Yoshii) | Transformation of Gender Roles: The Value of Change in Japanese Women’s Language and Contemporary Use |
| 3:15 | Troy MacCallumMhor (Yoshii) | Triumphalism on the Big Screen: The Division of East and West Germany after Reunification |
| 3:30 | Desiree Comer (Valdina) | Mainstream Tensions and Alternative Spiritualities: Making Sense of NRMs |
| 3:45 | Mickey Benson (Valdina) | Pastel Spirituality: Finding Religion in the Online Spiritual Marketplace |



FORUM #3 – PLATFORM PRESENTATIONS

AFTERNOON SESSION

1:00	Clara Wagner (Streu)	Synthesis of a Photoswitchable Cancer Drug
1:15	San Pham (Streu)	Syntheses and Characterizations of Azo c-Kit and Tie-2 Inhibitors for Light-controlled Cancer Treatment - Light the Way to Conquer Cancer
1:30	Noah Robertson (Streu)	The Synthesis of a Light-Activated Immunotherapy
1:45	Alexandra Seidel (McCaffrey)	Microwave-assisted Duff Reaction
2:00	Venkata Chintalapati (Reimann)	Decentralizing the Web: Hosting and Accessing Websites on the Blockchain
2:15	Claire Mitchell (Bollman)	Casino Euchre: From the Midwest to Las Vegas
2:30	Anna Crysler (Rohlman, Streu)	Generating Antimicrobial Nanobodies through Directed Evolution
2:45	Hannah Woods (McCaffrey, Zellner)	An Assessment of Amino Acids Observed in Carbonaceous Chondritic Meteorites: Implications for Survivability in Impact Events
3:00	Mary Beall (Metz)	Catalytic Hydrogenation of Oxyanions Using Transition Metal Carbon Microspheres
3:15	Peter Filbrandt, Kaitlyn Piontkowsky (Rohlman, Streu)	Development of Type Three Secretion System Binding Nanobodies
3:30	Marcelle Collares (Henke)	International Student Advocacy

FORUM #4 – PLATFORM PRESENTATIONS

AFTERNOON SESSION

1:00	Patrick Mayo (Cahill)	The Ecology and Impact of a Genetic “Superclone”
1:15	Audrey Lewis (Skean)	<i>Studies of Miconia sect. Calycodomatia: A Taxonomic Revision of the Miconia impressinervis complex (Melastomataceae) on Hispaniola</i>
1:30	Nathan Periat (White)	The Effect of Parasitic Mites on Incubation Patterns in House Wrens (<i>Troglodytes aedon</i>)
1:45	Irene Corona-Avila (Cahill)	Investigating Genetic Diversity of Oleander Aphids in the United States
2:00	Rosemary Hernandez (Cahill)	Phylogenetics and Distribution of <i>Culicoides</i> larvae in a Michigan Inland Salt Marsh
2:15	Saige Jost (Cahill)	Invertebrate Species Morphology and Analysis Throughout Different Environments
2:30	Alexis Wilkerson (Olapade)	Comparing Bacterial Occurrences and their Hydrolytic Enzyme Activities Among Different Soil Types
2:45	Hannah Erickson (Cervantes)	Mapping the Mating Type Recognition Pathway of <i>Tetrahymena thermophila</i>
3:00	Rachel Stander (Cahill)	Effects of Road Salt and its Alternatives on Freshwater Invertebrates
3:15	Leia Serlin (Rabquer)	Examination of a Novel, Multifaceted Support System That Provides Ankle Support and Stability for Patients With Arthritis While Walking and Standing in High Heels
3:30	Viktoria Carr (Francis, Wieth)	Relationship between Grit and COVID-19 Behaviors
3:45	Mauricio Perez Garcia (McLean)	Examining the Role Certain Public Policy Regarding Undocumented Immigrants Effects the Healthcare Outcomes of their Children who are U.S. Citizens During COVID-19
4:00	Eryn Lewis, Lyndsey Moore (Madhavan-Brown, Godfrey, Keyes)	Albion COVID- 19 Vaccine Needs Assessment



FORUM #5 – PLATFORM PRESENTATIONS

AFTERNOON SESSION

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| 1:00 | Emily Rancour, Joseph Tatar, Clement Bard, Erica Freville, Remi Massonnet, David Ribeiro de Azevedo (Baker, Bruneteaux-Swann) | Business Plan Development: An International Partnership Between the USA and France - Hubsy: The Hub for All of Your Educational Needs |
| 1:15 | John Hoesli, Sagar Kamaraju, Steven Carré, Alex Guitton, Valentin Jacquet, Jérôme Sambathe, Hayfa Tounsi (Baker, Bruneteaux-Swann) | Business Plan Development: An International Partnership Between the USA and France - Instantly |
| 1:30 | Jace Conley, Jared Fife, Fischer Jacobs, Chamil Alikhadjiev, Shamloune Fakrul, Abdulla Mohammad, Emilio Morille-Leal (Baker, Bruneteaux-Swann) | Business Plan Development: An International Partnership Between the USA and France
ConnectRoom: Building Human Connections in a Virtual World |
| 1:45 | Morgan Armstrong, Caitlin Cummings (Walling) | Beyond Protesting: A Toolkit for Student Activism |
| 2:00 | Eryn Star (Verduzco-Baker) | Autistic Perspectives Revealed: Autistic People's Experiences with Emotional Abuse from Teachers in Public School |
| 2:15 | Erin Lathrop (Henke) | Never Your Fault: A Memoir on Fighting the Stigma on Sexual Assault |
| 2:30 | Vicky Turner (Wieth, Francis) | Age of Second Language Acquisition Predicts Ability to Switch between Images on the Ambiguous Figures Task |
| 2:45 | Soterios (Soti) Michalos (Christopher, Wieth) | The Effects of a Flex Model of Teaching on Performance |
| 3:00 | Peach Ruth Amanda Norman Owen (Webb) | Effective Comprehensive Sexual Education with the Case Study of Denmark and the United States - Should Porn and Sex Work be Included? |
| 3:15 | Sierra Hazard (Baker) | A Guide to Buying and Selling Companies |
| 3:30 | Abigail V. Cluff (Jechura) | Health Psychology: Historical Context and Future Implications |
| 3:45 | Jessie Butchley (Myers) | "Multiculturalism Has Failed": Examining National Identity, Migration Policy and Germany in a Globalized World |
| 4:00 | Morgan Armstrong (Francis, Wieth) | Individual Differences in Counseling Preferences |



ABIGAIL AMAT, '21
Translations of *Paroles d'honneur Écrits de Créoles de couleur néo-orléanais*

Faculty Sponsors: Dianne Guenin-Lelle, Emmanuel Yewah, Helena Mesa
 Majors: English (Creative Writing), French
 Hometown: Niles, MI

My thesis project consists of original translations from French to English of the works of *Paroles d'honneur Écrits de Créoles de couleur néo-orléanais*, as well as a French introduction to the works. Until the year 2020, all but one of these pieces (“La Mulatre”) remained untranslated. This original contribution to US history, as well as the research I did into the importance of French influences in US history, helps to amplify the voices of people of color whose voices have not always been a central focus in academia. These French-speaking Creole people of color made additions to US literature that are often overlooked, but offer an amazing view into lives and subject matter that isn’t often taught or talked about.



MORGAN ARMSTRONG, '21

Major: Psychology (Human Services Concentration)
 Hometown: Albion, MI

Armstrong

CAITLIN CUMMINGS, '22

Major: Political Science
 Hometown: Gurnee, IL



Cummings

Beyond Protesting: A Toolkit for Student Activism

Faculty Sponsor: Carrie Booth Walling

Every movement starts with an idea; an idea that something can change for the better. Movements - big or small - are not dependent on whether or not someone is enough of an “extraordinary” individual to lead it. Rather, movements are dependent on whether or not one’s desire to make a change is extraordinary

enough to press on with it - even when it feels as if the weight of the world is against them. Protesting is a great way to gather like-minded individuals to join the fight for a cause, but activism does not end with protesting. Instead, protesting should be the catalyst for change. This is why we are developing a Human Rights Toolkit to help students on campuses organize more efficiently by making them aware of past used methods and strategies. With this toolkit, we hope to help those inspired enough to fight for the change they wish to see in their world.

Supported by: FURSCA



MORGAN ARMSTRONG, '21
Individual Differences in Counseling Preferences

Faculty Sponsors: Andrea Francis, Mareike Wieth
 Major: Psychological Science (Human Services Concentration)
 Hometown: Albion, MI

Maintenance of mental health is important to the success of Albion College students. Mental health services on campus have been promoted as being useful for students when tackling everyday issues. This research aims to better understand differences in counseling preferences of Black students and White students. We surveyed 141 Albion students (26 Black students and 115 White students) to examine their perceptions of counselor interactions. As seen in previous research, we found that Black students want to discuss how racism impacts them and have a counselor of the same race and ethnicity more than White students. Additionally, Black students want a counselor to work with them in a warm supportive manner and discuss how to signal when they are uncomfortable more so than White students. Regardless of race, Albion students do not want their counselor to give them homework. Components of our identity such as race and ethnicity create diversity in our contributions to campus and influence students’ reception of services that are available. By considering students’ attitudes, we can acknowledge differences in our identities and counseling preferences while enhancing the campus’s overall well-being.



ANTHONY AVOURIS, '21
Exploring Cultural Continuity between Ancient Greece and the Byzantine Empire

Faculty Sponsor: Christopher Riedel
 Major: History
 Hometown: Kent, OH

The literary and linguistic tradition of Greece is the second-oldest unbroken tradition in the world, after that of China. The works of Homer, Herodotus, Plato, and many others continue to play important roles in society today. Here I investigate an important link in this historical chain, the medieval Byzantine Empire, examining how it perceived its ancient Greek heritage and how ancient Greek culture shaped the Byzantines’ perception of themselves. Through the three avenues of historical, educational, and military writings, we see that, despite the many influences from other cultures, the Byzantines deliberately held ancient Greece up as a prime model, making it the central component of the Byzantine cultural experience.

Supported by: FURSCA - Robert M. Teeter Research Fellowship Endowment



MARY BEALL, '21
Catalytic Hydrogenation of Oxyanions using Transition Metal Carbon Microspheres

Faculty Sponsor: Kevin Metz
Major: Chemistry
Hometown: Midland, MI

Many environmental contaminants can be chemically reduced using catalyzed hydrogenation reactions. However, standard hydrogenation catalysts, e.g., Pd or Pt, are prohibitively expensive for these applications. This research focuses on the development of inexpensive bimetallic catalysts for the hydrogenation of oxyanions. Oxyanions are emerging environmental contaminants with known health impacts. Our catalysts are made using ultrasonic spray pyrolysis (USP), producing highly porous carbon microspheres (CM) with bimetallic nanoparticles embedded in them. To date Ni/Fe, Ni/Cu, Ni/Co, Fe/Cu, Fe/Co, and Cu/Co CMs have been made. We have studied the reduction of bromate as a model oxyanion. Different techniques of hydrogen incorporation have been attempted, including gas dissolution, hydrogen-transfer reagents, and high pressure Parr reactors. Ni/Fe CMs show promise in the reduction of bromate. Our latest results from optimizing these systems will be presented.

Supported by: FURSCA - Robson Family Fellows Endowment; Bruce A., '53 and Peggy Kresge, '53 Endowed Science Fellows

between vigorous and moderate intensity exercise on sleep quality. Therefore, the purpose of this study is to examine the effects of moderate and vigorous exercise on sleep quality. Surveys were conducted at Albion College, both students and faculty members were allowed to participate in the study (n=92). The mean age of the participants was 23.6+10.7 years. Participants rated their exercise intensities, as well as how long their bouts of exercise were, and their sleep quality using the Pittsburgh Sleep Quality Index, and the International Physical Activity Questionnaire. Statistical analyses were performed using the Pearson product-moment correlations and one-way ANOVA utilizing the SPSS Statistics software. Significance was set to $p < 0.05$. Correlations were run between moderate intensity physical activity, vigorous intensity physical activity, total physical activity, and sleep quality. A one-way ANOVA was used to compare sleep quality by group of physical activity.



MICKEY BENSON, '21
Pastel Spirituality: Finding Religion in the Online Spiritual Marketplace

Faculty Sponsor: Peter Valdina
Major: Religious Studies
Hometown: Portland, OR

My research aims to show how mechanical reproduction of religious forms and rituals contributes to the commodification of personal identity. Grounding specifically in the context of the 21st-century self-care market, I analyze spiritually influenced self-care objects that were recommended to three social media accounts I created with the goal of attracting religiously-themed products and modern self-help gurus to look at the revival and dissemination of religious information in the current market. Specifically, how this cultural exchange manifests in themes of Orientalism, cultural fetishization, and revivalism. The reframing and specification of spirituality and spiritual experiences as commodities can decontextualize religious practice while still bringing a sense of place to practitioners. In exploring this duality wherein something removed from its original source can still bring about a sense of community connection, I hope to show another dimension of the narrative around personal power and collective memory. Specifically, the existence of marketplace spirituality as a form of genuine religious expression addresses the critical theoretical question of whose job it is to maintain and define the sacred, and how the aura of the sacred can reaffirm itself in new contexts. By unpacking the nuances of the modern spiritual market, we can see that the sacred is not the sum of its parts but a sensory predecessor.



Begley

AUSTIN BEGLEY, '21

Majors: Kinesiology, Philosophy
Hometown: Battle Creek, MI

JACQUELINE ESPINOSA, '23

Major: Kinesiology
Hometown: Dallas, TX

ALLISON HASPEL, '23

Major: Kinesiology
Hometown: Port Huron, MI

NICOLE SWEETLAND, '23

Major: Kinesiology
Hometown: Saline, MI



Sweetland

Association of Physical Activity and Sleep Quality in College Students, Faculty, and Staff

Faculty Sponsor: Julie Cousins

Sleep quality and exercise are two distinct and important aspects of living a healthy lifestyle. While there has been a vast amount of research done on exercise and sleep quality, not much has been done on the distinction



LAUREN BERGERON, '22
"This Insolent and Inhuman Race": White U.S. Soldiers' Thoughts about White Southerners during the Civil War

Faculty Sponsor: Marcy Sacks
 Majors: History, Geology
 Hometown: Riverview, MI

The Civil War was the United States' bloodiest and deadliest war, with intense battles interspersed between long periods of boredom. In order to preserve the spirit and combat boredom, U.S. soldiers frequently wrote letters to home and kept personal diaries. For many ordinary white U.S. soldiers, it was their first time in the South, and their first time interacting with Southerners, both white and black. From reading scores of letters and diaries written by white U.S. soldiers, I have found that everyday white Northern soldiers were fascinated by white Southerners, enough that they commented on their perceived character and behaviors in their diaries and letters home. While there was often disdain, there also was frequent sympathy for poor white Southerners with the assumption that they had been duped into supporting secession by rich, slave-owning white Southerners. My project analyzes comments made by white U.S. soldiers about white Southerners, in order to better understand how white U.S. soldiers' perceptions of white Southerners contributed to their overall understanding of the war. Additionally, this analysis helps communicate the depth of the division between the North and the South, revealing that it extended far deeper than politics or commitment to a cause. Rather, white Northerners and Southerners in many ways viewed themselves as fundamentally culturally incompatible.

Supported by: FURSCA - Julia Robinson Burd, '31 Memorial Fellowship; GLCA--Library of Congress Program



JESSIE BUTCHLEY, '21
"Multiculturalism Has Failed": Examining National Identity, Migration Policy and Germany in a Globalized World

Faculty Sponsor: Perry Myers
 Majors: International Studies, History
 Hometown: Crystal Lake, IL

Contemporary German political debates concerning the topic of migrant integration serve as a vestige to West Germany's *Gastarbeiter* [guest worker] programs that existed from 1955 to 1973. The *Gastarbeiter* programs undeniably impacted the demographic makeup of the once homogenous country, but also serve to highlight how the concept of German national identity influenced the structure of laws and policies in Germany related to migrant rights. The idea of a German national identity has led to policies that excluded individuals that did not fit the German concept of national identity and of *Volk*.

This paper aims to examine how German national identity has influenced the ways in which migration policies, including the *Gastarbeiter* programs, have been structured in Germany. Additionally, it explores how these policies resulted in a failed sense of belonging in Germany for many migrants and their descendants, and unequal treatment of different migrant groups in Germany. Through the examination of international and human rights law, treaties, government letters and correspondences, and coalition records, this paper proposes that Germany's policies affecting migrants not only creates for unfair and unequal treatment of migrants, but also jeopardizes the country's international standing and commitment to human rights law. If Germany is to successfully adhere to international laws and conventions, the country must strive to create new laws and policies that benefit migrants and their descendants.

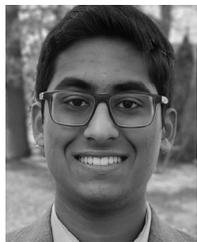


VIKTORIA CARR, '22
Relationship between Grit and COVID-19 Behaviors

Faculty Sponsors: Andrea Francis, Mareike Wieth
 Major: Psychological Science
 Hometown: Bay City, MI

Albion College has implemented several COVID-19 safety guidelines, including a set of rules for students. For example, students have been required to wear a mask when leaving their dorm room, not visit other residence halls, and ask permission to leave campus. There has been variability in both students' compliance to the new rules and flexibility with the changes implemented during the pandemic. In other words, some students were grittier than others during the COVID-19 crisis. Grit is defined as perseverance and passion for long-term goals during challenging times (Duckworth et al., 2007). Gritty perseverance is putting in continuous and strenuous effort towards achieving a goal despite hardship while gritty passion is continuing towards a goal with unwavering enthusiasm over time (Duckworth & Quinn, 2009; Duckworth et al., 2007). It was hypothesized that students with higher levels of gritty resilience would be more likely to follow safety guidelines in the fall 2020 semester than less resilient students. To test this hypothesis, 200 Albion College students (148 women, 52 men, 3 nonbinary, 1 gender fluid; 51 first-years, 36 sophomore, 56 sophomores, 51 seniors) completed surveys asking about their grittiness and COVID-19 rule following behaviors for the Fall 2020 semester. Analyses showed that as gritty resilience increased, so did compliance with COVID-19 safety rules. In contrast, as gritty passion increased, compliance decreased. Results suggest that while resilient students adjusted and were able to navigate the new rules, the most passionate students were the most resistant to following the new COVID-19 rules.

Supported by: FURSCA



VENKATA CHINTALAPATI, '22
Decentralizing the Web: Hosting and Accessing Websites on the Blockchain

Faculty Sponsor: David Reimann
Major: Combined Engineering - Physics
Hometown: Battle Creek, MI

The World Wide Web is trusted as a source of information by many. However, the hosting of websites often cannot completely guarantee two of the three core tenets of information security: integrity and availability. This is because websites are hosted on a centralized server or set of servers. If those servers are rendered inaccessible, the website is unreachable. On the other hand, if the content on the server is modified in an illegitimate manner, it can serve malicious purposes. These downfalls of traditional server-based hosting can be remedied utilizing the decentralized characteristic of blockchain technology. Blockchain is an emerging record-keeping technology that relies on thousands of servers worldwide; it is a public and decentralized ledger that is very secure. This makes it almost impossible for the data it contains to be modified or deleted. Thus, a solution can be formulated that stores websites utilizing blockchain technology, permanently, in a decentralized form, without a single point of failure. A proof-of-concept computer program was built that runs on a user's computer to (1) publish websites onto a publicly available blockchain, which, by its nature, is immutable, transparent, and decentralized, and (2) act as a web browser to access those websites. This way, websites can be hosted without dependence on a single entity or server, and be impossible to delete or alter in any way.

be discussing the historical context and foundations of Health Psychology. I will be using this historical context to explore the current applications of the field as well as any future advancements. For the creative element of this project, I propose a Health Psychology website aimed at Albion community members, students, faculty, and staff. The website includes general information about Health Psychology such as what the field studies and how it was established, local and national mental health organizations, and demographic-based resources and applications.



MARCELLE COLLARES, '23
Enhancing Water Literacy for Teenagers Using the Ludic Method

Faculty Sponsor: Suellyn Henke
Major: Geological Sciences
Hometown: Rio de Janeiro, Brasil

My project focused on how to teach and apply the ludic method of education. The ludic method is an informal type of teaching in which the learner is led to knowledge by their own curiosity, which makes the process of learning easier and spontaneous. The main goals of my research were: (1) to understand the method and the reasons to apply it and (2) to develop a water literacy curriculum project for the 6th grade social studies class at Mar Lee Middle School (Marengo, MI). This will be implemented after COVID-19 restrictions are decreased. My lesson plans include the use of a water table to teach about terms related to water and a scavenger hunt to introduce the topic of the Great Lakes.

Supported by: FURSCA



ABIGAIL V. CLUFF, '21
Health Psychology: Historical Context and Future Implications

Faculty Sponsor: Tammy Jechura
Major: Biology
Hometown: Grand Rapids, MI

Mental health and illness have been a common topic of study within the fields of psychology as well as physiology and have been found to have a reciprocal relationship with physical well-being. For example, depression can cause physical symptoms such as bodily pain and hypertension, and physical limitations such as chronic stress can increase the risk of depression. This reciprocal relationship has led to the foundation of the psychology sub-discipline, Health Psychology, which approaches mental health dynamically through the biopsychosocial model, which focuses on biological, psychological, and social factors that may influence mental health and physical well-being. Here I review the extensive literature that argues that the field of Health Psychology is an important component of mental health research and intervention, as it focuses on both psychological and physical symptoms and their impact on one another. I will



MARCELLE COLLARES, '23
International Student Advocacy

Faculty Sponsor: Suellyn Henke
Major: Geological Sciences
Hometown: Rio de Janeiro, Brasil

International students are a vital component of the student body at Albion College, and contribute to the learning environment in multiple ways. As an international student from Brazil who is aware of our needs, I decided to work on this project in order to (1) increase social media presence and communication channels for international students on campus, (2) create networking between current students and alumni, (3) communicate with key stakeholders to build awareness of international students' resource needs, and (4) advocate for and increase resources and opportunities for international students on campus. In simpler words, I wanted to turn my desire that international students feel welcomed and valued into action. This process involves creating social media accounts to represent these students, helping future international students apply to the college,

updating the Center for International Education website with pictures and short bios of current international students, working on offering more scholarships for future international students and creating a fun and cozy environment for them at the Global Room located at the Vulgamore building.

Supported by: FURSCA



DESIREE COMER, '21 **Mainstream Tensions and Alternative Spiritualities: Making Sense of NRMs**

Faculty Sponsor: Peter Valdina
Majors: Psychology, Sociology
Hometown: Flint, MI

In my presentation I take a critical but empathetic look at New Religious Movements (NRMs), often fearfully and pejoratively referred to as cults. Specifically, I analyze the Osho/Rajneesh movement, which has its roots in South Asia, and Scientology, which originates in the post-war US. My research focuses on the context of important social and historical changes occurring during the formative years of these movements. I examine the manner in which the messages of these movements can be understood as attractive to potential members. From a critical standpoint, I evaluate possible contradictions between those messages and the practices espoused by the leaders of these movements. I highlight a tension between Osho's message that endorses free sexual expression as the way to enlightenment, while simultaneously portraying same-sex desire in a negative light. Similarly, Scientology claims that freedom of the mind (Thetan) is the way to gain higher spiritual awareness, yet the movement contradicts that philosophy by using coercive practices such as auditing. My approach draws on the theoretical foundation of Jonathan Z. Smith, a historian of religion, who emphasized a humanistic approach to the study of religion. Like Smith, I hope to emphasize the importance of humanizing these groups. I will approach the topic empathetically while simultaneously critically analyzing the movements so as to highlight inconsistencies in the messages and practices of these groups. Through an exploration of these inconsistencies, I hope to expand the understanding of the human motivations behind NRMs.

JACE CONLEY, '22

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – ConnectRoom: Building Human Connections in a Virtual World)



IRENE CORONA-AVILA, '22 **Investigating Genetic Diversity of Oleander Aphids in the United States**

Faculty Sponsor: Abigail Cahill
Major: Biochemistry
Hometown: Lawrenceville, GA

Aphis nerii, commonly known as the Oleander Aphid, is an invasive species found across the United States on milkweed plants. The female *A. nerii* exhibits clonal ecology reproducing asexually throughout the summer season. This study is a follow-up to Katie Ferrero's "Investigating Aphid 'superclone' status" where her results displayed similar genotypes of the geographically distant aphids from Michigan and Pennsylvania. Although aphids are susceptible to low genetic diversity, due to their clonal ecology, little is known about the geography of recolonization and the possibility of genetic variation due to geographical isolation. In this study, we collected and extracted DNA from aphids in Illinois, Michigan, and Pennsylvania to investigate the genetic diversity among aphids across the United States. To determine the amount of genetic diversity between aphids, aphid DNA was amplified using the COI gene and sequenced at the Michigan State Genomic Core. An analysis of the sequences showed low genetic diversity predicted from clonal ecology.

Supported by: FURSCA



ANNA CRYSLAR, '22 **Generating Antimicrobial Nanobodies through Directed Evolution**

Faculty Sponsors: Christopher Rohlman, Craig Streu
Major: Biochemistry
Hometown: Rockford, MI

Antibodies are used in a variety of scientific settings including biological screening as well as drug therapies. These Y-shaped glycoproteins are naturally found in our immune systems as immunoglobulins, or IgGs. Every type of antibody binds to a unique antigen, giving them the ability to have high specificity. Modified fragments of antibodies can be engineered and further used as drugs and other therapeutics to take advantage of their high specificity. This presentation will focus on nanobodies (VhHs), which are engineered antibody-fragments that consist of one variable domain. In order to obtain a specific nanobody, we use directed evolution, a powerful tool that selects antibodies against a target antigen. While there are many techniques by which this is done, we use a technique known as yeast surface display. Yeast surface display works by first introducing a DNA library coding a billion or more different antibodies into yeast cells, which then transforms the cell to express the desired nanobodies on their surface. In this presentation, we focus on the cell-sorting technique



known as magnetic-activated cell sorting (MACS), a method that uses streptavidin labeled magnetic beads to select against biotinylated antigens. Using these technologies, nanobodies can be discovered and developed as drugs to help combat a variety of healthcare threats, including antibiotic resistance and the lack of new antibiotic development in the pharmaceutical industry. Producing nanobodies through directed evolution has the potential to create antibiotics that are efficacious against even the most resistant pathogens.

Supported by: FURSCA

CAITLIN CUMMINGS, '22

(See Morgan Armstrong, '21; Caitlin Cummings, '22)



Emerson

SAMANTHA EMERSON, '22

Major: Kinesiology
Hometown: South Lyon, MI

ERYN LEWIS, '22

Major: Kinesiology
Hometown: Albion, MI



Lewis

KIRK MYERS, '22

Major: Kinesiology
Hometown: Frankfort, MI

DANIELLE RINEMAN, '22

Major: Kinesiology
Hometown: Howell, MI



Myers

LIAM SMITH, '22

Major: Kinesiology
Hometown: Ann Arbor, MI

Sleep Quality, Sleep Duration, and Mental Health in College Athletes

Faculty Sponsor: Julie Cousins



Rineman

Mental health is a growing concern for many individuals worldwide, especially in college students. Sleep is essential for good health. Sleep duration and quality can be negatively impacted by the demanding schedules of college athletes. The purpose of this study was to assess the sleep quality, sleep duration, and mental health of college athletes. It was hypothesized that college athletes with higher sleep quality would have better mental health than college athletes with lower sleep quality. Additionally, college athletes that sleep for a longer duration would have better mental health than college athletes with shorter sleep

duration. A total of 45 student athletes (age = 20.0+1.0 years) answered demographic questions and completed surveys measuring sleep quality, sleep duration, and mental health via Google Forms. The athletes were recruited through word of mouth and email. Statistical analyses were performed using Pearson Product-Moment correlations and a one-way ANOVA. Significance was set to $p < 0.05$. Pearson Product-Moment Correlations were run between sleep quality, sleep duration, stress score, anxiety score, and depression score. A one-way ANOVA was performed to compare sleep quality by athletes' stress score grouping.

SAMANTHA DYE, '23 Synthesis of an Azologue of a Known Smoothened Inhibitor

Faculty Sponsor: Craig Streu
Major: Biochemistry
Hometown: Canton, MI



My research is focused on synthesizing a light responsive version of the drug Vismodegib, a smoothened inhibitor. Smoothened is a transmembrane protein that is a key component of the Hedgehog signaling pathway. This pathway is very important for tissue proliferation, but when mutations arise it leads to cancerous cells being formed in the body. The goal of my project is to create a photo-switchable azologue of Vismodegib that will drastically reduce the harsh side effects of this drug due to the ability of azo-stilbenes to isomerize in response to light. The drug is designed to be taken in its inactive form and activated by photoisomerization with light selectively in the cancer cells, thus not harming healthy cells in the body.

Supported by: FURSCA



HANNAH ERICKSON, '21
Mapping the Mating Type Recognition Pathway of *Tetrahymena thermophila*

Faculty Sponsor: Marcella Cervantes
 Major: Biology
 Hometown: Birmingham, MI

For my research, I am analyzing RNAseq data collected from *Tetrahymena thermophila* during starvation. This fits into a larger goal of discovering the mating type recognition pathway for *T.thermophila*. I am researching this pathway in the context of gene expression. The MTA and MTB transmembrane proteins are known to determine mating type. The samples that I am working with include the wild type (SB210), a double knockout of both MT genes, and a single knockout of MTA. From comparing these samples, I am looking for genes that are related to MTA and MTB function. Differential expression analysis shows genes that have a statistically significant difference of expression between samples. With these identified genes I can relate and identify their function to the MT genes. I am using a few different programs, including HISAT, HTSeq2, and EdgeR. Each of these play different roles in aligning, counting, and evaluating the RNAseq data. In addition, I am using R studio as a visualization tool to display the results. I expect to find additional transmembrane proteins as well as genes related to signaling, costimulation, and conjugation. All of the information I am learning and discovering is useful, as not much is currently known about the mating type recognition pathway.

JACQUELINE ESPINOSA, '23

(See Austin Begley, '21; Jacqueline Espinosa, '23; Allison Haspel, '23; Nicole Sweetland, '23)

JARED FIFE, '21

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – ConnectRoom: Building Human Connections in a Virtual World)



PETER FILBRANDT, '23

Major: Biochemistry
 Hometown: South Haven, MI

Filbrandt

KAITLYN PIONTKOWSKY, '23

Major: Biochemistry
 Hometown: Grand Rapids, MI



Piontkowsky

Development of Type Three Secretion System Binding Nanobodies

Faculty Sponsors: Christopher Rohlman, Craig Streu

Just as humans can become infected with bacterial infections, other members of the living world such as plants can as well. When these affected plants are also responsible for feeding millions of humans, lives can be at stake. Rice and tomatoes are two plants that are targeted and infected by the bacteria

species *Xanthomonas oryzae* pv. *Oryzae* and *Pseudomonas syringae* respectively. These bacteria species have been located in several countries damaging the crops there. Both *Xanthomonas oryzae* pv. *Oryzae* and *Pseudomonas syringae* are gram-negative bacteria and have a unique cell surface structure called the type three secretion system (T3SS). The T3SS is a large protein composed of several subunits that these two bacteria species use to inject their effector proteins into host cells. Since the proper packing of the subunits into the translocator complex is required for pathogenicity and is highly conserved, it is an ideal target for targeting antimicrobial compounds. One especially promising antimicrobial compound for foodstuffs is known as a nanobody, which is a small, bio-degradable protein. Our projects are to design a nanobody to bind to our respective target proteins and impede the bacteria's ability to attack and infect host cells.

Supported by: FURSCA - Orpha Leiter Irwin Fellowship



JESSICA GARCIA-LOPEZ, '22
Environmental Bioindicators in South Central Michigan

Faculty Sponsor: Abigail Cahill
 Major: Biology
 Hometown: Los Angeles, CA

Over the years, macroinvertebrates have been used as bioindicators for many rivers, and have been analyzed for biodiversity for certain habitats. The Kalamazoo River that runs through the Whitehouse Nature Center is a habitat for many species. It provides nursery for other species of invertebrates, and is a resting stop for birds. The research incorporated macroinvertebrates from the wild rice and other sections of the Kalamazoo River. The objective of this study was: (i) compare two main areas of the Kalamazoo River, (ii) determine differences in diversity. In order to determine the difference in biodiversity between



the wild rice and other areas of the Kalamazoo River, we used the measuring methods of diversity and taxonomic richness of these species. The samples were collected from eight points in the Kalamazoo River, and were analyzed through the use of a taxonomic key.

side, do business owners know the necessary steps to sell their company? What risk is involved on each side of the transaction? This project is a step-by-step guideline that uses tried and true, best practices to explore this popular industry; the buy-and-sell enterprise.



HANNAH GRACIN, '21
Romantic Interests and Female Agency in YA Dystopian Novels

Faculty Sponsor: Jess Roberts
 Major: English
 Hometown: Saint Clair Shores, MI

Drawing on the work of my honors thesis, this presentation analyzes the roles that the male counterparts play in the lives of the female protagonists in two widely popular young adult dystopian series: Suzanne Collins's *The Hunger Games* and Veronica Roth's *Divergent Trilogy*. In *The Hunger Games*, Peeta plays a critical role identifying and sharing concrete ways Katniss can rebel against the Capitol of Panem whereas Gale plays a role as the symbol of rebellion to Katniss. In the *Divergent Trilogy*, Tobias utilizes his position of power to help Tris come to fully understand and leverage her status as a Divergent individual. In both of these Young Adult Dystopian trilogies, then, the male romantic interests understand the world they live in more fully than the main female character. Their sharing of this understanding enables the main female characters to seize on their individual agency. Therefore, the actions of female characters in *The Hunger Games Trilogy* and the *Divergent Trilogy* are influenced by the male romantic interests. Furthermore, the conclusions of these novels are ones that question the roles of powerful women in society.

ALLISON HASPEL, '23

(See Austin Begley, '21; Jacqueline Espinosa, '23; Allison Haspel, '23; Nicole Sweetland, '23)



SIERRA HAZARD, '21
A Guide to Buying and Selling Companies

Faculty Sponsor: Vicki Baker
 Major: Accounting
 Hometown: Saline, MI

It is common for aspiring entrepreneurs to hit the ground running with a startup business of their own, but instead, perhaps early-career professionals should concentrate their efforts on existing companies, focusing on how to improve a business's security, profitability, and growth. But can an individual with less industry and occupational experience fill the position of a seasoned business owner? Are these professionals qualified to own and operate a living, breathing company without establishing one themselves first? On the flip



ROSEMARY HERNANDEZ, '22
Phylogenetics and Distribution of *Culicoides* larvae in a Michigan Inland Salt Marsh

Faculty Sponsor: Abigail Cahill
 Major: Biology
 Hometown: Dallas, TX

In 2018, 21 sediment samples were collected in July, April, and October from a transect in Michigan's Maple River inland salt marsh. The *Culicoides* biting midge insect was one of many macroinvertebrates found in these samples. In North America only two biting midge species have been identified, *Culicoides sonorensis* and *Culicoides variipennis*. Their larval habitat causes them to be rarely identified in Michigan. But due to the salt marsh's salinity and organic matter levels it creates a prime habitat for *Culicoides* larvae. Genetic testing and phylogenetic trees were used to identify the species and seasonal distribution of the *Culicoides*. The *Culicoides* larvae distribution was different in each season. In July, the species count was high; in April, the population count decreased; and in October, no larvae were present. Genetic testing and DNA barcoding identified the insect as *Culicoides sonorensis*. To further validate these results, I conducted phylogenetic trees in R using our barcoding data sequence and the COI gene of the two plausible *Culicoides* species. Multiple trees were constructed: one with our sequence and the *C. sonorensis* COI gene, another with our sequence and the *C. variipennis* COI gene, and lastly comparing all three. Results are inconclusive, and further DNA barcoding research is underway to find the specific *Culicoides* species located in the inland salt marsh.

Supported by: FURSCA (SRP)

ROSEMARY HERNANDEZ, '22

(See Breh Ruger, '23; Bach Tran, '23; Rosemary Hernandez, '22; Saige Jost, '22)

JOHN HOESLI, '21

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – Instantly)

FISCHER JACOBS, '23

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – ConnectRoom: Building Human Connections in a Virtual World)

ERIN LATHROP, '22**Never Your Fault: A Memoir on Fighting the Stigma on Sexual Assault**

Faculty Sponsor: Suellen Henke
Majors: Biology, Psychology
Hometown: Saline, MI

Never Your Fault: A Memoir on Fighting the Stigma on Sexual Assault is about my journey from being a survivor to finding my passion to advocate for other survivors. In order to craft the memoir to the best of my abilities I conducted research by reading books that were about how trauma affects a person, how to write memoirs, and examples of memoirs themselves. Reading this literature while writing this memoir has been extremely therapeutic for my journey and more helpful than I could have imagined. In the future, I plan on using this memoir as a tool to help me in my career of becoming a sexual assault nurse examiner, a career path that I chose as a result of being a survivor.

Supported by: FURSCA–Orpha Leiter Irwin Fellowship

**SAIGE JOST, '22**
Invertebrate Species Morphology and Analysis throughout Different Environments

Faculty Sponsor: Abigail Cahill
Majors: Geology, Spanish
Hometown: Saline, MI

Since different types of species are found in different environments, it is important to record the morphological data and differences in species that inhabit these environments. This is important because it allows us to account for which invertebrates can survive and adapt to these different environments. I went to the Maple River in October 2019 and took samples in the floodplains and in the river itself. I used a dichotomous key to identify and count the different species of macroinvertebrates in these river samples. I then compared the river samples to the samples that we took along a transect in the Maple River salt marsh and another set of samples from Lake St. Clair Metropark. The inland salt marsh is a rare environment in Michigan and comparing the species diversity and abundance to freshwater sites helps us better understand which macroinvertebrates are abundant in this type of environment. Since these environments are so close to each other yet so different, especially in the salt composition and water flow, the types of macroinvertebrate species varied quite a bit from the different locations. The morphological data allowed me to determine species abundance throughout different environments.

Supported by: FURSCA (SRP)

SAIGE JOST, '22

(See Breh Ruger, '23; Bach Tran, '23; Rosemary Hernandez, '22; Saige Jost, '22)

SAGAR KAMARAJU, '21

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – Instantly)

**AUDREY LEWIS, '21**
Studies of *Miconia* sect. *Calycodomatia*: A Taxonomic Revision of the *Miconia impressinervis* complex (Melastomataceae) on Hispaniola

Faculty Sponsor: Dan Skean
Majors: Biology, Spanish
Hometown: Marshall, MI

I examined herbarium specimens and digital images of specimens of four poorly-known species of *Miconia* sect. *Calycodomatia* endemic to Hispaniola: *M. bairdiana* (Skean, Judd, Clase, & Peguero) Skean & Judd, *M. erkmaniana* Skean & Judd, *M. impressinervis* Skean & Judd, and *M. torbeciana* (Urb. & Ekman) Skean & Judd. These species are in the genus *Miconia* (1900 species), in a section of 18 species that is an evolutionary lineage defined by the synapomorphies of a calyptra (cap over the flower bud) and mite domatia (small dwellings for mites at vein junctions on leaf undersides). My goal was to discover differences that could be used to distinguish these four species from each other as they are often confused by botanists. *Miconia bairdiana* occurs along the banks of rivers in moist pine forests at elevations of 525-990 m in the Cordillera Central of the Dominican Republic. *Miconia erkmaniana* occurs at elevations of 1000-1200 m in “rak bwa” forests in the Massif de la Hotte of Haiti. *Miconia impressinervis* occurs at 1500 m elevation in the Cordillera Central of the Dominican Republic. Finally, *M. torbeciana* occurs in the Massif de la Hotte at elevations of 1000-1450 m in limestone “rak bwa” forests.

Supported by: FURSCA - Hyde Fellows in Student/ Faculty Research; National Science Foundation



Lewis

ERYN LEWIS, '23

Majors: Biology, Kinesiology
Hometown: Albion, MI

LYNDSEY MOORE, '21

Majors: Psychology, Kinesiology
Hometown: Kingsford, MI



Moore

Albion COVID- 19 Vaccine Needs Assessment

Faculty Sponsors: Shanti Madhavan-Brown, Maggie Godfrey, Barbara Keyes

As the war against COVID-19 rages on, inequalities in treatment and preventative care among diverse populations have resurfaced, providing evidence for systematic disparity in areas with higher populations of minorities (Dorn, Cooney, & Sabin, 2020). Communities with families of color have

faced specific challenges in healthcare availability, with the current pandemic being no exception (Copeland, 2005). Currently, vaccine availability is a primary concern, but what about vaccine apprehension? Regarding prior research, surveys have been conducted in Australia, the United Kingdom, and the United States indicating that the general public often has specific and unaddressed concerns about the COVID-19 vaccine (Faasse, Newby, & Newby, 2020; Malik et al., 2020; Reiter, Pennell, & Katz, 2020; Seale et al., 2021; Williams et al., 2020). Due to the recency of vaccine distribution, there has been a dearth of research conducted addressing the needs of at-risk groups despite reporting indicating that they have unique concerns about the vaccine (Chaffin & Rogers, 2020; Holt & Allen, 2020). Research conducted in partnership with the NAACP found that less than half (40%) of surveyed black community members would be willing to receive the vaccine but more than half (55%) know someone who has been diagnosed with COVID-19 (COVID Collaborative, 2020). This presentation will provide the results from the Albion COVID-19 Vaccine Needs Assessment regarding the perspectives of Albion community members on COVID-19 vaccine access, information, and concerns. Examples of the developed educational materials that were distributed in the community will also be presented.

ERYN LEWIS, '22

(See Samantha Emerson, '22; Eryn Lewis, '22; Kirk Myers, '22; Danielle Rineman, '22; Liam Smith, '22)



TROY MACCALLUMHOR, '21
Triumphalism on the Big Screen: The Division of East and West Germany after Reunification

Faculty Sponsor: Midori Yoshii
Majors: International Studies, History
Hometown: Macomb, MI

Almost thirty years have passed since the formal German reunification in 1990, but former East Germans continue to express frustration with the integration process, even feeling nostalgic about their past life. While this sentiment, Ostalgie [eastern nostalgia], is widely recognized by the German news media and in the academic world, popular German films fail to represent the East German perspective of their lives and struggle for integration, instead presenting a heavily biased Western narrative of life in the East.

This paper explores why contemporary German films omit their perspective through the analysis of four pieces of German media, Good Bye Lenin! (2003), The Lives of Others (2006), Barbara (2012), and Deutschland '83 (2015). A close examination of character motivations and plot points reveals a West German bias that stereotypes the East German system as one of inferiority and dominated by fear. This paper argues that these works fail to portray an accurate depiction of East German life because West Germans have developed a feeling of triumphalism over the former Eastern system, believing their way of life was superior to the East.



PATRICK MAYO, '22
The Ecology and Impact of a Genetic "Superclone"

Faculty Sponsor: Abigail Cahill
Major: Biology
Hometown: Battle Creek, MI

This research project's goal was to determine how much of an effect the invasive species of aphid *Aphis nerii* has upon the environments in which the species has been found and where it could logically spread. Ecological data was collected on the aphids via observations and collections of aphids at and around the host plant milkweed. Observational data was logged and organized for analysis. I found that *Aphis nerii* have a wide range, tend to group in either large groups or very small collections, and may have a beneficial aspect in terms of predation. I then investigated genetic diversity in aphid samples via DNA extraction, PCR of the COI barcoding gene, and genetic sequencing. The presentation of both the observational data and molecular information will better inform the community at large of the impact these insects have and could have upon the ecological level and how this species of aphid could harm milkweed populations as well as the monarch butterflies that fed on them.



ANGELA MEYERS, '21
Biases in Studies of Animal Communication and Impacts on Conservation

Faculty Sponsor: Dale Kennedy
 Major: Biology
 Hometown: Whitmore Lake, MI

Despite the wide diversity of signals utilized by animals for mate selection such as colors, calls, smells, and complex displays, studies of mating signals in each of these different sensory modalities have not received equal representation within the animal communication literature. Coleman (2009) used Web of Science to conduct a literature review of mate-choice studies published from 1966-2005 and identified both a taxonomic and sensory bias within the literature. Birds were the most well-represented, making up 40% of the total studies. Studies of visual and acoustic signals dominated the literature at 46% and 30% of the total studies, respectively. These findings revealed a human-centric bias in animal communication studies, since both humans and birds primarily utilize visual and acoustic signals in their communication. There was a significant underrepresentation of chemical and multimodal signaling in mate-choice, despite suggestions that both are likely widespread throughout the animal kingdom. Successful communication in a mate-choice context is indispensable for sexual selection, speciation, and inevitably survival, now more than ever in our rapidly changing environment. Using the protocol of Coleman (2009), I reviewed 107 mate-choice studies published from 2006-2020 and found that there has been an increase in chemical and multimodal studies and an increase in studies of spiders. I suggest this direction will be advantageous for future conservation efforts since chemical signalers are some of the most vulnerable to environmental change and multimodal signalers may help reveal how human actions are altering multiple sensory channels simultaneously.

Supported by: FURSCA - Bruce A., '53 and Peggy Kresge, '53 Endowed Science Fellows

combination of in-person and online class attendance) are related to student learning and motivation. In this study, students enrolled in a 200 level psychology course were tracked throughout the duration of a 7-week module during the Spring 2021 semester to identify which of the two settings they were in when learning specific information. Students were separated into two groups that alternated between in-person and online attendance throughout the weekly class schedule. The data was gathered through attendance-based tracking that was then correlated with examination performance on specific topics covered during class meetings. The effect of setting was assessed by comparing performance on the selected portions of each exam for which a student was in-class or online. In addition, each student at the beginning of each examination period was given a motivation questionnaire that assessed their level of motivation throughout each week and how that motivation may have differed as a function of learning setting. These data allowed us to examine how motivation interacts with the learning setting on predicting student exam performance.



CLAIRE MITCHELL, '21
Casino Euchre: From the Midwest to Las Vegas

Faculty Sponsor: Mark Bollman
 Major: Mathematics
 Hometown: St. Paul, MN

Casino gambling is one of America's favorite pastimes, but the process of creating a casino game is unknown to most. The process of casino game creation involves planning, mathematical configuring, and a touch of luck. This presentation will discuss what makes a successful casino game and how that applies to Euchre, a common card game in the Midwest. The long term objective was to determine an exact house advantage. An optimal player strategy was needed before that could happen. The determination of player strategy is the center of this project. This was done through calculations and the formulation of a computer program. This can be used in the future to calculate house advantage and finalize euchre as a casino game.

Supported by: FURSCA - Bruce A., '53 and Peggy Kresge, '53 Endowed Science Fellows



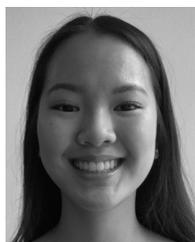
SOTERIOS (SOTI) MICHALOS, '21
The Effects of a Flex Model of Teaching on Performance

Faculty Sponsors: Drew Christopher, Mareike Wieth
 Major: Psychological Science
 Hometown: Bloomfield Hills, MI

The purpose of the current study was to assess the flex model of education that many institutions of higher education have adapted to cope with the COVID-19 pandemic. The flex model is an educational delivery platform that allows students to attend class throughout the week in two separate settings, as opposed to traditional, in-person education. Specifically, the current research examines how the two settings produced by the model (a

LYNDSEY MOORE, '21

(See Eryn Lewis, '23; Lyndsey Moore, '21)

**ALEXIS MOSS, '24**

Major: Biochemistry
Hometown: Bloomfield Hills, MI

VEDHA REDDY, '24

Major: Biochemistry
Hometown: Ann Arbor, MI



Moss

NOELLE ROBERT, '24

Major: Undecided
Hometown: Livonia, MI

Synthesis of Hemithioindigo Compounds as Potential Tubulin Polymerization Inhibitors

Faculty Sponsor: Craig Streu



Reddy

Cancer is caused by the inability for a cell to regulate cell division. One critical process in cell division is the assembly of microtubules, without which the cell cannot divide. Given the importance of microtubule assembly to cell division, a number of highly successful cancer drugs have been developed that interfere with this process. However, microtubule assembly is a process that is common to all cells and so these drugs have the potential for serious side effects that result from interfering with desirable microtubule assembly. One

approach to limiting the off-target side effects of cancer drugs is to activate them selectively within cancer cells. One particularly exciting method for such selectivity is the use of light. For decades scientists have been developing molecules that respond reversibly to light with shape changes for fields such as computing and energy. However, only recently has their application to human medicine been fully realized. Specifically, these drugs can, if designed properly, be activated by light. Since biomolecular drugs target and recognize their targets based on shape and charge complementarity, structural changes in a drug following exposure to light can change the bioactivity of a drug. Fortunately, the carbon skeleton of a well-established tubulin polymerization inhibitor is almost structurally identical to a known photoswitchable molecule. Our project is to synthesize a version of this photoswitch as a light activated microtubule formation inhibitor. This poster will outline our progress toward the synthesis and photophysical characterization of this molecule.

KIRK MYERS, '22

(See Samantha Emerson, '22; Eryn Lewis, '22; Kirk Myers, '22; Danielle Rineman, '22; Liam Smith, '22)

**PEACH RUTH AMANDA****NORMAN OWEN, '21****Effective Comprehensive Sexual Education with the Case Study of Denmark and the United States - Should Porn and Sex Work be Included?**

Faculty Sponsor: Meghan Farley Webb
Majors: International Studies, Anthropology
Hometown: Albion, MI

Comprehensive sexual education is a curriculum-based process of teaching and learning about the cognitive, emotional, physical and social aspects of sexuality. It aims to equip children and young people with knowledge, skills, attitudes and values that will empower them to realize their health, well-being and dignity; develop respectful social and sexual relationships; consider how their choices affect their own well-being and that of others; and understand and ensure the protection of their rights throughout their lives.

This presentation examines sexual education in Denmark and the United States. In Denmark sexual education is considered comprehensive and begins at an early age, meanwhile the United States has taken a very different approach with only 17 states requiring medically accurate sexual education and most sexual education starts in middle or high school. The presentation also discusses media portrayals of sex, sexual education, porn and intimacy in the respective countries.

**MAURICIO PEREZ GARCIA, '23**
Examining the Role Certain Public Policy Regarding Undocumented Immigrants Effects the Healthcare Outcomes of their Children who are U.S. Citizens During COVID-19

Faculty Sponsor: Patrick McLean
Major: Political Science
Hometown: Dallas, TX

This research will focus on understanding the collateral healthcare impacts Latinx children, who are also United States citizens, experience during the COVID-19 pandemic by examining and identifying the specific public policies, and the implementation of such policies, which effect their undocumented parent(s). Furthermore, through the analyzing and comparison between the recognized systematic factors found through a literature review and the collected shared experiences found through various case studies/interviews, the research findings can reinforce, redirect, or add nuance to our current perceptions and acknowledgement of what are the collective effects of public policy regarding undocumented immigrants.

Supported by: FURSCA



NATHAN PERIAT, '21
The Effect of Parasitic Mites on Incubation Patterns in House Wrens (*Troglodytes aedon*)

Faculty Sponsor: Doug White
 Major: Biology
 Hometown: Monclova, OH

Avian reproduction may suffer when parasites in nests burden host vigor or disturb incubation. To test for this effect, I examined morning incubation patterns of female House Wrens in Whitehouse Nature Center. Miniature temperature loggers deployed in nest boxes documented females alternating between “off bouts” feeding outside the box and “on bouts” heating the developing embryos in her clutch. I hypothesized that females stressed by moderate or severe infestations of ectoparasitic mites would extend their off bout feeding time and require longer on bouts to effectively reheat their clutches. Over three breeding seasons, 2017, 2018, and 2019, females in nests with elevated mites experienced both longer on and off bouts as predicted when compared to females in boxes with few or no mites. In addition, females with mite infestations showed signs of restlessness by waking up earlier. These results suggest that incubation patterns might be used as an index to the reproductive stress imposed by nest parasites. Experimental manipulation of mite levels in nests of House Wrens and other cavity-nesting species could provide stronger evidence for a link between incubation patterns and parasite loads.

Supported by: FURSCA - Orpha Leiter Irwin Fellowship

an “on” and an “off” state, where only one shape acts as an active drug. Using light, azo-based drugs can be activated at specific sites at will so as to reduce off-target activity significantly. Our strategy for generating these drugs efficiently is to incorporate the light-switchable azo bonds into what are already highly potent drug molecules, creating their azologues. Herein we report the syntheses, photophysical characterizations, and biological evaluations of two azologues of Tie-2 and c-Kit inhibitors, each of which have been shown to be promising targets for cancer treatment. Specifically, c-Kit has been shown to activate the cell proliferation process, while Tie-2 has been implicated in cancer angiogenesis.

Supported by: FURSCA - Robson Family Fellows Endowment; Richard K. Vitek, '56 FURSCA Endowment

KAITLYN PIONTKOWSKY, '23

(See Peter Filbrandt, '23; Kaitlyn Piontkowsky, '23)



CHRISTINA RAFAILL, '21
The Association Between Physical Activity, GPA, and Sleep in College Students

Faculty Sponsor: Julie Cousins
 Major: Kinesiology
 Hometown: Grosse Pointe, MI

Physical activity has emerged as a promising method for positively influencing cognitive function across the human lifespan and reducing the risk of age-related cognitive decline (Erikson, et al., 2019). Physical activity has also been shown to result in improved sleep (Reid et al., 2010). The purpose of this study was to investigate the association between physical activity, grade point average (GPA), and sleep. A total of 105 undergraduate students (age 19.9 (1.16) years) participated in this research study. The students completed a demographic survey, International Physical Activity Questionnaire, and Pittsburgh Quality Sleep Index via Google Forms. The students were recruited through email and word of mouth. Statistical analyses were performed using Pearson product-moment correlations and a one-way ANOVA. Significance was set to $p < 0.05$. There was a negative correlation between sleep quality score and MET minutes of physical activity per week ($r = -0.22$, $p = 0.02$). Higher sleep quality scores indicate worse sleep quality. Thus as MET minutes of physical activity per week increased, sleep quality scores decreased indicating better sleep quality. GPA was not significantly associated with MET minutes of physical activity ($p = 0.48$).



SAN PHAM, '21
Syntheses and Characterizations of Azo c-Kit and Tie-2 Inhibitors for Light-controlled Cancer Treatment - Light the Way to Conquer Cancer

Faculty Sponsor: Craig Streu
 Major: Biochemistry
 Hometown: Da Nang, Vietnam

Medicinal chemists have always strived to create next-generation targeted treatments for cancer. This is because off-target activity, which leads to detrimental side effects, is a major concern. In cancer, most of the drug targets are responsible for cell growth and division; thus, indiscriminate drug activity often negatively impacts healthy cells along with cancerous cells, causing side effects. Photopharmacology is a novel approach to achieve optimal drug specificity using light. Azo compounds are among the most studied photopharmaceuticals. With a nitrogen-nitrogen double bond, these molecules possess the ability to change shape when irradiated. Given that drugs bind to their targets due to shape and charge complementarity, having the light-switchable azo bond provides phototherapeutics the advantage of having



LUIS ANGEL RAMIREZ GALVAN, '21
Understanding the Effects of the COVID-19 Pandemic on Community Youth Programs

Faculty Sponsor: Suellyn Henke
 Majors: Environmental Studies, Anthropology
 Hometown: Chicago, IL

By the end March of 2020, universities and colleges worldwide suspended in-person learning due to the coronavirus pandemic and temporarily transitioned to online instruction. Many commentators have focused on concerns from the current widespread disruption of the education system pertaining to schools, but other educational settings, including community youth programs, faced similar challenges. The limitations on face to face interaction created a challenge for youth educators to keep their program doors open while ensuring the safety of their participants. This study was carried out in the summer of 2020 and evolved because my own plan to create an environmental education program for local teenagers was derailed because of COVID-19 safety protocols. Program leaders from local community youth organizations were interviewed to find out the challenges and opportunities their programs experienced due to the summer months of 2020. In this study, two challenges that program leaders described were: 1) receiving or accessing the resources needed to safely run their programs; and 2) developing new curriculum models to successfully run their program virtually. In contrast, program respondents expressed that as a result of the transition to online learning there was an opportunity for programs to reach out to more families and program participants.

Supported by: FURSCA

EMILY RANCOUR, '21

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – Hubsy: The Hub for All of Your Educational Needs)

VEDHA REDDY, '24

(See Alexis Moss, '24; Vedha Reddy, '24; Noelle Robert, '24)



AKAIIA RIDLEY, '22
Black Teachers Matter—the Story of Albion Public Schools Going South to Historically Black Colleges and Universities to Create a Teaching Faculty That Looks Like Its Students.

Faculty Sponsor: Wesley Arden Dick
 Major: History
 Hometown: Albion, Michigan

The transformation of Albion, Michigan into a city with a robust Black population began in 1916 when the Albion Malleable Iron Company recruited African American workers from Pensacola, Florida, connecting Albion to the fabled Great Migration of African Americans from the American south to the north. Later waves of the Great Migration brought more African Americans to Albion. In the late 1960s and early 1970s, the Albion Public Schools experienced the racial unrest that swept the nation. In response to the changing national mood and to demands for Black teachers, the Albion Public Schools sent recruiters to southern Historical Black Colleges and Universities (HBCUs). Through scholarly research and oral history interviews, this study tells the story of five women graduates of HBCUs who were recruited to teach in the Albion Public Schools: Mae Ola Dunklin, Eddie Williams, Barbara Davis-Landry, Vivian Davis, and Hazel Lias. The author examines their lives in the South, racism, segregation, the civil rights movement, their experience at an HBCU, contact by Albion Public Schools, the decision to travel north, arrival in Albion, racism and segregation in Albion, teaching in Albion Public Schools, retirement, and their continuing community involvement as mentors and consultants following the school annexation by Marshall. This remarkable story affirms that Albion Public Schools once believed that Black Teachers Matter and can inform the Marshall Public Schools in its efforts to diversify its nearly all-white teaching staff. This study is informed by the perspective of its African American author, who attended Albion and Marshall Public Schools.

Supported by: FURSCA - Jean Bengel Laughlin, '50 and Sheldon Laughlin Endowment for Student Research

DANIELLE RINEMAN, '22

(See Samantha Emerson, '22; Eryn Lewis, '22; Kirk Myers, '22; Danielle Rineman, '22; Liam Smith, '22)

NOELLE ROBERT, '24

(See Alexis Moss, '24; Vedha Reddy, '24; Noelle Robert, '24)



NOAH ROBERTSON, '21
The Synthesis of a Light-Activated Immunotherapy

Faculty Sponsor: Craig Streu
 Major: Biochemistry
 Hometown: Saginaw, MI

This presentation outlines the synthesis of a small molecule immunotherapy drug that can be reversibly activated by specific wavelengths of light. Immunotherapy is a type of cancer treatment where an individual's own immune system is manipulated to attack cancer cells in the body. Cancer evades the immune system by utilizing an immune checkpoint that tells the immune system which cells belong in the body. By blocking this checkpoint with a drug that can change shape with light, the immune system can be turned "on" in selected areas of the body so fewer healthy cells are killed in the process.

Supported by: FURSCA - Lawrence B., '72 and Frances Schook Research Fund

from 2019 is different from 2018 due to the inclusion of samples from floodplains and different areas of the marsh than used previously. The floodplain showed a higher level of diversity and richness due to the presence of species that live in the Maple River, many of which cannot survive in the abiotically stressful salt marsh.

Supported by: FURSCA



MARLO SCHOLTEN, '21
The Way Social Movements and Anxieties Present Themselves on Screen (Specifically in the History of Horror and Current Children's Cartoons)

Faculty Sponsor: Alli Harnish
 Majors: Anthropology, English (Creative Writing)
 Hometown: Hudsonville, MI

I've heard a few peers discuss hypothetically what kind of creations will be borne of this pandemic; if art is a reflection of the artist, it should come as no surprise that major historical events and social movements also become reflected in art. Drawing upon the last 100 years of American-made horror movies and the latest installment in Disney reboots, I will investigate how life influences, imitates, and anticipates art (and vice versa). My 2019 FURSCA project covered the horror timeline, and my 2021 thesis unpacks DuckTales (2017), how it differs and doesn't differ from DuckTales (1987), and what that says about the shift in social attitudes over the last 30 years.

Supported by: FURSCA - Russell Bradshaw, '30 Endowed Research Fund



BREH RUGER, '23

Major: Biology
 Hometown: Battle Creek, MI

BACH TRAN, '23

Major: Undeclared
 Hometown: Hanoi, Vietnam

ROSEMARY HERNANDEZ, '22

Major: Biology
 Hometown: Dallas, TX

SAIGE JOST, '22

Majors: Geology, Spanish
 Hometown: Saline, MI

Macroinvertebrate Species Diversity in the Maple River Salt Marsh

Faculty Sponsor: Abigail Cahill

In 2018, we began collecting samples along a transect through the Maple River salt marsh to look at the species distribution and richness in this rare Michigan habitat. This past year we continued to improve our morphological data by going through more samples from the April, July, and October (2018) transects. We used dichotomous keys to identify different species and sequenced molecular DNA of

certain species such as the *Culicoides* midge larvae. Then we went back out into the field in October (2019) and sampled along the same transect in the marsh and throughout the floodplains of the Maple River. We analyzed these samples for species diversity and richness and compared them to the previous year's data. The data



ALEXANDRA SEIDEL, '21
Microwave-assisted Duff Reaction

Faculty Sponsor: Vanessa McCaffrey
 Major: Chemistry
 Hometown: Beverly Hills, MI

Aromatic aldehydes and their derivatives are widely used with applications in areas like research and industry. Substituted salicylaldehydes have many applications, from food flavorings to starting materials in complex synthesis research. One method for forming these versatile compounds is the Duff Reaction, where a formyl group is added to a phenol in the ortho position through the use of hexamethylenetetramine (HMTA) under acidic conditions, followed by hydrolysis. The benefits of this reaction are that the starting materials are cheap, commercially available, and require mild reaction conditions; however, limitations of this reaction arise with the reaction times, percent yield, and the issues of regioselectivity with unsymmetric phenols.



This study utilized a microwave reactor in place of conventional heating at reflux and aimed to optimize reaction conditions for the formylation of methyl-, methoxy-, and nitro-phenols. A microwave reactor is a more efficient method of heating, with less energy loss to the environment and more direct and evenly distributed heating as compared to conventional heating methods. Each reaction followed the same procedure, but the times and temperatures of irradiation were varied to find the optimal conditions. In this study, reaction times were reduced from hours to minutes, compared to the traditional Duff reaction.

The microwave-assisted Duff Reaction promotes shorter reaction times, higher yields, fewer impurities, and requires less energy than the conventional method. The reduction of reaction times makes this method more useful in industrial and laboratory settings by reducing the time and energy required for the synthesis of these versatile compounds.

Supported by: FURSCA - Anna and Carl Weiskittel Endowed Chemistry Fellowship

LIAM SMITH, '22

(See Samantha Emerson, '22; Eryn Lewis, '22; Kirk Myers, '22; Danielle Rineman, '22; Liam Smith, '22)



RACHEL STANDER, '21

Effects of Road Salt and its Alternatives on Freshwater Invertebrates

Faculty Sponsor: Abigail Cahill
Majors: Biology, Secondary Education
Hometown: Grosse Pointe Woods, MI

Road salt (NaCl) has been an economically affordable and efficient solution to deicing roads in northern climates, including throughout the State of Michigan. NaCl lowers the freezing temperature of water, which accelerates the melting process of snow and ice. Once this chemical reaction occurs, sodium and chloride ions drain into the sewers, soil, and other freshwater systems. This salt contamination of freshwater environments comes in contact with and harms the existing aquatic life. Road salt deposition has produced ecological drawbacks in Michigan's freshwater.

The purpose of this project was to examine NaCl's effect on common Michigan invertebrates which included *Daphnia*, ostracods, midge larvae and earthworms by testing ice melting alternatives. Alternatives used in this experiment included Beet-It Ice Melt, pickle juice, sugarcane molasses, and sand. We conducted a second experiment in which we exposed the animals to a range of NaCl concentrations, in hopes of identifying a threshold concentration that allows for survival in salty environments. In both experiments, we measured survival and reproduction of the organisms in order to demonstrate the detrimental effects of road salt pollution.

In both experiments, we found that the organisms responded differently to all deicer alternatives. Only *Daphnia* was significantly affected by road salt. The other invertebrates were not significantly affected by any treatment, including high concentrations of road salt, demonstrating interspecific differences in response to salt. This research allowed us to investigate a less harmful alternative to road salt in hopes of minimizing the endangerment and potential extinction of ecologically important invertebrate species.

Supported by: FURSCA - Bruce A., '53 and Peggy Kresge, '53 Endowed Science Fellows



LEIA SERLIN, '21

Examination of a Novel, Multifaceted Support System That Provides Ankle Support and Stability for Patients With Arthritis While Walking and Standing in High Heels

Faculty Sponsor: Brad Rabquer
Major: Biology
Hometown: West Bloomfield, MI

High heel wearers often face a choice between fashion, or comfort and support when choosing high heel shoes. For arthritis patients this is more than just a decision between comfort and support, but a choice between joint pain, and even possible joint or autoimmune flare ups. In today's society, more often than not fashion is chosen over comfort. This leads to patients facing pain and lack of stability due to ill-fitted high heels. A multifaceted support system attachment for high heels was created with the goal of providing the necessary stability and support for the wearer to be comfortable in any heeled shoe of their choosing. In order to test the efficacy of the attachment, the dynamic gait index and measurements with a goniometer were conducted for two populations: arthritis subjects and non-arthritis subjects. Each population was tested both with the attachment and without. With the attachment the dynamic gait index score significantly increased in both arthritis and non-arthritis subjects ($p < .0001$). The goniometer measurements all increased towards proper alignment in both arthritis and non-arthritis sample groups when wearing the attachment ($p < .0001$). The purpose of this project was to design, create and test a novel multifaceted support system for high heel shoes that would enable wearers to combine both fashion and function.

Supported by: FURSCA



ERYN STAR, '21
Autistic Perspectives Revealed: Autistic People's Experiences with Emotional Abuse from Teachers in Public Schools

Faculty Sponsor: Lynn Verduzco-Baker
 Majors: Sociology, English
 Hometown: Centerbrook, CT

There has been no research on teacher abuse of autistic students in which the interview participants were autistic survivors, so this research is the first of its kind. As an autistic researcher, I designed a qualitative interview study for autistic survivors to share the ways their teachers emotionally abused them, how school authorities responded to the abuse, and how the abuse impacted their lives academically and personally. I interviewed six autistic survivors of various genders and geographic locations, but mainly white. I found that teachers demonstrated and reproduced bias against neurodivergence when they targeted the participants' autistic traits through insults, for example, intelligence-based attacks and encouraged other students to bully the participants. Of participants who tried to report the abuse, school authority figures refused to help and often victim-blamed them, thereby validating the presumption of the participants who chose not to report because they believed school authorities would not help them. During and after the abuse, all of the participants experienced low self-esteem along with mental health disabilities, and some developed physical health disabilities as well. The abuse led to most of them being afraid of school environments, which affected if, when and how they went to college. Moving forward, research about abuse in the school system needs to actively engage with autistic researchers and participants in order to shape schools into spaces where all teachers and administration treat autistic people with respect and biases against autistic people are dismantled.

Supported by: FURSCA - Robert M. Teeter Research Fellowship Endowment

NICOLE SWEETLAND, '23

(See Austin Begley, '21; Jacqueline Espinosa, '23; Allison Haspel, '23; Nicole Sweetland, '23)

JOSEPH TATAR, '22

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the USA and France – Hubsy: The Hub for All of Your Educational Needs)

BACH TRAN, '23

(See Breh Ruger, '23; Bach Tran, '23; Rosemary Hernandez, '22; Saige Jost, '22)



VICKY TURNER, '21
Age of Second Language Acquisition Predicts Ability to Switch between Images on the Ambiguous Figures Task

Faculty Sponsors: Mareike Wieth, Andrea Francis
 Majors: Psychological Science, Spanish
 Hometown: Ypsilanti, MI

Previous research shows that because people who speak more than one language must switch between languages depending on the situation, this flexibility may extend beyond language to include other forms of cognition (Storme, et al., 2017). A commonly used assessment of cognitive flexibility is the Ambiguous Figures Task. This task asks participants to switch between multiple interpretations of an ambiguous figure. Among young adults, bilinguals were able to correctly identify the second form of the ambiguous figure sooner than monolinguals (Chung-Fat-Yim, Sorge, & Bialystok, 2017). This study expands on this research by examining whether the age at which an individual acquires a second language impacts their ability to switch between images in the ambiguous figures task. Participants in the study completed a series of cognitive tasks, the Ambiguous Figures Task, and a language questionnaire. The results showed the earlier participants learned their second language, the earlier they perceived a change in the ambiguous figure. Furthermore, participants who learned a second language earlier also perceived the intended or correct change earlier than those that learned a second language later in life. This result suggests that the age at which one learns a second language plays an important role in cognitive flexibility.

Supported by: FURSCA



ANNETTE VARGA, '21
Transformation of Gender Roles: The Value of Change in Japanese Women's Language and Contemporary Use

Faculty Sponsor: Midori Yoshii
 Majors: International Studies, Anthropology
 Hometown: Shelby Township, MI

The Japanese language differentiates male and female speech morpho-syntactically. Many contemporary scholars date the origin of women's language to Imperial Court ladies in the fourteenth century. They thus consider Japanese women's language as a cultural heritage. This view implicitly suggests that women's language is static and has never changed or evolved. Such a view, subsequently, allows many critiques of contemporary women's language to be contributing to corruption or disappearance of traditional culture.

This paper challenges this static view about a language. Borrowing the Sapir-Whorf hypothesis that language determines one's perceptions, this paper examines the



changing nature of Japanese gendered language after the end of World War II. The post-war era was such a transforming era for women in Japan in terms of their positions in society, beliefs, and self-perception, that it consequently brought substantial change in their language use. With the contemporary examples of many women using traditionally male-associated pronouns or gender-neutral speech, the flexibility and change in women's language in Japan is a growing trend, reflecting the reality of women's language today. This paper argues that the change in language use is also transforming the perceptions of individuals, thus, however slowly, the Japanese society is moving toward a more egalitarian state that gives more autonomy and rights to women. This is a valuable and welcoming sign.



CLARA WAGNER, '21
Synthesis of a Photoswitchable Cancer Drug

Faculty Sponsor: Craig Streu
Major: Biochemistry
Hometown: Saginaw, MI

The goal of my project is to synthesize a molecule that behaves like colchicine, which has promise as a treatment for cancer and gout, but with integrated photoswitchable properties by virtue of the incorporation of an azo bond. Azo bonds can change shape in response to light and so incorporation of these groups into drug molecules can allow the drugs to also change shape. Drugs work because they can bind to a target like an enzyme much like a key fits into a lock of complementary shape. By changing the shape of a drug in response to light, we expect to make a drug that we can activate in response to light. One 'key' is expected to fit well in the target preventing its activity and acting as a drug, while the other 'key' is not. Side effects are often a result of off-target effects, which are interactions either with undesired targets or the desired target but in an unwanted location in the body, so the ability to control drug activity with light has potential for decreasing side effects in patients.

Supported by: FURSCA - Orpha Leiter Irwin Fellowship



REBECCA WAGENER, '21
Chancay Style Graves in Central Peru: Artifacts and Burial Traditions from the Chancay Culture

Faculty Sponsor: Bille Wickre
Majors: Art History, Anthropology
Hometown: Shelby Township, MI

In the summer of 2019, a collection of 27 artifacts from Peru were donated to Albion College. More than half of these artifacts came from the Pre-Columbian Chancay culture. Other artifacts originated from the Moche, Wari, and the Chimú (with influences from the Inka Empire). These artifacts provide an insight into the culture and artistic styles of these cultures. By researching the artifacts from the Chancay culture, the roles that these artifacts had within the culture, such as ritualistic or funerary purposes can share what life may have been like along Peru's central coast from 1200-1450 C.E. The artifacts also exhibit several different ceramic styles used by the Chancay. Including the artifacts from the other Peruvian cultures, the collection displays over a thousand years of history and the developments in production of ceramics throughout Pre-Columbian Peru.

Supported by: FURSCA - Lawrence B., '72 and Frances Schook Research Fund



VICTORIA WIESE, '21
Iskay Simipi Runapanakuy Yachachina: The Role of Intercultural Bilingual Education in the Preservation and Appreciation of Quechua in Peru

Faculty Sponsor: Meghan Farley Webb
Majors: History, International Studies
Hometown: Marquette, MI

Peru is a multilingual and multicultural country, with a rich Indigenous history. Today, thirteen percent of the Peruvian population speaks the Indigenous language of Quechua. Despite a significant number of speakers, the Quechua language is currently endangered. For instance, Quechua speakers are still discriminated against, while many Indigenous parents would rather their children learn Spanish instead of Quechua. After a history of suppressing the Quechua language, the Peruvian government is finally taking steps to rectify this through Peru's education system, specifically through intercultural bilingual education (IBE).

Through the examination of academic sources, primary sources, governmental documents and legislation, and several interviews with those who work directly with IBE and/or the language of Quechua, this paper investigates the role IBE plays within the preservation and valuation of Quechua in Peru. My research delves into the progress

made by IBE, through policies like the creation of a national registry for IBE schools and teachers, the creation of more teaching programs and scholarships. This project also examines the gaps between IBE policy and implementation within Peru, and the ways the system lacks Indigenous participation.



HANNAH WOODS, '21
An Assessment of Amino Acids Observed in Carbonaceous Chondritic Meteorites: Implications for Survivability in Impact Events

Faculty Sponsors: Vanessa McCaffrey, Nicolle Zellner

Major: Biochemistry

Hometown: Macomb, MI

Amino acids are among some of the many complex molecules found in extraterrestrial objects and it is known that these amino acids can be brought to Earth by meteorites. The highest concentrations of amino acids can be found in carbonaceous chondrites, which contain high amounts of water, carbon, and organic material. In this project, we have focused on understanding the differentiation of amino acids within different classifications of carbonaceous chondrites. Amino acid data was collected from primary literature sources. The amino acids were classified by three different criteria based on structure: branched vs linear, heteroatom vs non-heteroatom, and cyclic vs non-cyclic. Trends based on composition will be presented. This project also includes the collection of shock impact experiment data from a variety of sources to model and better understand how structure affects amino acid survivability. These trends that have been uncovered are then applied to the assessment of amino acids observed in the carbonaceous chondrites. This may lead us to a better understanding of what conditions are optimal for amino acids survivability.



ALEXIS WILKERSON, '21
Comparing Bacterial Occurrences and their Hydrolytic Enzyme Activities among Different Soil Types

Faculty Sponsor: Ola Olapade

Majors: Biology, Religious Studies

Hometown: Southfield, MI

Microbial assemblages in terrestrial environments, such as soils, utilizes hydrolytic enzymes to function in various environments including for the degradation of organic carbon compounds and cycling of nutrients, contributing to the ecological and agricultural productivity of such environments. In this study, three soil types (sandy, loamy and clayey) with varying characteristics were collected within the premises of Albion College in Michigan, with the goal of comparing the occurrences of indigenous bacterial populations and respective hydrolytic enzyme activities in the soils. The soils were examined for their organic matter content (%OM), while bacterial abundance was determined by combinations of viable counts and nucleic acid staining, and enzymatic activities measured using fluorescein diacetate (FDA) analysis. Results from the study showed loamy soil to have a significantly higher %OM at 30% on average as compared to 2.5% and 6.6% in sandy and clayey soils, respectively. Comparatively, bacterial numbers (viable and total counts) were also higher in loamy soils than the other two soils. The same trend was observed for FDA analysis with higher fluorescein released in the loamy soil relative to the two soils. The results suggest that %OM strongly influences both bacterial abundance and hydrolytic enzyme activities in loamy soil and less so in both sandy and clayey soils examined in the study.

Supported by: FURSCA - Orpha Leiter Irwin Fellowship; Kenneth Ballou, '47 Research Endowment for Biology



ALBION/ L'ÉCOLE SUPÉRIEURE DE VENTE (SDV) ENTREPRENEURIAL EXCHANGE

Faculty Sponsors: Vicki Baker (Economics and Management), Catherine Bruneteaux-Swann (SDV)
Program Manager: Brittany Middlebrook

We are pleased to announce another successful international exchange—blending students from Albion College’s Carl A. Gerstacker Institute for Business and Management with students from France—to create international and intercultural business plans. The International Entrepreneurial Exchange (IEE) partnership was started in 2008 and lives on in Gerstacker’s annual exchange with L’École Supérieure de Vente (SDV), a business school located in Saint-Germain-en-Laye, near Paris. The goal is simple—create a partnership and student exchange for upperclassmen (juniors and seniors) around experiential learning opportunities dealing with entrepreneurship, innovation and change, and business plan development and implementation.

Despite a challenging year due to the global pandemic, French and American students worked in teams virtually, developed market surveys and started to lay the groundwork for the development of a new business venture during the fall semester. They created a market research plan and marketing strategy for their chosen business. Student teams were coached by French and American experts on their specific endeavor and marketing strategy. Students solidified their preliminary business plans, taking next steps as they continued working together from afar—utilizing virtual meeting rooms and other technology to stay in touch, moving their plans forward. During the spring semester, the French and American students continued refining their B2B ideas, working through their feasibility studies, and preparing their final business plans. The teams were able to pre-record their presentations in order to participate in Elkin Isaac, with the Albion students fielding questions during a live Q&A. The French team(s) with the best business ideas will have the opportunity to present in front of French bankers and venture capitalists in the near future.

The participants are driven by the guiding principles of discovery, creativity, sharing, and empowerment, which determine the success of their projects. This special partnership provides a unique opportunity to grow as an individual, a student, and an entrepreneur. The most valuable aspect of an exchange like this is the opportunity to become familiar with cultures from around the globe, to learn foreign business practices and teamwork, and to make lasting friendships. The business plans each student team developed are described on the following pages.



Conley

Business Plan Development: An International Partnership Between the USA and France - ConnectRoom: Building Human Connections in a Virtual World

JACE CONLEY, '22

Major: Finance
Hometown: Waterford, MI



Fife

JARED FIFE, '21

Major: Accounting (CPA emphasis)
Hometown: Louisville, KY



Jacobs

FISCHER JACOBS, '23

Major: Business
Hometown: Jackson, MI

CHAMIL ALIKHADJIEV, '21

Major: Business Engineering
Hometown: Courdimanche, France



Morille-Leal

SHAMLOUNE FAKRUL, '21

Major: Business Engineering
Hometown: Versailles, France

ABDULLA MOHAMMAD, '21

Major: Business Engineering
Hometown: Limay, France

EMILIO MORILLE-LEAL, '21

Major: Business Engineering
Hometown: Caen, France

The future of the workplace is online. Companies are leaving their massive office spaces in New York because their teams are just as productive and for some companies more productive working at home. We believe that when the pandemic ends companies will shift to a hybrid approach for their office time, letting employees work from home and only making them come into the office for important things. Our product, Connect Room, is software that allows any company to create a virtual office space for their business. Our software can be fully customizable to the point where it can mimic your own office in real life. Our goal is to bring “water cooler conversations” into the virtual office. We found employees are missing the non-work-related conversations with coworkers in the virtual workplace. Employees build team chemistry and comradery through these discussions. Connect Room aims to bring these conversations back to the workplace.

Supported by: Carl A. Gerstacker Institute for Business and Management



Rancour

**Business Plan Development:
An International Partnership Between
the USA and France - Hubsy: The Hub
for All of Your Educational Needs**

EMILY RANCOUR, '21

Major: Economics and Management (Human Resources emphasis)
Hometown: Saint Charles, IL



Tatar

JOSEPH TATAR, '22

Major: Marketing Management
Hometown: Battle Creek, MI



Bard

CLEMENT BARD, '21

Major: Business Engineering – International Specialty
Hometown: Poissy, France



Massonnet

ERICA FREVILLE, '21

Major: Business Engineering – International Specialty
Hometown: Krakow, Poland

REMI MASSONNET, '21

Major: Business Engineering – International Specialty
Hometown: Région de Niort, France



Ribeiro
De Azevedo

DAVID RIBEIRO DE AZEVEDO, '21

Major: Business Engineering – International Specialty
Hometown: Clamart, France

Hubsy is an educational software system that allows all students and faculty to have an all-in-one hub for educational and extracurricular purposes. With one click of a button, students and staff are able to consult their lessons, check their schedule, access grades, receive or give feedback, find upcoming classes and school events, and much more. Hubsy will be offered via internet browser or mobile app. Some of Hubsy's features consist of: a host for online video meetings; a document scanner that will upload key dates to a calendar; instant messaging/group networking; assignment turn-in; and pop up notifications. Hubsy offers a solution for the ever-evolving online learning environment. Not only will Hubsy help with organization but it will also incorporate key time management skills that will help students in the future, with or without the application.

Supported by: Carl A. Gerstacker Institute for Business and Management



Hoesli

**Business Plan Development:
An International Partnership Between
the USA and France - Instantly**

JOHN HOESLI, '21

Major: Finance
Hometown: Charlotte, MI



Kamaraju

SAGAR KAMARAJU, '21

Majors: Biology, Political Science
Hometown: Saginaw, MI



Guitton

STEVEN CARRÉ, '21

Major: Business Development
Hometown: Versailles, France

ALEX GUITTON, '21

Major: Industrial Sales
Hometown: Montpellier, France

VALENTIN JACQUET, '21

Major: Business Development
Hometown: Villejuif, France

JÉRÔME SAMBATHE, '21

Major: Smart Building and Automation
Hometown: Montigny-lès-Cormeilles, France

HAYFA TOUNSI, '21

Major: Global Business
Hometown: Tourcoing, France

Our app is augmented software which allows for integration into the restaurant and tourism industry. Our product allows users to use a plethora of actions to make their dining experience more practicable and enjoyable. Furthermore, it allows for restaurants and chains to create more revenue and allow for highly efficient. The reason that we believe that this product is necessary is because while the restaurant industry is growing, so are the reasons for using these various dining options. A variety of individuals use restaurants whether it is for business, personal, or for pleasure. Our product creates a different ambience for each type of customer. Professionals can order their food ahead, allowing for business to take place in an efficient manner. The seating option allows families with small children to be close to the bathroom. Also, it allows restaurants to create a quicker turnover rate as open tables will be posted on a live interface. Finally, our app allows tourists to try and create new experiences at restaurants which may have been otherwise booked.

Supported by: Carl A. Gerstacker Institute for Business and Management



About the Symposium

Albion College's Student Research Symposium is now in its 31st year. The first symposium, held on April 20, 1990, involved seven students making presentations describing their research projects in the sciences. Three years later, a poster session was added. The program has been offered annually since its founding and now typically features the work of more than 100 students recommended by their faculty mentors. Representing a broad array of disciplines, the symposium has become the College's principal showcase for outstanding student research, scholarship, and creative activity.

The Elkin R. Isaac Endowment

The Elkin R. Isaac Endowed Lectureship was created in 1991 by Albion College alumni in honor of their former teacher, coach, and mentor, Elkin R. "Ike" Isaac, '48. Isaac taught at Albion from 1952 to 1975 and coached basketball, track, and cross country. He led his teams to one Michigan Intercollegiate Athletic Association basketball title, six consecutive league championships in track, and three cross country championships. He also served as the College's athletic director and created Albion's "Earn, Learn, and Play" program and the "Albion Adventure Program." In 1975, Isaac joined the faculty at University of the Pacific and became athletic director in 1979. He retired there in 1984. He passed away in August 2013.

Proceeds from the endowment have been used to sponsor an alumni lecture each year. In 1997, the lectureship was expanded and is now associated with the College's annual Student Research Symposium, which now bears Isaac's name.

The Isaac Endowment Committee

Cedric W. Dempsey, '54
Thomas G. Schwaderer, '56
Leonard F. "Fritz" Shurmur, '54 (deceased)
John R. Taylor, '55 (deceased)

Past Isaac Symposium Speakers

Elkin R. Isaac Alumni Lecture

Wilbur Hurst, '61 (1997)
Terrence Karpowicz, '70 (1998)
Emilio DeGrazia, '63 (1999)
James Misner, '66 (2000)
John Vournakis, '61 (2001)
Joseph Serra, '56 (2002)
Denise Cortis Park, '73 (2003)
John Porter, '53 (2004)
Elkin Isaac, '48 (2005)
Joseph Calvaruso, '78 (2006)
Eileen Hebets, '94 (2007)
James Beck, '97 (2008)
James Gignac, '01 (2009)
Kristen Neller Verderame, '90 (2010)
John Ferris, '89 (2011)

Lawrence Schook, '72 (2012)
Michael Harrington, '85 (2013)
Hugh McDiarmid, '84 (2014)
Samata Singhi, '05 (2015)
Mallory Brown, '08 (2016)
Nick Whitney, '00 (2017)
Amy Elaine Wakeland, '91 (2018)
Natalie Dubois, '97 (2019)

Joseph S. Calvaruso Keynote Address

Wade Davis (1999)
Stephen Jay Gould (2000)
Doris Kearns Goodwin (2001)
Kurt Vonnegut (2002)
Salman Rushdie (2003)
Gloria Steinem (2004)
Edward O. Wilson (2005)
Regina Carter (2006)
Steven Pinker (2007)
Carl Hiaasen (2008)
David Trimble (2009)
Mira Nair (2010)
Annie Leonard (2011)
Laurie Garrett (2012)
Alexander McCall Smith (2013)
Richard Alley (2014)
Nathan Wolfe (2015)
Benjamin Jealous (2016)
Mary Jean Eisenhower (2017)
Dacher Keltner (2018)

Symposium Keynote Address

Jennine Capó Crucet (2019)

The 2021 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)
Andrew Christopher (Psychological Science)
Carrie Walling (Political Science/Prentiss M. Brown Honors Program)
Lisa Lewis (Chemistry)
Jill Marie Mason, Coordinator (Library)
Michael Dixon (Art and Art History)
Patrick McLean (Ford Institute)
Vanessa McCaffrey (Director of FURSCA/Chemistry)
Ashley Miller (English)
John Perney (Marketing and Communications)
Michael Van Houten (Library)

Foundation for Undergraduate Research, Scholarship, and Creative Activity (FURSCA)

The Foundation for Undergraduate Research, Scholarship, and Creative Activity (FURSCA) was established to promote and support student research, original scholarship, and creative efforts in all disciplines. Through a number of programs taking place at all points in a student's career at Albion, FURSCA can help students pursue independent study in their areas of interest. Students work closely with a faculty mentor to develop and carry out research or other creative projects. Participation in such projects provides valuable experience beyond the scope of classroom work, and enhances a student's preparedness for future employment or graduate studies. Some examples of FURSCA programs are listed below.

Student Research Partners Program—Geared toward first-year students, this program pairs a student with a faculty mentor to work on a project related to the faculty member's research or creative area. Students gain hands-on experience with scholarship in a specific field, and may elect to continue during their sophomore year. Participation is selective, based on high academic achievement, and stipends are awarded.

Research Grants—Students may apply for funds to support research or other creative projects. Students must work closely with a faculty adviser; however, projects are not limited to any particular discipline. Grants may be awarded to pay for supplies, printing costs, subject payments, software, or other costs associated with completion of the project.

Travel Grants—Students may be awarded travel funds to help cover expenses associated with travel to attend professional meetings at which they will present the results of their research or creative projects.

Summer Research Fellowship Program—A select number of students may remain on campus during the summer, earning a stipend, to work on research or creative projects. In addition to working closely with a faculty adviser, students participate in weekly seminars with other students in the program.



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