



Elkin R.

ISAAC

ALBION COLLEGE

EST 1990

STUDENT RESEARCH SYMPOSIUM

Thursday, April 18, 2024



9-10:15am | Student Research Platform Presentations

Forum #1 Norris 100

Forum #2 Norris 101

Forum #3 Norris 102

Forum #4 Norris 104

10:45am | Honors Convocation

Goodrich Chapel

1:15-4pm | Student Research Platform Presentations

Forum #1 Norris 100

Forum #2 Norris 101

Forum #3 Norris 102

Forum #4 Norris 104

4-5pm | Student Research Poster Session

Science Complex Atrium

MORNING SESSION

FORUM #1 – NORRIS 100

9:00	Alexis Moss (Streu)	Combinatorial Derivatization of Hemithioindigo Compounds as Microtubule Inhibitors
9:15	Max Griffin (Streu)	Progress in Synthesis Towards a Novel Photoswitchable Inhibitor for TRKA, TRKB, and TRKC
9:30	Sathwik Reddy (Streu)	Progress Towards a Novel Screening Approach to Photoswitchable Therapeutic Discovery Using a Commercially Available NSAID as a Model System
9:45	Aishat O. Fagun, Daniel S. Jeremiah, Deema Saeed (Harris)	The Enantioselective Synthesis of Amino Alcohols: Reaction of Meso-Epoxides With Benzylamine and Aniline in the Presence of a Chiral Amine-Borane Catalyst
10:00	Tess Anthony (Streu)	Progress Towards the Synthesis of a Photoswitchable BCR-ABL Kinase Inhibitor

FORUM #2 – NORRIS 101

9:00	Aminaa Injinash (Kim)	Impact of the ATM (Automated Teller Machine) Network on Small Businesses in a Cashless Economy
9:15	Riley Kunkel (Casey, Wilch)	An Analysis of Sweden's Social Democracy: Just How Sustainable and Progressive Does Sweden Remain in This Day and Age
9:30	Antoine Couillard, Chloé David, Carson Foor, Thomas Galliard, Vincent Girard, Julien Guignery, Maxwell Honiss, Jacqueline Kallis, Nolwenn Le Gloanec (Mathews, Baker, Bruneteau-Swan)	E-Floor
9:45	Arthur Apchain, Laura Deludet, Meerimai Kadyrzhanova, Ehsan Ali Khan, Owen McDaniel, Kiera Murphy, Emmanuel Octau, Emma Perdiger, Laetitia Villaire (Mathews, Baker, Bruneteau-Swan)	WineWise
10:00	Marceau Boulanger, Alassane Dieng, Nicholas Johns, Théo Lanier, Inès Martins Reverendo, Aadhya Mohan, Medha Mohan, Thomas Peltier, Thomas Valet (Mathews, Baker, Bruneteau-Swan)	Wait4Weights

FORUM #3 – NORRIS 102

9:00	Riley Zoll (Mortimer, Zellner, Shanton)	Astro Restoration Project Lesson Plans
9:15	Kali Johnson (Roberts)	Empowering Youth Through Diverse Voices: Ensuring Equitable Access to Books That Are Mirrors and Windows
9:30	Sheridan Leinbach (Franzen)	Book Banning and Censorship Legislation and Their Links to the Rise of Fascism
9:45	Emily Abramczyk (Ho, Meert, Visco)	Growth of Political Relations or Sportwashing? The Nuances of Sports as Soft Diplomacy
10:00	Delia Johnson (Kim)	Financial Literacy in the Black Community

FORUM #4 – NORRIS 104

9:00	Mackenzie Rundell (Madhavan-Brown, Saville)	CHARGE Syndrome and the CHD7 Gene
9:15	Rodney Mitchell (Jechura, Wieth, Fisher, Baker)	Circadian Rhythms and Pheromone Perception
9:30	Lauren M. Busuito (Wieth, Francis, Madhavan-Brown)	How Empathy and Similarity in Experience Impact Memory for Others Experiencing Emotionally and Physically Painful Situations
9:45	Tori Balog (Wieth, Jechura, Madhok)	The Relationship Between Trait Resilience and Memory
10:00	break	

AFTERNOON SESSION

FORUM #1 – NORRIS 100

1:15	Melanie Foust, Tricia Sankiewicz (Harris)	β -Amino Alcohol Enantioselective Synthesis: Desymmetrization of Cyclohexene Oxide Using Lithium Morpholide and Lithium Pyrrolidide in the Presence of a Chiral Aminoborane Catalyst
1:30	Noelle Robert (Streu)	Progress Towards the Synthesis of a Photoisomerizable Antagonist of the 5ht2a Receptor for Use as a Chemical Probe
1:45	Olivia Buchweitz (Michigan State University)	Characterization of Neuroinflammation and Myelin Integrity in SHRSP
2:00	Vedha Reddy (Streu)	Progress Towards the Synthesis of Azo Danuglipron
2:15	Diana Kernen (Streu)	Progress Towards the Synthesis of a Novel Photo-switchable Checkpoint Inhibitor for Modulation of Self Versus Non-Self Recognition
2:30	Madison McGraw (Streu)	Progress Towards the Synthesis of a Novel Bidentate Warhead Ligand
2:45	Mariah Brenz, Madeline Budd (Streu)	Progress Towards the Synthesis of a Next-Generation Photoswitchable BCR-ABL Inhibitor
3:00	Paul Volesky (Streu)	Progress Towards the Synthesis and Incorporation of Photoswitchable Prosthetics Into Common Antibiotics
3:15	Avery Campbell (University of Nebraska)	Streptavidin Silica Microcolumns for Analyzing Biopharmaceuticals
3:30	Noah Rollison (Streu)	Strategies for the Synthesis of Novel Azologues of Validated Kinase Inhibitors

FORUM #2 – NORRIS 101

1:15	Luke Rivard (Dierickx, Laban)	Wanderer Above the Sea of Sprites
1:30	Skye Dickson (Ribeiro, Laban)	Florence Price: Because My Soul's Been Anchored
1:45	Tate Nelson (Balke, Laban)	Mozart's Marriage of Figaro: How to Foil the "Lord of the Manor"
2:00	Luke Rivard (Wharton)	A Theoretical Cross-Examination of the Late Wind Sonatas of Francis Poulenc
2:15	Rana Huwais (Solomon)	Venus Fly Trap
2:30	Vanessa Ybarra (Merriman)	Turning Point: The Physical and Mental Struggles of a Chronic Illness Explored in Mixed Media Sculpture
2:45	Fox Dennis (Demerdash)	El Kazovsky: The Liberating Inclusion of BDSM in Art
3:00	Lauren Farley (Demerdash, Kreger)	Antonio Berni, Ramona Montiel, and the Agency of Argentine Sex Workers
3:15	Cass Burgess (Henderson)	The Edge of Humanity: Examining Humans Through the Lens of the Vampire Mythos
3:30	Madison Davis (Henke)	Beyond the Spectrum: The Portrayal of Autistic Women and Girls in Popular Media
3:45	Elizabeth Dicks (Mesa)	And Then We Sing: A Collection of Poems

FORUM #3 – NORRIS 102

1:15	Kelly Guadarrama, Kevie Lamour (Visco)	The Value of Local Internships
1:30	Ashlynn Reed (Franzen, Wilch)	Food Sovereignty in the Rust Belt and the Albion Creedcommunity Cookbook Project: Examining Pressures or Food Insecurity Through Local Recipes and Food Stories
1:45	Malena Solis (Knowlden, McCaskill)	Plug, Play, Connect: Mapping Youth Programming Resources in Albion
2:00	Riley Davis (Madhavan-Brown)	The Merging of Two School Districts: Considerations of Race, Belonging, and Teacher-Student Relationships

2:15	Henry Bacolor (Chase)	Arrowheads in Albion: Mapping the Find Spots of Gete Anishinaabe Artifacts Housed at Albion College
2:30	Donna K. Avina (Harnish, Palmer, Chase)	Ritual Remnants: Artifacts from the Ancient City of Teotihuacán
2:45	Kyndall Lewis (Harnish)	The Relationship between Albion College and the Nottawaseppi Huron Band of Potawatomi
3:00	Madilyn Archambeau (Harnish, Day, Chase)	Environmental Interpretation at the Whitehouse Nature Center
3:15	Rae Baker (Lyons-Sobaski)	Impacts of Mile-a-Minute Management in Lower Michigan's Plant Communities
3:30	Abigail Coleman, Alaina Shepardson (Knowlden, Wilch, Franzen)	Student-Led Sustainability: Green Initiatives

FORUM #4 – NORRIS 104

1:15	McKenna Shearer (Farrow)	The Effect of Exercise on Balance, Sleep, and Strength in Middle Aged Adults
1:30	Kaitlyn Hernandez (Kim)	Effects of US Youth Team Funding on a Professional Soccer Career
1:45	break	
2:00	Kristina Dolgacheva (Kim)	The Impact of Freedom of Trade Agreements with the US on CO2 Emissions of Partner Countries
2:15	Bonnie Lord (Lee-Cullin)	Surveying Dissolved Organic Carbon Reactivity in the Streambed of the Kalamazoo River
2:30	Isaac Hautala (Marshall)	Stratigraphic and Paleoenvironmental Implications of Cambrian Glauconite Revealed by Microscopic Analyses
2:45	Paige McDowell (Menold, McRivette, Metz)	Chemical Heterogeneity of Phengite in Gneiss from the Tso Morari Terrane, Himalaya
3:00	Ikatari Swope (Cahill)	The Genetic Diversity of <i>Aphis nerii</i>
3:15	Mickey England (Lee-Cullin)	Serious Games in Environmental Education
3:30	Shannon Barba (Cho)	Characterization of Synergistic Information Processing in Neural Network Motifs
3:45	Nomin Bilegdemberel (Cho)	Performance Evaluation of Neuromorphic Chips in Small Robotic Cars for Object Recognition and Avoidance Tasks

POSTER SESSION

SCIENCE COMPLEX ATRIUM, 4-5 P.M.

Zoya Ahmed (Cervantes)	The Role of Concanvalin A in <i>Tetrahymena thermophila</i> Early Mating
Cindy Ávila (University of Michigan)	Calcium Handling Protein Expression and SERCA2a Function in a Mouse Model of HFpEF
Rachel Belf, Parker Douglass, Katherine Dudenhoefer, Madison Spurlock (Saville)	Genomic Annotation of <i>Drosophila willistoni</i> Contigs 11 and 22
Zosia Bolde, Sid Childers, Sam Helmbreck, Katelynn Kadow, Alaina Shepardson (Wilch)	The Pollinator Garden Project
Rae Baker, Zosia Bolde, Niko Kosmas, Mackenzie Rundell (Saville)	Genomic Annotation of <i>Drosophila willistoni</i> Contigs 4 and 58
Madison Brillley, Bode Brown, Daniel Jeremiah, Will Tessin (Saville)	Genomic Annotation of <i>Drosophila willistoni</i>
Sid Childers (Lee-Cullin)	Dissolved Organic Carbon Across Stream Networks of the Lower Peninsula, Michigan
Gwendolyn Cinzori (Christopher)	Promoting Awareness of Menstrual Poverty
Abigail Coleman, Jennifer Emeka, Curtis Hamilton, Jayth Joseph, Liam McLaughlin (Wilch)	Student Farm Compost Project

Naomi Cloostermans, Anaka McCoy, Nicklas Penabaker (Wilch)	Reduce and Recycle Initiative
Kelvin Crone-Willis (Cahill)	The Effects of Wild Rice on Macroinvertebrate Communities Within the Northern Branch of the Kalamazoo River
Sontiana Davis, Bayasgalan Gantulga, Amani Williams (Saville)	Genomic Annotation of <i>Drosophila willistoni</i> Contigs 22 and 23
Ryan Driscoll, Ava Emary, Brandon Gonzalez-Brosky, Mara Pilgrim (Saville)	Genomic Annotation of <i>Drosophila willistoni</i> Contigs 16 and 18
Devin Easterwood (Reimann)	To Infinity and Beyond: Expanding Access to Innovate Albion's Youth Robotics Program
Tessa Falan (Marshall)	Fishing For Fossils in the Michigan Basin
Anudari Gansukh (Anderson)	Do You Think the Euro Will Go Down or Go Up? Let's See!
Tynayia George (Chase)	(RE)Discovering Albion's Stolen Culture: New Archaeological Research at the Whitehouse Nature Center
Ella Hardwick (Wilch)	Braiding Sweetgrass Book Club Project
Ella Hardwick, Dana Parker (Metz)	An Exploration of Different Methods for the Catalytic Reduction of Bromate
Brandon Harrell (Streu)	De Novo Catalytic Amyloids
Monique Hernandez (Franzen, Noble, Soriano)	Oral Histories of Community Gardens in the Rust Belt of Michigan
Maxwell J. Honiss (Christopher)	The Effect of Journaling on Student-Athlete Performance: A Preliminary Study
Meerimai Kadyrzhanova (Kim)	Spillover Effect of the Russian-Ukrainian War on the Economy of Neighboring Countries
Kevie Lamour (McCaskill)	Engagement in the City of Albion: Understanding the Role of Racial Perception
Brianna B. Lopez (Bieler)	Optimization of Natural Product Extraction Techniques
Dulce 'Dany' Martinez (Feagin)	The Creation
Anaka McCoy (Lee-Cullin)	Mapping Mile-A-Minute-Weed in Calhoun County
Nicholas A. Miller (Syracuse University)	Natural Protein Sequences Inspire Catalytic Amyloids
Delia Nieves (Goldberg)	Comparative Phylogenetic Analysis of Duetting and Other Life History Traits in the Avian Order Strigiformes
Iris Patel, Isabelle Patel (Streu)	Progress Toward the Development of a Nanobody Binder of a Pathogenic Moonlighting Protein
Heather Phipps (Mesa)	The Art of the Bard: Integrating Irish Mythology Into Modern English Poetry
Larry Reed Jr. (Betz)	Mental Health, Cardiovascular Disease Risk Factors, and the College Student
Livia Rich (Cervantes)	Changes in Receptor Localization During Early Mating of <i>Tetrahymena thermophila</i>
Cloud Rimer (Marshall)	Seeing the Past in the Present: Understanding Trilobites through Roly-Polies
Diana Sanchez (Rohlman)	The Purification of Powassan NS5 Protein for RNA Transcription Analysis
Alaina Shepardson (Cahill)	Effect of Warming Water Temperatures on Local Gastropod Growth, Reproduction, and Mortality
Sarah Starkey (McCaskill, Auton, Starkey)	Health and Wealth of Life: How Fitness Can Help Seniors Age-In-Place
Taylor Strom (Madhavan-Brown)	Helping-Seeking Behavior and Peer-to-Peer Support on College Campuses
Michaley Vieau (Streu)	Progress Toward the Synthesis of a Photo-Switchable NMDA-Antagonist



Emily Abramczyk, '24
Majors: Political Science, History
Hometown: Rochester Hills, Michigan

Growth of Political Relations or Sportswashing? The Nuances of Sports as Soft Diplomacy
Faculty/Staff Sponsors: Joseph Ho, Abigail Meert, Eddie Visco

The use of sports as soft diplomacy is an effective tool for political persuasion, but there has also been a rise in sportswashing. When authoritarian regimes—regimes where the governments centralize power through repression, exclusion, and disallowing challenges to their leaders—host international sporting events, they utilize the international media coverage to increase their prestige and finances. They manipulate public perceptions in a way that develops a positive international image despite their political misdeeds, such as human rights violations or government corruption. The issue of sportswashing has also contributed to the rise in human rights abuses, political tensions, and cultural clashes. Through closer analysis of sports diplomacy used in U.S.-China and U.S.-Saudi Arabian relations from the middle of the 20th century to today, society can learn how to alter the perceptions of sports diplomacy as a negative political tactic. Through a focus on case studies of the 1970s Ping Pong Diplomacy events, the international presence of the National Basketball Association throughout the early 2000s, the 2022 Beijing Winter Olympics, and the present implications of the Saudi Arabia backed LIV golf league, there becomes evident negative implications, such as increases in human right abuses and political corruption, but also positives, such as sports bringing different cultures together and strengthening relations between countries. By understanding the connection between sports and diplomacy, society can use sports and major sporting events to encourage greater respect for human rights, build cultural understanding, and grow positive political relations.

Sponsored by: FURSCA



Tess Anthony, '25
Majors: Biochemistry, Spanish
Hometown: Coopersville, Michigan

Progress Towards the Synthesis of a Photoswitchable BCR-ABL Kinase Inhibitor
Faculty Sponsor: Craig Streu

The Philadelphia Chromosome is a mutated chromosome caused by the translocation of chromosome twenty two with chromosome nine. At the site of this translocation, the BCR and ABL1 genes are fused, giving rise to the mutated enzyme BCR-ABL1 kinase. This kinase fusion is known to cause cancerous cell growth; specifically this kinase is commonly present in patients with Chronic Myeloid Leukemia (CML). There are many drugs currently on the market to treat CML by inhibiting the BCR-ABL1 kinase, one of these being asciminib. Asciminib functions as an allosteric inhibitor of the BCR-ABL1 kinase; however, this drug causes significant side effects to the patient during treatment, often as a result of unintended interactions away from the site of the tumor. One possible solution to this side effect issue is to explore the prospect of targeted drug delivery using photoisomerization from an inactive drug conformation to an active conformation. Among the

most studied photoswitches are the azo-stilbenes, which demonstrate the ability to reversibly photoisomerize between cis- and trans- isomers in response to near UV-light. By altering the chemical structure of asciminib slightly to include this azo group, it is possible to create a drug that may be activated selectively in the tumor. The goal is to allow this molecule the ability to photo-switch while retaining the binding affinity for BCR-ABL1 kinase. The proposed synthesis pathway to attain this altered molecule and the progress toward its production will be discussed.

Sponsored by: FURSCA, Orpha Leiter Irwin Fellowship



Arthur Apchain, '24
Major: Business Engineering
Hometown: Les Clayes-sous-Bois, France

Kadyrzhanova

Laura Deludet, '24
Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France



Meerimai Kadyrzhanova, '25
Major: Economics
Hometown: Bishkek, Kyrgyzstan

McDaniel

Ehsan Ali Khan, '24
Major: Business Engineering
Hometown: Epinay-sur-Seine, France



Owen McDaniel, '25
Majors: Business, Kinesiology
Hometown: Plainwell, Michigan

Murphy

Kiera Murphy, '25
Majors: Marketing Management, Psychology
Hometown: Northville, Michigan

Emmanuel Octau, '24
Major: Business Engineering
Hometown: Les Clayes-sous-Bois, France

Emma Perdriger, '24
Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France

Laetitia Villaire, '24
Major: Business Engineering
Hometown: Cormeilles-en-Vexin, France

WineWise
Faculty/Staff Sponsors: Row Mathews, Vicki Baker, Catherine Bruneteaux-Swann

We are creating a product that will revolutionize the wine industry and provide an informational and educational component for aspiring wine drinkers seeking to become more informed about their purchases. Our product, WineWise, collects data from customers' purchase patterns to help stores gain a better understanding of what is selling and how they can improve their inventory or stock. The kiosk also provides easy in-store directions in order to guide customers to readily available wine in the store, making the customer experience easy and enjoyable. Our headquarters will be located in South Carolina, United States. Our product will be built and distributed from this location. Our team has determined that an LLC is our best way to go about starting this idea.



Madilyn Archambeau, '24

Major: Anthropology and Sociology
Hometown: Rossford, Ohio

Environmental Interpretation at the Whitehouse Nature Center

Faculty Sponsors: Allison Harnish, Monica Day, Brad Chase

The Whitehouse Nature Center holds significance for both Albion College and the broader Albion, Michigan, community. Interpretive signage serves as a vital link connecting individuals to their environment, offering unique resources not readily available to the public. This involves a mission-driven communication process that establishes emotional, intellectual, and spiritual connections between the audience's interests and the inherent meanings within the resource. Recognizing the importance of knowledge and a relationship with the environment, interpretive signs provide visitors with an informal learning experience. Commencing in *Methods of Anthropology* in Spring '23, the development of an interpretive sign draft began. Extensive research, design, and collaborative efforts during Summer '23 and Spring '24 semesters culminated in the creation of a comprehensive interpretive sign plan. Through partnerships across departments and institutions, the plan aims to provide a well-rounded experience of nature, fostering connections between people and special places with their unique stories.

Sponsored by: Whitehouse Nature Center, Anthropology and Sociology Department at Albion College



Donna K. Avina, '24

Major: Anthropology
Hometown: Los Angeles, California

Ritual Remnants: Artifacts From the Ancient City of Teotihuacán

Faculty Sponsors: Allison Harnish, Elizabeth Palmer, Brad Chase

For my undergraduate honors thesis, I curated an exhibit at the Art Center of Battle Creek featuring thirty-eight mostly fragmented artifacts originating from Teotihuacán, an ancient Mesoamerican city established circa 100 BC and abandoned by 750 AD. Through access to the Kingman Collections housed in Battle Creek, I meticulously cataloged, researched, and photographed seventy 1500-year-old objects, updating their entries in the collection management software Past Perfect. Among these items are diverse pieces ranging from small ceramic figurines to shards of obsidian and utensils for food preparation and storage, indicative of the multifaceted material culture of Teotihuacán. These artifacts bear witness to the adept craftsmanship of the Teotihuacanos, whose creations were intrinsic to everyday ritual practices. Additionally, my research delved into archival records from the artifacts' procurement to situate the Kingman Museum's first directors within the history of Mesoamerican archaeology.

Sponsored by: FURSCA, Anthropology and Sociology Department at Albion College.



Henry Bacolor, '24

Majors: Anthropology and Sociology, History
Hometown: Ann Arbor, Michigan

Arrowheads in Albion: Mapping the Find Spots of Gete Anishinaabe Artifacts Housed at Albion College

Faculty Sponsor: Brad Chase

Albion College is home to a number of Native American projectile points and other artifacts, found across Calhoun County and donated to the Anthropology department. Though a record of these artifacts and whose land they were found on was compiled by Elizabeth Brumfiel, former Archaeology professor at Albion, no comprehensive attempt has been made to find where exactly these artifacts were found. Our research hopes to find the original locations of these artifacts, primarily through the use of archival sources, property records, and mapping software. The end goal of this research is to create a digital map of the locations in order to better understand indigenous use of the land we now call home.

Sponsored by: Scholarship Assistant Program (SAP)



Tori Balog, '24

Major: Psychology
Hometown: Livonia, Michigan

The Relationship Between Trait Resilience and Memory

Faculty Sponsors: Mareike Wieth, Tammy Jechura, Bindu Madhok

Trait resilience is characterized as the ability to cope and "bounce" back from traumatic and emotional situations, allowing people to cope with adversity (Tianqing et al. 2015). Previous research indicates that low trait resilience is related to an increased likelihood to develop Post-Traumatic Stress Disorder (PTSD) after a traumatic event (Bensimon, 2011; Lee et al., 2014). Research looking at PTSD and memory has found increased detail memory for emotional events (McKinnon et al. 2014) but more general memory for non-emotional events (Brown et al. 2013). This study was designed to investigate whether the connection between trait resilience and memory is similar to the connection between PTSD and memory. Eighty participants were asked to take a short resilience questionnaire and exposed to both a story with pictures and a list of words. Half of the participants listened to an emotional story to go with the pictures, while the other half had a neutral story. Similarly, there were also two conditions for word lists: emotional or neutral. Participants were tested on their memory of the details in the pictures, as well as their recall of the word list.

The result of this study found that individuals with low trait resilience remembered more details in the emotional condition than participants with high trait resilience. In the non-emotional condition, participants with low trait resilience remembered fewer details than participants with high trait resilience. These findings indicate that individuals with low trait resilience show a similar memory pattern as individuals with PTSD, further strengthening the connection between low resilience and PTSD.

Sponsored by: FURSCA



Baker

Rae Baker, '24

Major: Biology
Hometown: Jackson, Michigan

Zosia Bolde, '25

Major: Chemistry
Hometown: Traverse City, Michigan



Bolde

Nicholas Kosmas, '24

Major: Biology
Hometown: Grosse Pointe, Michigan

Mackenzie Rundell, '24

Major: Biology
Hometown: Kingsford, Michigan



Kosmas

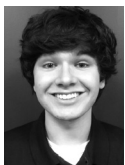
Genomic Annotation of *Drosophila willistoni* Contigs 4 and 58
Faculty Sponsor: Ken Saville



Rundell

The Genomics Education Partnership (GEP) is a scientific and educational partnership using comparative genomics to characterize the Muller F element, a distinct chromosomal region, from the genomes of several *Drosophila* species. In the well-studied fruit fly, *Drosophila melanogaster*, the F element corresponds to the fourth chromosome, or "dot" chromosome. Chromosomes are made

up of two major types of structures called euchromatin and heterochromatin. The dot chromosome has a unique structure, appearing as heterochromatic by many criteria, but has a relatively high gene density, which is more like euchromatin. The goal of the GEP is to study the evolution of genes on the dot chromosome to further our understanding of the function of heterochromatin. As part of the Introduction to Bioinformatics course at Albion College, we used several web-based tools to identify and annotate the genes present in approximately 50,000 base pairs of DNA, called a contig, from the *Drosophila willistoni* genome. In this species, the dot chromosome has merged with another chromosome. The goal of this project is to study the organization of the genes in this new chromosomal environment. Our group specifically analyzed contigs 2 and 4. Detailed gene models for all of these genes within each contig will be presented.

**Shannon Barba, '24**

Majors: Physics, Computer Science
Hometown: Marshall, Michigan

Characterization of Synergistic Information Processing in Neural Network Motifs
Faculty Sponsor: Demian Cho

In the brain, there is a network of neurons that send and receive signals composed of chemicals and electricity from surrounding neurons. While we have gained computational understanding of how smaller-scale neuron groupings operate, the inner workings of higher-order neural networks remain a mystery. The purpose of this project is to characterize synergistic information processing in motifs (small neuron groupings) to gain a better understanding on how complex networks may operate in the brain.

Sponsored by: FURSCA



Belf

Rachel Belf, '24

Major: Biology
Hometown: Berkley, Michigan

Parker Douglass, '25

Majors: Biology and Anthropology
Hometown: Fowlerville, Michigan



Douglass

Katherine Dudenhoefer, '25

Majors: Biology, Earth Science
Hometown: Harborcreek, Pennsylvania

Madison Spurlock, '25

Major: Biology
Hometown: Clarkston, Michigan



Dudenhoefer

Genomic Annotation of *Drosophila willistoni* Contigs 11 and 22
Faculty Sponsor: Ken Saville



Spurlock

The Genomics Education Partnership (GEP) is a scientific and educational partnership using comparative genomics to characterize the Muller F element, a distinct chromosomal region, from the genomes of several *Drosophila* species. In the well-studied fruit fly, *Drosophila melanogaster*, the F element corresponds to the fourth chromosome, or "dot" chromosome. Chromosomes are made up of two major types of structures called euchromatin and heterochromatin. The dot chromosome has a unique structure, appearing as heterochromatic by many criteria, but has a relatively high gene density, which is more like euchromatin. The goal of the GEP is to study the evolution of genes on the dot chromosome to further our understanding of the function of heterochromatin. As part of the Introduction to Bioinformatics course at Albion College, we used several web-based tools to identify and annotate the genes present in approximately 50,000 base pairs of DNA, called a contig, from the *Drosophila willistoni* genome. In this species, the dot chromosome has merged with another chromosome. The goal of this project is to study the organization of the genes in this new chromosomal environment. Our group specifically analyzed contigs 20 and 22.

**Nomin Bilegdemberel '25**

Majors: Engineering Dual Degree Program
Hometown: Ulaanbaatar, Mongolia

Performance Evaluation of Neuromorphic Chips in Small Robotic Cars for Object Recognition and Avoidance Tasks
Faculty Sponsor: Demian Cho

This research aims to evaluate the performance of neuromorphic chips in small robotic cars for object recognition and avoidance tasks. The study will measure the accuracy, speed, and energy efficiency of these chips in real-world scenarios. The results of this research will provide insights into the capabilities and limitations of neuromorphic computing in small robotic cars and inform future design decisions in this area.

Sponsored by: FURSCA



Bolde

Zosia Bolde, '25

Major: Chemistry
Hometown: Traverse City, Michigan

Sid Childers, '24

Major: Geology
Hometown: Holly, Michigan



Childers

Sam Helmbreck, '25

Majors: Earth Science, Art
Hometown: Albion, Michigan



Helmbreck

Katelynn Kandow, '25

Major: Environmental Studies
Hometown: Livonia, Michigan

Alaina Shepardson, '25

Major: Environmental Science
Hometown: Jackson, Michigan



Kandow

The Pollinator Garden Project

Faculty Sponsor: Thom Wilch



Shepardson

This project was initiated in the Fall 2023 Sustainability Projects class (ENVN 287) and aims to establish a pollinator garden on campus. Research has shown that pollinator gardens can increase the biodiversity of native plants in addition to providing a space for community engagement. Our goal is to foster local biodiversity, create a space for pollinators, and promote sustainability initiatives within the community. The garden will additionally serve as an educational tool and a habitat for native pollinators in Michigan. With the help of our faculty advisor Thom Wilch, the Biology, facilities and

grounds department, we were able to reserve a plot behind Bobbit to turn into a pollinator space. Starting this spring, we will begin prepping the plot for planting and order plants from local nurseries.

Over the course of this project, our team has learned how to design garden layouts, and implement a student-run space that increases native plant species directly on campus. Through collaboration with students and faculty, this project will educate the community about pollinator species and the importance of garden spaces. We hope this project will inspire others to protect the environment and promote sustainability.



Lanier

Marceau Boulanger, '24

Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France

Alassane Dieng, '24

Major: Business Engineering
Hometown: Achères, France



A. Mohan

Nicholas Johns, '24

Major: Economics and Management
Hometown: Bloomfield Hills, Michigan

Théo Lanier, '24

Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France



M. Mohan

Aadhya Mohan, '25

Major: Computer Science
Hometown: Bangalore, India

Medha Mohan, '25

Majors: Biochemistry, Data Science
Hometown: Bangalore, India

Thomas Peltier, '24

Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France

Inès Martins Reverendo, '24

Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France

Thomas Valet, '24

Major: Business Engineering
Hometown: Saint-Germain-en-Laye, France

Wait4Weights

Faculty/Staff Sponsors: Vicki Baker, Roy Mathews, Catherine Bruneteaux-Swann

In today's world, we're all busy people. At Wait4Weights, we believe you shouldn't have to sacrifice your physical fitness to your other daily obligations. Using logistic and mapping technology tailored to your gym or fitness center, we can schedule every step of your workout so you'll never have to wait to use a machine, station, or piece of equipment, even during peak gym hours. Wait4Weights gives users complete control over how they work out by organizing their fitness routine around everyone else's. This technology can revolutionize university gyms and small-sized fitness centers by drastically reducing the barrier of time conflict for its busy customers. With Wait4Weights, "I don't have enough time" will be an excuse of the past.



Brenz

Mariah Brenz, '24

Majors: Biochemistry, Biology
Hometown: Grand Blanc, Michigan



Budd

Madeline Budd, '24

Majors: Biochemistry, Public Health
Concentration
Hometown: Kalkaska, Michigan

Progress Towards the Synthesis of a Next-Generation Photoswitchable BCR-ABL Inhibitor

Faculty Sponsor: Craig Streu

Cancer is one of the leading causes of death in the United States. Chronic myeloid leukemia (CML) and acute lymphoblastic leukemia (ALL) are two malignant cancers of the blood which impact thousands of people annually. The predominant cause of these cancers has been traced to a chromosomal translocation that results in a constitutively active kinase fusion known as BCR-ABL. Luckily, there are various chemotherapies that have evolved, and hundreds currently in various stages of development. However, these cancer drugs induce many systemic side effects throughout the body, often as a result of unintended off-target interactions. One way to eliminate these side effects is to target the drug to the desired tissue. One powerful means of drug targeting is the reversible

activation of drugs with light. The advantage of working with photoswitchable drugs is that they can be activated by confining the light to the diseased areas. The goal of our project is to use an azo bond as a bioisostere of the amide in the chemical structure of a next-generation BCR-ABL inhibitor. This azo bond permits the drug to photoisomerize in response to UV-light. We herein report the design, computational modeling, and progress towards the synthesis of a photoswitchable BCR-ABL inhibitor in hopes of limiting the negative side effects of cancer drugs.

Sponsored by: FURSCA, Faculty Development



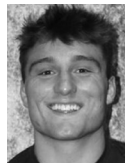
Brilley

Madison Brilley, '24

Major: Biology
Hometown: Onaway, Michigan

Bode Brown, '25

Majors: Biology, Chemistry
Hometown: Jackson, Michigan



Brown

Daniel Jeremiah, '25

Majors: Biochemistry, Biology
Hometown: Abuja, Nigeria

Will Tessin, '25

Majors: Biology, Spanish
Hometown: Midland, Michigan



Jeremiah

Genomic Annotation of *Drosophila willistoni* Faculty Sponsor: Ken Saville

The Genomics Education Partnership (GEP) is a scientific and educational partnership using comparative genomics to characterize the Muller F element, a distinct chromosomal region, from the genomes of several *Drosophila* species. In the well-studied fruit fly, *Drosophila melanogaster*, the F element corresponds to the fourth chromosome, or "dot" chromosome. Chromosomes are made up of two major types of structures called euchromatin and heterochromatin.

The dot chromosome has a unique structure, appearing as heterochromatic by many criteria, but has a relatively high gene density, which is more like euchromatin. The goal of the GEP is to study the evolution of genes on the dot chromosome to further our understanding of the function of heterochromatin. As part of the Introduction to Bioinformatics course at Albion College, we used several web-based tools to identify and annotate the genes present in approximately 50,000 base pairs of DNA, called a contig, from the *Drosophila willistoni* genome. In this species, the dot chromosome has merged with another chromosome. The goal of this project is to study the organization of the genes in this new chromosomal environment. Our group specifically analyzed contigs 23 and 42.



Tessin



Olivia Buchweitz, '26

Major: Biochemistry
Hometown: Grand Ledge, Michigan

Characterization of Neuroinflammation and Myelin Integrity in SHRSP

Michigan State University ASPET SURF
Sponsor: Anne Dorrance
Faculty Sponsor: Craig Streu

Elevated blood pressure, or hypertension, causes inward hypertrophic remodeling, disrupting cerebral blood flow and compromising neurovascular crosstalk. This research investigates the interplay of hypertension, neuroinflammation, and myelin integrity in spontaneously hypertensive stroke-prone rats (SHRSP), aiming to fill a knowledge gap regarding connections between hypertension and dementia. Focusing on critical memory-related structures like the corpus callosum and cortex, our hypothesis posits that hypertension induces neuroinflammation and diminishes myelin integrity, contributing to memory impairment in SHRSP. Male and female normotensive Sprague Dawley and SHRSP were divided into 4 animals per group. At 6-months of age, animals were behavior-tested using the Y-maze novel arm procedure and then sacrificed. Brains were collected and preserved until analysis. Region-specific sections of the brain were taken using a cryostat and then stained with Glial Fibrillary Acidic Protein (GFAP) antibodies to evaluate neuroinflammation, and Luxol Fast Blue to examine myelin integrity. When analyzing astrocyte parameters including number and size between normotensive Sprague Dawley rats and SHRSP, a statistical difference was not observed in the corpus callosum, but rather a trend of decreased numbers of astrocytes in SHRSP. This suggests the potential for astrocyte-mediated functions in memory. In the cortex, only female SHRSP exhibited significantly lower astrocyte count and size, indicating gender specific effects on neuroinflammation. Gender-specific data highlights potentially more complex relationships between hypertension, neuroinflammation, and memory impairment in SHRSP. Our findings demonstrate a correlation between reduced myelin integrity and memory dysfunction in hypertensive rats, underscoring the importance of vascular structures in neurocognitive decline.

Sponsored by: ASPET Michigan State University SURF program



Cass Burgess, '24

Major: Theatre
Hometown: Fife Lake, Michigan

The Edge of Humanity: Examining Humans Through the Lens of the Vampire Mythos

Faculty Sponsor: Stephanie Henderson

Vampires are fascinating creatures in and of themselves, but what their mythos tells us about humans is even more so. My research focuses on examining society's perception of vampires today, its perception of vampires when they first originated, and writing a stage play that examines what those perceptions tell us about how humanity's view of the supernatural, morality, gender, and sexuality have changed over time. Join me in looking at some of my most intriguing research and have a glimpse into what playwriting is like behind the scenes.

Sponsored by: FURSCA



Lauren M. Busuito, '24

Major: Psychological Science
Hometown: Dearborn, Michigan

How Empathy and Similarity in Experience Impact Memory for Others Experiencing Emotionally and Physically Painful Situations

Faculty Sponsors: Andrea Francis, Mareike Wieth, Shanti Madhavan-Brown

Increased empathy is associated with better memory (Wagner et al. 2015). Painful emotional experiences are also remembered more than those involving physical pain (Chen et al. 2008). Moreover, information is better remembered if participants can relate the situation to their own experiences than if they cannot (Rogers, et al. 1977). The current study investigates how empathy (high versus low), pain type (emotional versus physical), and similarity to own experience (high versus low) impact memory.

One hundred college students read scenarios about an individual experiencing either a physically or emotionally painful event, noted their empathy towards the individual in the scenario, and indicated if they had been through a similar experience. Participants' memory for the scenario was then tested. For participants who indicated low levels of similarity between the scenario and their own experiences, results showed that high compared to low levels of empathy led to greater memory for the emotionally but not the physically painful scenario. For participants who indicated high similarity between the scenario and their own experiences, a trend indicated that those with high empathy remembered less than those with low empathy in the emotional but not in the physical pain scenario. These findings indicate that even if people do not share a similar experience, they remember more if they have empathy for the individual experiencing an emotional situation. However, if a person is too involved in another's emotionally painful situation (high similarity and empathy), memory for the situation may decrease.



Avery Campbell, '24

Major: Biochemistry
Hometown: Waterford, Michigan

Streptavidin Silica Microcolumns for Analyzing Biopharmaceuticals

Faculty Sponsors: Clifford Harris, Craig Streu, Bradley Chase

Biopharmaceuticals are a promising avenue for future medical treatments. However, because their great structural variability presents a challenge for analyzing them, a method is needed that will enable multiple drugs to be analyzed the same way. Streptavidin silica microcolumns are highly adaptable allowing them to be used for a number of different analyses. This study develops, optimizes, and uses methods based on streptavidin silica microcolumns to analyze biopharmaceuticals. Affinity chromatography is a type of liquid chromatography that uses a specific interaction between a biologically-related binding agent, or "affinity ligand", on the support and an applied target analyte in the mobile phase. A subcategory of affinity chromatography is immunoaffinity chromatography (IAC), which uses immobilized antibodies as the stationary phase. To perform IAC, streptavidin will be immobilized onto high-performance silica by reductive amination, or the Schiff base method.

Multiple immunoaffinity columns will be created using this material along with streptavidin-biotin binding to immobilize biotin-containing antigens onto the support. These biotin-containing antigens will allow for the analysis of the monoclonal antibodies that interact with the specific antigen. During the evaluation of this method calibration curves will be created, the assay time will be optimized, and the specificity of assays will be examined. Lastly, the methods will be characterized by determining their limits of detection, sensitivity, and ranges of linearity. The development of these methods and the streptavidin microcolumn platform should make a significant improvement in methods for the specific analysis of biopharmaceuticals.

Sponsored by: National Science Foundation REU grant 2147939, University of Nebraska-Lincoln Chemistry Department



Sid Childers, '24

Major: Geology
Hometown: Holly, Michigan

Dissolved Organic Carbon Across Stream Networks of the Lower Peninsula, Michigan

Faculty Sponsor: Joe Lee-Cullin

Characterizing how land use affects water chemistry is important for understanding how humans alter the environment. Using a synoptic sampling approach, this study aims to build a model of lower Michigan's stream biogeochemistry. We will test for spatial autocorrelation and assess stream patterns of chemistry as it relates to land use and land cover using the ArcGIS package STARS and compatible R package. STARS(Spatial Tools for the Analysis of River Systems) allows for the calculation of spatial statistics while accounting for the unidirectional connectivity and weighing of converging streamlines. The SSN(Spatial Stream Network) package for R creates the generalized linear model of stream networks once it's been formatted in STARS. Land use will be extracted across the determined watershed boundaries for the sample locations. Connecting the river analysis to the land use of Michigan allows assessment of patterns between land use and water chemistry.



Gwendolyn Cinzori, '27

Major: English; Ford Institute
Hometown: Holland, Michigan

Promoting Awareness for Menstrual Poverty

Faculty Sponsor: Andrew Christopher

Approximately half of the global population is biologically female. This means that half the population menstruates. Despite this fact, a majority of women do not have access to the supplies and education necessary to safely menstruate. This research will explore the circumstances that deny women access to these materials and propose solutions that can be implemented both locally and on a large-scale. This presentation will include examining how different economic standings and social norms affect women's access to menstrual materials. These circumstances will be studied on a global level in order to show the variety of challenges faced by women. The research will also look at the specific policies Albion College has already implemented and suggest ones that could be implemented in the future.



McCoy

Naomi Cloostermans, '25

Major: Environmental Science
Hometown: Saint Pierre De Chartreuse,
France

Anaka McCoy, '25

Major: Environmental Science
Hometown: Jackson, Michigan

Nicklas Penabaker, '25

Majors: Biology, Biochemistry
Hometown: Brighton, Michigan

Reduce and Recycle Initiative

Faculty Sponsor: Thomas Wilch

For the class Sustainability Projects (ENVR 287/288), we created the Reduce and Recycle Initiative. This initiative is a movement to increase recycling on campus while simultaneously starting to phase out one use plastics for compostable options. Our goal for this project was to reduce the amount of one-use plastics in the KC Eat Shop, promote recycling on campus, and give information on how recycling works on campus. Through meetings with campus Facilities, Metz Culinary Management, and our team members, we managed to establish compost bins in the KC Eat Shop, along with switching nearly all eating utensils and drink cups to compostable options. We also created infographics to promote recycling in campus dormitories.



Coleman

Abigail Coleman, '24

Majors: Psychological Science,
Environmental Studies
Hometown: Mason, Michigan

Jennifer Emeka, '24

Major: Biology
Hometown: Evanston, Illinois



Joseph

Curtis Hamilton, '26

Major: Environmental Studies
Hometown: Warren, Michigan

Jayth Joseph, '24

Majors: Environmental Science, Spanish
Hometown: Lansing, Michigan



McLaughlin

Liam McLaughlin, '25

Majors: Earth Science, Secondary education
focus
Hometown: Erie, Colorado

Student Farm Compost Project

Faculty Sponsor: Thomas Wilch

During our Sustainability Projects class (ENVN 288), we were asked to envision, propose and enact a sustainable plan of action. Our project group focused on developing a food waste composting system. It has been determined that 6-8% of all human-caused greenhouse gas emissions originate from food waste. Our objectives were to divert food waste generated at Baldwin from going to a landfill and to help build healthy soil at the Student Farm. We met with Metz Culinary Management staff to understand food waste in college dining and to gain access to their pre-consumer food waste. We constructed multiple compost

bins at the student farm. We realized that a multi-bin composting system will only be able to process a portion of the food waste generated at Albion College. Throughout this experience we were required to build relationships with College Facilities and Metz staff, which helped us build skills in communication and project management. We also helped raise awareness of sustainable practices and environmental issues, with a strong focus on Albion College.



Coleman

Abigail Coleman, '24

Majors: Environmental Studies,
Psychological Science
Hometown: Holland, Michigan



Shepardson

Alaina Shepardson, '25

Major: Environmental Science
Hometown: Jackson, Michigan

Student-Led Sustainability: Green Initiatives

Faculty/Staff Sponsors: Lindsey Knowlden,
Thomas Wilch, Trisha Franzen

In recent years, sustainability has become a pressing issue, especially within small communities and college campuses. Students are a driving force behind environmental justice and sustainable change. This presentation focuses on how two CSE/AmeriCorps students are leading impactful sustainability initiatives right here on Albion's campus. By highlighting two standout projects, Operation Bellemont and the Thrift Fair, this talk highlights the student-led efforts to promote sustainability and build collaboration within their community. These projects serve as compelling examples, demonstrating the resourcefulness and commitment of student organizers. By exploring the successes and challenges faced by these students, others can gain valuable insights into effective project planning and execution. From overcoming different obstacles to building community support, the journey of sustainability initiatives is examined, offering valuable lessons for future student projects.

Sponsored by: AmeriCorps



Coleman

Kelvin Crone-Willis, '25

Major: Environmental Studies
Hometown: Ferguson, Missouri

The Effects of Wild Rice on Macroinvertebrate Communities Within the North Branch of the Kalamazoo River

Faculty Sponsor: Abigail Cahill

Wild Rice (Manoomin in Anishinaabemowin, the language of the Indigenous Anishinaabe people) is a culturally and ecologically significant plant native to the Great Lakes region. As part of an ongoing relationship between Albion College and the Nottawaseppi Huron Band of Potawatomi, I worked to measure the impact this plant has on the aquatic ecosystems by assessing the diversity of macroinvertebrate communities throughout the Kalamazoo River. Specialized macroinvertebrate collectors made out of 3D-printed wood, birchbark, and artificial sinew were designed, printed, and assembled. These collectors were filled with dead leaves and deployed in the north branch of the Kalamazoo River both within and outside of wild rice beds. The collectors

stayed in the river for two weeks while macroinvertebrates moved into them. The samples were then returned to the lab where richness and biodiversity were calculated to establish the diversity of the samples. I also used biotic indices to measure pollution based on pre-established tolerances of the macroinvertebrates. Initial statistical analysis of the macroinvertebrates within the river has shown that there is little difference in diversity, richness, or biotic index of the sample sites with wild rice and those without rice. Biotic indices showed that the water quality in the river was consistently fair across sites. Both diversity and richness showed no consistency between sites. This shows that there is little difference in diversity and water quality inside and outside of the rice. Further research must be done to establish the larger effects of wild rice on the whole river ecosystem.



Antoine Couillard, '24

Major: Business Engineering
Hometown: Paris, France

Chloé David, '24

Major: Business Engineering
Hometown: Montesson, France



Carson Foor, '25

Major: Finance
Hometown: Kalamazoo, Michigan

Thomas Galliard, '24

Major: Business Engineering
Hometown: Maurepas, France

Vincent Girard, '24

Major: Business Engineering
Hometown: Bois-d'Arcy, France

Julien Guignery, '24

Major: Business Engineering
Hometown: Versailles, France

Maxwell Honiss, '25

Major: Economics and Management
Hometown: South Lyon, Michigan

Jacqueline Kallis, '24

Majors: Business, Psychology
Hometown: Troy, Michigan

Nolwenn Le Gloanec, '24

Major: Business Engineering
Hometown: Bois-d'Arcy, France

E-Floor

Faculty/Staff Sponsors: Vicki Baker, Roy Mathews,
Catherine Bruneteaux-Swann

Every day, humans produce energy merely by walking. E-Floor is a company we created to harness this untapped energy. Piezoelectricity, meaning powered by pressure, uses people's steps to output energy. The product, called Elec-Strip, is a mat that captures and transforms energy via piezoelectric components. Our product would provide small amounts of power transformation and data analytics insights to companies using the mat and its accompanying sensors. It's small, accessible, and fits into the entrance

of your business to provide our services. Additionally, the mat is highly customizable and can be custom tailored to whatever need the business has. Anyone can use it to save money on electricity by storing power in batteries, to abide by government energy incentives through electrification, and to measure foot traffic in a business for data collection. Elec-Strip will be the future of green energy.



Madison Davis '24

Majors: English, Elementary Education
Hometown: Albion, Michigan

Beyond the Spectrum: The Portrayal of Autistic Women and Girls in Popular Media

Faculty Sponsor: Suellyn Henke

This project addresses the critical issue of the underrepresentation of women and girls with autism in popular media, highlighting the pervasive gender disparities in the portrayal of autistic individuals. Despite the increasing prevalence of autism spectrum disorders (ASD) globally, popular media narratives have predominantly centered on male experiences, thus rendering the unique challenges and perspectives of autistic females largely invisible. This oversight not only perpetuates stereotypes but also neglects the diverse manifestations of autism across genders, leading to a significant gap in public awareness and understanding.

To counter this imbalance I wrote a children's book featuring a female lead with autism, aiming to fill a void in children's literature where such representation is scarce. The book was crafted with the intention of both being a tool for families visiting Albion with autistic children, but also to foster empathy and understanding in neurotypical children. Through engaging storytelling and relatable scenarios, the book endeavors to present autism in a realistic manner, highlighting both the highs and lows that neurotypical children and their families encounter, as well as tools that can be used to combat overstimulation and meltdowns.



Riley Davis, '24

Major: Psychology
Hometown: Chelsea, Michigan

The Merging of Two School Districts: Considerations of Race, Belonging, and Student-Teacher Relationships

Faculty Sponsor: Shanti Madhavan-Brown

In 2016 the Albion school district was annexed and many of its students were sent to the neighboring Marshall school district. This merger created an interesting scenario in which students from two different communities are attending the same schools while remaining separate geographically and in some ways demographically. Since the introduction of new students in 2016, parents and other community members have raised concerns about learning outcomes within the changed district. The literature surrounding belonging and achievement in schools points to the role of teachers and role models, perceived barriers relating to socioeconomic status and race, community, and peers. Considering the sudden introduction of increased diversity to the school district, this poses many questions surrounding the quality of education socially and

academically relating to these factors. The current proposal suggests a survey of students in the Marshall school district targeting these specific aspects of schooling. Through this research we will discover which students in the district feel that they belong, are comfortable and supported, why they feel that way, and how these are related to achievement.



Davis

Sontiana Davis, '24

Majors: Biology, Anthropology/Sociology
Hometown: Roseville, Michigan

Bayasgalan Gantulga, '26

Majors: Biology, Economics
Hometown: Ulaanbaatar, Mongolia



Gantulga

Amani Williams, '26

Major: Biology
Hometown: Detroit, Michigan

Genomic Annotation of Drosophila willistoni Contigs 22 and 23

Faculty Sponsor: Ken Saville



Williams

The Genomics Education Partnership (GEP) is a scientific and educational partnership using comparative genomics to characterize the Muller F element, a distinct chromosomal region, from the genomes of several *Drosophila* species. In the well-studied fruit fly, *Drosophila melanogaster*, the F element corresponds to the fourth chromosome, or “dot” chromosome. Chromosomes are made up of two major types of structures called euchromatin and heterochromatin. The dot chromosome has a unique structure, appearing heterochromatic by many criteria, but has a relatively high gene density, which is more like euchromatin. The goal of the GEP is to study the evolution of genes on the dot chromosome to further our understanding of the function of heterochromatin. As part of the Introduction to Bioinformatics course at Albion College, we used several web-based tools to identify and annotate the genes present in approximately 50,000 base pairs of DNA, called a contig, from the *Drosophila Willistoni* genome. In this species, the dot chromosome has merged with another chromosome. This project aims to study the organization of the genes in this new chromosomal environment. Our group specifically analyzed contigs 6 and 11.



Fox Dennis, '25

Majors: Art, Art History
Hometown: Albion, Michigan

El Kazovsky: The Liberating Inclusion of BDSM in Art

Faculty Sponsor: Nancy Demerdash

BDSM is often associated with mental illness and/or individuals who are generally sadistic, abusive, or controlling. These associations are not accurate and have created drastic misunderstandings and hate toward the kink community. Mutual consent and pleasure (sexual and non-sexual) are key in these encounters above all else. To put it succinctly: BDSM or kink is a social interaction where participants can redefine or transform emotional and sensational states of being that are typically defined as displeasures into pleasurable experiences.

This paper and presentation examine queer identity and its relationship with social oppression and freedom through BDSM; lending to this examination are the theories of power and control with Foucault's panopticon. These theories are used here to discuss the complexities of Sadism/Masochism and Dominance/Submission, to identify the benefits of BDSM, especially to socially oppressed people, and to describe how BDSM connects with the artistic expression of the artist, El Kazovsky. Kazovsky is a fantastic example of an individual who found catharsis in BDSM and used it both in his art and life as a way of turning what would typically be considered an unpleasant experience into one that was liberating and led to his greater ability to accept the life he was dealt in Hungary and Russia as a transgender person.+



Elizabeth Dicks, '24

Majors: English, Music
Hometown: Dearborn, Michigan

And Then We Sing: A Collection of Poems

Faculty Sponsor: Helena Mesa

This is my first collection of poetry. I have been interested in writing my whole life, and discovered my love of poetry through classes at Albion College. This creative honors thesis gave me the opportunity to experience a poetic apprenticeship and learn about poetry. This process of learning and writing consisted of reading poems by contemporary poets, writing poems of my own, revising, and ordering the poems to tell a story. I learned about the line, experimented with repetition, wrote sectioned poems, wrote free verse poems, and discovered that I gravitate towards imagery-driven narratives.

The poems in this collection are mostly narrative poems drawn from my personal experiences, especially the loss of my father. As I looked back on the events of the past few years, I felt myself drawn to the transitional moments: driving home for a visit, cleaning out the old house, trying to figure out what was next in my life, the familiar becoming the unfamiliar, the closing of a life. I also felt another theme arising—traditions: celebrating the holidays, going home on the weekends to visit, talking to my dad after each music performance, a childhood nighttime routine. These transitions and traditions, the quotidian and the life-changing, were compelling and poignant to capture in poetry. My hope for the collection is that these poems might also be compelling or poignant to their reader or listener.

This presentation will consist of a reading of a few poems and a discussion about the writing process.



Skye Dickson, '24

Major: Music Performance
Hometown: Detroit, Michigan

Florence Price: Because My Soul's Been Anchored

Faculty/Staff Sponsors: Jenny Ribeiro, Nicholas Laban

Florence Price (1887-1953) was an American composer and pianist whose catalog consists of everything from chamber music to orchestral work, with songs for voice and piano making up the majority of her catalog. In 1943, she wrote to Serge Koussevitsky, the director of the Boston Symphony Orchestra, “I have two handicaps — those of

sex and race; I would like to be judged by merit alone,” and to some degree, she was. Although most of her works were forgotten after her death, in recent years, her work has resurfaced and she has become the most performed female composer in the world. In my presentation, I will be exploring some of her life, works and achievements, and take a closer look at three of her songs for voice and piano. Two of the songs I will perform were set to poetry written by other cultural trailblazers: “Bewilderment” by Langston Hughes and “Because” by Paul Laurence Dunbar. Lastly, I will be discussing and performing her arrangement of the spiritual “My Soul’s Been Anchored in the Lord”.



Kristina Dolgacheva, '25

Major: Finance

Hometown: Ann Arbor, Michigan

The Impact of Freedom of Trade Agreements with the US on CO2 Emissions of Partner Countries

Faculty Sponsor: Seolah Kim

According to the World Bank, world trade as a percentage of GDP has more than doubled in the last five decades. Parallel to this, trends in global greenhouse gas emissions are 40% higher than in 2000 and 55% higher than in 1990. This simultaneous influx has motivated a wealth of research on the relationship between trade openness and environmental emissions. However, the results of such research are heterogeneous, causing debate on the effect of global trade involvement and trade openness on CO2 emissions. The motivation for this research is to evaluate the impact of Free Trade agreements with the US on partner countries' CO2 emissions. To observe the relationship, I used data from the World Bank to conduct regression analysis on Stata comparing CO2 emissions before and after FTA participation from 1990-2020.



Ryan Driscoll, '25

Major: Biology

Hometown: Grosse Ile, Michigan

Ava Emary, '25

Major: Biology

Hometown: Lake Orion, Michigan

Emary



Brandon Gonzalez-Brosky, '24

Major: Biology

Hometown: Dearborn Heights, Michigan

Mara Pilgrim, '24

Majors: Marketing Management, English

Hometown: Trenton, Michigan



Pilgrim

Genomic Annotation of Drosophila willistoni Contigs 16 and 18

Faculty Sponsor: Ken Saville

The Genomics Education Partnership (GEP) is a scientific and educational partnership using comparative genomics to characterize the Muller F element, a distinct chromosomal region, from the genomes of several *Drosophila* species. In the well-studied fruit fly, *Drosophila melanogaster*, the F element corresponds to the fourth chromosome, or “dot” chromosome. Chromosomes

are made up of two major types of structures called euchromatin and heterochromatin. The dot chromosome has a unique structure, appearing as heterochromatic by many criteria, but has a relatively high gene density, which is more like euchromatin. The goal of the GEP is to study the evolution of genes on the dot chromosome to further our understanding of the function of heterochromatin. As part of the Introduction to Bioinformatics course at Albion College, we used several web-based tools to identify and annotate the genes present in approximately 50,000 base pairs of DNA, called a contig, from the *Drosophila willistoni* genome. In this species, the dot chromosome has merged with another chromosome. The goal of this project is to study the organization of the genes in this new chromosomal environment. Our group specifically analyzed contigs 16 and 18.



Devin Easterwood, 24

Major: Computer Science

Hometown: Albion, Michigan

To Infinity and Beyond: Expanding Access to Innovate Albion's Youth Robotics Program

Faculty Sponsor: David Reimann

Albion community students often face financial and socioeconomic barriers that limit their participation in extracurricular STEM activities such as robotics. Addressing these barriers is crucial for promoting diversity and inclusivity in STEM fields, the workforce, and ultimately the Albion Community. I have worked with Innovate Albion and community leaders to help implement a scholarship program designed to cover team expenses for underrepresented students wishing to join our community robotics teams. This pilot project of scholarships seeks to demonstrate the potential of targeted financial support to break down barriers to participation in STEM for underrepresented students. We anticipate increased participation of students, as well as parents and other mentors, in community robotics teams and related STEM activities, leading to a more diverse and inclusive team environment that promotes a sustained interest in STEM.



Mickey England, '24

Majors: Earth Science, Environmental Studies

Hometown: Kalamazoo, Michigan

Serious Games in Environmental Education

Faculty Sponsor: Joe Lee-Cullin

As the 21st century continues on, education is becoming saturated with digital advancements. At first the integration was met with growing pains and many adjustments to meet the needs of diverse learners. Meeting the needs of all students is at the forefront of the educator's mind and serious games (SGs) is a category in the gaming industry that immerses students in an informative, engaging, and self-paced learning environment. The introduction of serious games based on complex concepts in the environmental sciences and climate change are receiving astounding positive feedback in student engagement and meeting curricular focuses. Creating such a game based in Albion, Michigan, would promote further development in local students and community members. We see a serious game based on the Albion area

environment and hydrology: the distribution and movement of water above and below Earth's surface, would foster diversity and inclusivity where it has been historically lacking in the geosciences.



Fagun

Aishat O. Fagun, '25

Major: Biochemistry
Hometown: Houston, Texas



Jeremiah

Daniel S. Jeremiah, '25

Majors: Biochemistry, Biology
Hometown: Abuja, Nigeria



Saeed

Deema Saeed, '24

Major: Biomedical Chemistry
Hometown: Chicago, Illinois

Towards the Enantioselective Synthesis of Amino Alcohols: Reaction of Meso-Epoxides With Benzylamine and Aniline in the Presence of a Chiral Amine-Borane Catalyst.
Faculty Sponsor: Clifford Harris

Over the years, the chemical and pharmaceutical industries have focused on developing drugs to treat medical conditions like atrial fibrillation (popularly known as Afib in the medical industry), a heart condition characterized by irregular, fast rhythms and potential blood clot formation. Beta-blockers or amino alcohols are used to manage Afib. This project explores an eco-friendly and cost-effective method to synthesize these drugs, emphasizing minimizing allylic alcohol byproducts. Our research has advanced the study of meso-epoxide reactions with lithium amides using a chiral amine-borane catalyst. We've analyzed the impact of solvent and N-substitution variations, measuring mechanistic influence through the allylic-to-amino alcohol ratio and reaction efficiency via percent yield. Additionally, we're evaluating enantioselectivity using chiral HPLC and NMR analysis of derivatives. Our work aims to enhance the synthesis of amino alcohols, improving treatments for conditions like Afib in the pharmaceutical industry.

Sponsored by: Chemistry and Biochemistry Alumni



Tessa Falan, '25

Majors: Environmental Science, Geology
Hometown: Ann Arbor, Michigan

Fishing for Fossils in the Michigan Basin
Faculty Sponsor: Madeline Marshall

Do you know what fossils are under your feet? In this invertebrate paleontology outreach project, I translated the structure of a popular game, Fishin' Time, to serve as an interactive board game about Michigan fossils. I researched fossils that are commonly found in the Michigan Basin and created a board game rich in paleontological data that can be used for general play or classroom use. The game board itself is structured as a grid that overlays a geologic map of the Michigan Basin, where each geologic formation of a distinct age has a different color. Players begin their adventure at one of Michigan's current coastal cities, and work their way inland, into the area that was an ancient ocean from the Cambrian through Mississippian Periods. During each player's turn, they roll the dice and then move

between grid spaces on the board. The goal is to land on a fossil icon and collect a fossil game card. Each card has a color that corresponds to the geologic formation it was found within. These cards are worth a different amount of points depending on the abundance vs. scarcity of that fossil type or rock age. The player with the most points at the end of the game wins! Overall, this project allowed me to learn more about fossils and to also create a fun and exciting way for students to learn more about Michigan fossils.



Lauren Farley, '24

Majors: Art History, Spanish
Hometown: Plano, Texas

Antonio Berni, Ramona Montiel, and the Agency of Argentine Sex Workers

Faculty Sponsor: Nancy Demerdash,

Antonio Berni (1905-1981) was an Argentinean artist who broke the boundaries of what it meant to be an artist in the mid-20th century. He invented his own technique of xylocollage in which he implemented materials like scrap metal, fabrics, trash, etc. into his paintings to make larger comments about society. Berni is most known for his series surrounding Juanito Laguna, but my research centers around his second character. Ramona Montiel was created by Berni while living in Paris in 1962. She is a prostitute whose entire life is shown in Berni's pieces including moments like her wedding, her infancy, her dreams, nightmares, and her shady yet powerful clients. Through Ramona and the techniques used in her pieces, Berni makes comments on post-industrial society, consumerism, prostitution, and how women can find ways to be successful through "immoral" means. To support my analysis, I use first hand quotes from Berni himself, essays and articles written by Latin American art scholars, and historical accounts of prostitution in the early to mid-20th century.



Foust

Melanie Foust, '25

Major: Biochemistry
Hometown: Hillsdale, Michigan

Tricia Sankiewicz, '25

Major: Biochemistry
Hometown: St. Clair Shores, Michigan



Sankiewicz

β -Amino Alcohol Enantioselective Synthesis: Desymmetrization of Cyclohexene Oxide Using Lithium Morpholide and Lithium Pyrrolidide in the Presence of a Chiral Aminoborane Catalyst

Faculty Sponsor: Clifford Harris

Our project focuses on the reactions of cyclohexene oxide with lithium morpholide and lithium pyrrolidide in the presence of a chiral amine-borane has progressed. The effect of variations in solvent and N-substitution have been investigated using the ratio of allylic to amino alcohols as a measure of mechanistic influence and percent yield as a measure of efficiency. Our progress towards measurement of reaction enantioselectivity by chiral HPLC and NMR analysis of derivatives is presented.

Sponsored by: Chemistry and Biochemistry Department at Albion College



Anudari Gansukh, '25

Majors: Economics, Mathematics
Hometown: Ulaanbaatar, Mongolia

Do You Think the Euro Will Go Down or Up? Let's See!

Faculty Sponsor: Paul Anderson

The exchange rate is an important economic variable and it fluctuates all the time, thus forecasting exchange rates is a very difficult task, and it is for this reason that many companies and investors simply hedge their currency risk. The Euro Usd exchange rate interests me because those are the most powerful and special currencies in the world. For example, in 2022, for the first time in two decades, the euro reached parity with the US dollar in July, indicating market concerns regarding a deep and prolonged recession in the EU. Thus, I aimed to build two models to forecast the exchange rate: Multivariate time series regression and Box Jenkins Time Series Modeling.



Tynayia George '25

Major: Anthropology
Hometown: Detroit, Michigan

(RE)Discovering Albions Stolen Culture: New Archaeological Research at the Whitehouse Nature Center

Faculty Sponsor: Brad Chase

The goal of my FURSCA in summer 2023 was to collaborate with Dr. Chase from the Anthropology and Sociology department to revive archaeological fieldwork at the Whitehouse Nature Center (WNC), building upon the earlier efforts led by the late Dr. Elizabeth Brumfiel in 1979 through 1996. The plan involved three main components: 1) creating a GIS model for the WNC and the surrounding region, 2) devising a pedestrian survey strategy to relocate the archaeological site within the WNC, and 3) organizing archival materials from the past excavations. We planned to find archival objects from Brumfiel's research that would help us get a better understanding of the land at the time. Additionally it would help us locate the location of the historical site. Our goal was to rediscover and map the site, elucidating its connection to rice-beds using GIS technology. The intention is to rejuvenate archaeological investigations at WNC and potentially extend similar efforts to the Nottawaseppi Huron Band of Potawatomi's Pine Creek reservation near Athens, MI. We seek to restore and preserve the rich history of Anishinabe culture in Albion.



Mackenzie Gillette, '24

Major: Political Science
Hometown: Harbor Springs, Michigan

Capital Punishment in Michigan

Faculty Sponsor: William Rose

For generations capital punishment has been a form of state-sponsored punishment. Capital punishment application varies across state lines and national borders. Analysis of capital punishment in the United States and its individual states results in interesting and contradictory histories. When the founding fathers drafted the Constitution, the death penalty was a common form of administration of justice, but time and society have

changed. The appropriateness of capital punishment began to be challenged. Its legality, humaneness, and effectiveness have been questioned by many. On the other hand, the state of Michigan has been resistant to accepting capital punishment. My research seeks to uncover the factors that enable Michigan's resistance to adopting capital punishment. Analyses of legislation, Supreme Court decisions, and societal perceptions all play a role in determining what contributed to Michigan's story surrounding state-sponsored execution.



Max Griffin, '25

Major: Biochemistry
Hometown: Birmingham, Michigan

Progress in Synthesis Towards a Photoswitchable Inhibitor for TRKA, TRKB, and TRKC.

Faculty Sponsor: Craig Streu

Cell growth and division are controlled by cellular signaling. Dysregulation of these processes can result in cancer. Kinases play a central role in cell signaling and TRKA, TRKB, TRKC, and ALK are among the kinases implicated in oncogenetics. Through translocation, these enzymes can be modified to a form that is overactive, causing rapid and uncontrolled cell growth and division. These kinases are key players in many types of cancer including non-small cell lung cancer, ROS1, and solid tumors with neurotrophic tyrosine receptor kinase gene change. Although many drugs targeting these kinases have been discovered, pernicious side effects that result from off-target interactions are still a limiting factor to treatment efficacy. One promising strategy to reduce the incidence of unintended side effects is targeting active drugs with light. Although many strategies exist for photo-induced drug uncaging, the advent of photoswitchable drugs that may be reversibly activated with light is a growing field. The purpose of this project is to create a competitive photoswitchable inhibitor for multiple tyrosine receptor kinases that contribute to uncontrolled cell division. Among the most studied photoswitchable elements is the azo bond which isomerizes between trans and cis forms in response to an appropriate wavelength of light. These isomerizations result in wholesale changes in shape and charge that can be exploited to reversibly activate an inhibitor. We herein report the design, computational modeling, and progress toward the synthesis of a photoswitchable azologue of a well-validated kinase inhibitor for the target treatment of cancer.

Sponsored by: FURSCA, Faculty Development



Kelly Guadarrama, '24

Major: Political Science
Hometown: Houston, Texas

Kevie Lamour, '25

Majors: Political Science, Economics
Hometown: Cap-Haitien, Haiti



The Value of Local Internships

Staff Sponsor: Eddie Visco

This year, we both had the opportunity to intern at the Greater Albion Chamber of Commerce. During these two semesters of internship, we were able to contribute

to impactful initiatives within the Albion community. We were also given the opportunity to learn more about the city of Albion and connect with its residents. The Chamber has not only been a workplace but a learning experience. Immersed in the dynamic world of community engagement, we have connected with the local community in various ways. Building relationships and contributing to the growing future of Albion's business landscape is a key goal of the Chamber and we are glad to be working alongside them, and helping shape the future of Albion. This experience has been beneficial to us in understanding the value of local internships and the profound impact of being an active member of a growing community. The two roles we have had the opportunity to take on are as a Marketing intern and Government Affairs & Advocacy Intern which has allowed us to actively engage with the community on all social media outlets and create and attend events that create strong relations that allow us to listen to the needs of the community and advocate for them. Through the wonderful support from the staff at the Chamber, we have been able to create events, digital media engagements, and community initiatives for chamber and community members to benefit from and share ideas for website and social media advancements.

Sponsored by: Class of 1960 Albion Community Intern Endowment



Ella Hardwick, '25

Major: Chemistry, Environmental Studies
Hometown: Seattle, Washington

Braiding Sweetgrass Book Club Project

Faculty Sponsor: Thom Wilch

The book *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* by Robin Wall Kimmerer has gained notable attention in recent years. Robin Wall Kimmerer is a mother, scientist, decorated professor, and enrolled member of the Citizen Potawatomi Nation. The book has radical ideas about science, and represents what is hoped to be the beginning of multiple paradigm shifts. Kimmerer discusses the bridge between science and spirituality, and how to heal our fractured relationship with the land. In addition, this book creates feelings of hope and inspiration in regards to healing the earth. Due to positive interest from students and staff I created a space where we could discuss the topics from this book. There were three sessions of this book discussion group. The first two sessions were open to students only and the last was open to student, staff and community members. I envisioned and planned the *Braiding Sweetgrass* discussion group as part of my fall 2023 Sustainability Projects class (ENVN 288).



Ella Hardwick, '25

Major: Chemistry
Hometown: Seattle, Washington

Dana Parker, '25

Major: Chemistry
Hometown: Madison, Wisconsin

An Exploration of Different Methods for the Catalytic Reduction of Bromate

Faculty Sponsor: Kevin Metz

Bromate is a member of a class of emerging contaminants known as oxyanions. Bromate

is formed during the ozonolysis step of water purification, and as it is a known carcinogen, its introduction to drinking water sources is reason for concern. Many different approaches for the removal of oxyanions such as bromate in drinking water have been proposed, each with its own strengths and limitations. A common concern among these studies is that the oxyanion concentrations used are much higher than those observed in nature. These studies also have the potential to be very costly and detrimental to the environment. For these reasons, previous experimental methods may not be feasible for removing bromate from water sources. The goal of this project is to develop a bromate reduction method that is sustainable, affordable, and applicable on a large scale. This work focuses on chemical and electrochemical reduction reactions using metal-embedded carbon microspheres as catalysts. These metal nanoparticle-carbon microsphere composites are created using ultrasonic spray pyrolysis. Palladium-embedded carbon microspheres have been the line of inquiry thus far, as palladium is a well-studied catalyst for this reduction reaction. This research is ongoing, and our current results will be presented.



Brandon Harrell, '24

Major: Biomedical Chemistry
Hometown: Detroit, Michigan

De Novo Catalytic Amyloids

Faculty Sponsor: Craig Streu

Amyloids are aggregates of protein characterized by a fibril morphology and their ability to form a beta sheet secondary structure. Although most widely known for their presence in Alzheimer's disease, amyloids have proven to be useful catalysts that can be designed readily with a desired functionality. This interest in amyloidogenic catalysis led us to explore whether it is possible to successfully incorporate a nucleophilic dyad in amyloids. Specifically, cysteine and histidine can work cooperatively in hydrolytic enzymes, as part of a catalytic dyad. Through a de novo approach we wanted to test the catalytic efficiency of this Cys-His dyad in an amyloid. We then created structural isomers of a Cys-His dyad on an amyloid surface, and tested their ability to act as hydrolytic catalysts in the absence of zinc. From this process, the most active cofactor catalytic amyloid thus far was identified.



Isaac Hautala, '25

Majors: Geology, Anthropology
Hometown: Caledonia, Michigan

Stratigraphic and Paleoenvironmental Implications of Cambrian Glauconite

Revealed by Microscopic Analyses
Faculty Sponsor: Madeline Marshall

The green clay mineral glauconite is common, yet variable, throughout the shallow marine, storm-dominated Cambrian-aged Tunnel City Group of WI and MN. Today, glauconite forms in open marine, low energy environments. This paradox between the past and the present formation of glauconite poses the question of what conditions truly drive glauconite formation? Through microscopic analyses of sediments containing glauconite, compared with field-based macroscopic features indicative of the paleoenvironment, I aim to constrain the dominant controls

on the formation of glauconite. This study analyzed 66 rock samples qualitatively from 2 distinct localities, and identified 22,000 individual sedimentary grains. This analysis allowed me to collect a robust dataset of 2075 distinct glauconite grains while investigating data such as size, shape, abundance, and other features. Using this dataset I have been able to elucidate relationships between the characteristics of the glauconite-bearing rocks macroscopically and what the individual grains reveal on a microscopic scale. These relationships both establish a robust baseline of glauconite characteristics tied to formative conditions, and will be used to help understand the paleoenvironments of other glauconite-bearing rocks.

Sponsored: FURSCA, Bruce A. '53 & Peggy Kresge, '53 Endowed Fellowship, FDC



Moniqué Hernandez, '24

Majors: Women's, Gender, and Sexuality Studies; Spanish
Hometown: Iron Mountain, Michigan

Oral Histories of Community Gardens in the Rust Belt of Michigan

Faculty Sponsors: Trisha Franzen, Marcie Noble, Lucia Soriano

Albion is located in a food apartheid (often called a food desert), which prevents students and community members alike from easily accessing healthy, affordable food. Resources like the Albion Community Garden allow people to consume whole fruits and vegetables without the financial burden of traveling, or the limiting selection of local markets. Further, mental and physical health can be improved with exposure to nature, alongside a nutritional diet. Community gardens allow individuals to help strengthen their community, and the foods grown improve the overall health of community members. Community gardens are incredibly valuable, but they require a significant amount of upkeep, which is usually done by volunteers, making these spaces hard to sustain over long periods of time. Through this project, I hope to find ways to help make Albion's community garden more sustainable. By interviewing participants from local community gardens, I searched for ways to improve the Albion Community Garden through food storage, management, food distribution, or soil replenishment. Access to quality produce is an advantage that many people take for granted; however, food consumption is directly linked to mental and physical well-being. Moreover, low income people in Albion—especially children—are at a distinct disadvantage to individuals who can travel, or live closer to affordable food.

Sponsored by: FURSCA



Kaitlyn Hernandez, '24

Majors: International Economics, Spanish
Hometown: Los Altos Hills, California

Effects of US Team Funding on a Professional Soccer Career

Faculty Sponsor: Seolah Kim

Youth soccer is increasing in popularity in the United States, but there have not yet been studies into how professional

soccer players were impacted by their youth teams. This paper looks into the human capital investments associated with funded versus unfunded youth soccer clubs and later success by alumni of those clubs who went on to play professionally. Utilizing data for American male soccer players across several professional soccer leagues and compiling a list of their youth teams, the regression analysis found that players that came from fully funded youth teams were more successful in that they were significantly more likely to play in an overseas league and earn a higher overall salary than those who played for unfunded teams.

Sponsored by: FURSCA

Maxwell Honiss, '25

Major: Economics and Management
Hometown: South Lyon, Michigan

The Effect of Journaling on Student Athlete Performance: A Preliminary Study

Faculty Sponsor: Drew Christopher

Student athletes have to manage their physical, mental, social, and academic health on a day to day basis to stay at their best. Through any athletic season, there are many challenges that can put pressure on these essential areas, but with the right tools, pressure can actually enhance performance. For example, a study that focused on the effects of journaling on stressful events found that a group that journaled showed relatively “decreased distress and depression, fewer illness-related visits to physicians, and positive changes in immune function” (Ulrich & Lutgendorf, 244). For the current study, I randomly assigned half of the Albion College men's and women's wrestling teams to receive an empty journal for them to use during the course of their season. The other half of the participants were a part of the control group. I then tracked each participant's wrestling performance in wins and losses, GPA, anxiety screenings, and collected anonymous survey data each Sunday to explore if the habitual act of journaling has any relationship to various aspects of the life of a student athlete. We analyzed patterns in all of the variables to draw meaningful conclusions about how the act of keeping a journal can affect student athletic performance.



Rana Huwais, '24

Major: Art
Hometown: Jackson, Michigan

Venus Fly Trap

Faculty Sponsor: Emmeline Solomon

Venus Fly Trap is a self portrait exploring perception, the terror of vulnerability and the elation of being known, and the comfort and chaos that comes with loving and being loved. The lines between the viewer/participant and the artist are blurred as both parties become each other, and both must become vulnerable, to see oneself in another as they enter the space. This very connection, the butterflies-in-stomach hoping-to-god feeling of vulnerability, feels akin to being consumed. To enter this contract of connection, one must be ready to be eaten alive, an immense risk with a gamble of an immense reward. And so, the self portrait becomes a mouth: carpet tongue, canopy palate, blood beads beginning the digestion. In all elements of the piece

I explore the tension that exists between comfort and discomfort. The blood does not gush. The consumption is soft, the venus fly trap closes slowly.

There is a reciprocity of belonging to and with someone. Does one learn love like breathing? One can asphyxiate trying to do both. This love is grand, this love is powerful, this love is intense. It is the belligerence and jubilee of a child god, new to the world and so excited by it, ever powerful but unaware of it. The love explored here, more a love, love, love, love, love, love, l o v e, is one of an innocent, overwhelmed by where to finally put it all.

Sponsored by: FURSCA Summer Research Grant



Aminaa Injinash, '24

Major: Mathematics, Economics
Hometown: Ulaanbaatar, Mongolia

Impact of the ATM (Automated Teller Machine) Network on Small Businesses in a Cashless Economy

Faculty Sponsor: Seolah Kim

As there are more digital payment methods being developed, small businesses face the challenge of adopting digital payments to increase their profit. As the role of small firms cannot be underestimated in the economy, we study how the use of cash affects the small business owner's income. Using the accessibility of cash as ATM density, we analyze its impact on the owner's income in the United States. We find that the increase in the accessibility to cash increases the small business owner's income, and its impact is stronger as the firm size decreases.

Sponsored by: FURSCA Vernon and Gladys B. Lawson Endowed Research Fellowship



Delia Johnson, '24

Major: Finance
Hometown: Grand Rapids, Michigan

Financial Literacy in the Black Community

Faculty Sponsor: Seolah Kim

The African American community has had problems for a long time regarding their financial well being. Reasons for such disparities include exclusion from wealth-building opportunities, educational inequities, and historic legacy of discrimination, just to name a few. The black population in the U.S. seems to be underserved and under-supported. Finding what is to blame can become very convoluted, and finding and implementing ways to bridge the wealth gap are not easy. The purpose of this project is to investigate and find possible solutions that may help the black community bridge this gap. Something that is incredibly important for this gap to be bridged is education. This project is meant to highlight the importance of financial education, especially pertaining to the black community. I will outline the possible effects of financial education happening in earlier stages of education and what financial education is doing now to help adults. This information is important and necessary in order to create a new understanding of this problem and to find new ways to create solutions.



Kali Johnson, '24

Major: English, Secondary Education
Hometown: Lincoln Park, Michigan

Empowering Youth Through Diverse Voices: Ensuring Equitable Access to Books That Are Mirrors and Windows

Faculty Sponsor: Jessica Roberts

Despite increasing diversity in classrooms across America, students from historically marginalized backgrounds often lack access to literature that mirrors their lived experiences and cultures. This inequity stems from two primary factors: the underrepresentation of authors of color in publishing and the recent surge in book banning disproportionately targeting books by and about people of color. From 2013-2022, only 21% of over 33,000 children's books received by a leading literacy center were by and/or about people of color. Meanwhile, in 2022 alone, the American Library Association tracked 2,571 books in the process of being banned, with 89% intended for child readers and works featuring characters of color being a prime target. Consequently, over 5,000 public schools banned at least one book in the 2022-23 school year, potentially depriving four million students of literary windows into diverse lived realities.

As a future English educator and a white person in America, I recognize the imperative need to counter this concerning trend by curating engaging, culturally responsive resources for teachers. This project centers on creating a website (www.empoweringyouththroughdiversevoices.com) housing summaries of banned books by authors of color along with comprehensive lesson plans enabling their classroom exploration. Moving forward, the site will be expanded by incorporating professional development materials – specifically, reading guides synthesizing key anti-racist pedagogies from pivotal teacher education texts. Promoting equitable access to “mirror” books validating students’ identities alongside “window” books building cross-cultural understanding, this evolving initiative equips educators with tools to cultivate an empowering, inclusive literary experience for all learners.

Sponsored by: FURSCA



Meerimai Kadyrzhanova, '25

Major: Economics
Hometown: Bishkek, Kyrgyzstan

Spillover Effect of the Russian-Ukrainian War on the Economy of Neighboring Countries

Faculty Sponsor: Seolah Kim

The outbreak of the Russian-Ukrainian War has changed many aspects of society in many countries. This study examines the spillover effect of the Russian-Ukrainian War on the economy of neighboring countries. These neighboring countries are closely related to both Russia and Ukraine in that there is no language barrier and there was lots of migration between countries. Therefore, the effects of the war on them are little known. Using regression analysis, this paper aims to shed light on the relationship between war and economic growth in terms of real GDP. The outcome will provide insights into the impact of armed conflicts on neighboring countries' economies and offer a clearer picture of the relationship between war and economic development.

Sponsored by: FURSCA, Harriet E. Elgin Endowed Fellowship



Diana Kernen, '24

Major: Biochemistry
Hometown: Keego Harbor, Michigan

Progress Towards the Synthesis of a Novel Photo-Switchable Checkpoint Inhibitor for Modulation of Self Versus Non-Self Recognition

Faculty Sponsor: Craig Streu

Checkpoints have become major therapeutic targets in cancer treatments. In a normally functioning immune system, T-cells target dysregulated cells for destruction while leaving normal cells unharmed. Tumor cells, however, evade the immune system at these checkpoints by expressing ligands on their surface that interact with the corresponding checkpoint receptors on the surface of T-cells. To prevent this, immunotherapies have been produced to prevent this interaction from occurring, reactivating the immune system to attack cancer cells. However, by interfering with the immune system's self versus nonself recognition pathways, these drugs can result in a broad array of side effects such as joint pain, confusion, seizures, headaches, and chest pain. Additionally, such checkpoint inhibitors are almost exclusively monoclonal antibodies, which are expensive to produce and require intravenous administration, generally in a medical setting. To address these issues, small molecule checkpoint inhibitors have been developed, lowering development costs, improving tumor penetration, and allowing treatments to be taken orally. Yet, these molecules, too, result in adverse side effects. It may be possible to avoid these potentially dangerous side effects by selectively activating the immune system specifically at the site of the solid tumor, so as to prevent the off-targeting autoimmune responses and reduce the potential for undesired side effects. One way to do this is using azo moieties. Herein, we disclose progress towards the synthesis of a novel second-generation photopharmaceutical for use as a site-selective checkpoint inhibitor.

Sponsored by: FURSCA, Faculty Development



Riley Kunkel, '25

Major: Environmental Studies, Political Science
Hometown: Eaton Rapids, Michigan

An Analysis of Sweden's Social Democracy: Just How Sustainable and Progressive Does Sweden Remain in This Day and Age

Faculty/Staff Sponsors: Cristen Casey, Thomas Wilch

For close to a century Sweden has been regarded as a progressive, sustainable, social democracy. This is predominantly because Sweden has seen so many successes in social change movements such as Feminist movements, LGBTQ+ movements, and Climate Change movements. However many European countries, and of course the United States as well, see far-right populist leaders gaining increasingly more support, enabling them to legislate anti-immigration policies or share ideals that promote ideas of monoculturalism, and in turn rejecting progressive values of a sustainable, civic, democratic nation. So the question is, in a world full of rising far-right populist influence, does Sweden still remain the progressive social democracy it's been seen as for the last century? The goal of my independent research is to analyze Sweden's

social democracy throughout history and today to identify just how sustainable and progressive Sweden has been, and remains to be. I will use my unique global perspectives and knowledge acquired throughout my coursework, experiences, and literature during my study abroad semester to support my claims and research, so that I may be able to share Sweden's successes, failures, and where they stand today in a world that is still very much changing.



Kevie Lamour, '25

Majors: Political Science, Economics
Hometown: Cap-Haitien, Haiti

Engagement in the City of Albion: Understanding the Role of Racial Perception

Staff Sponsor: Ari McCaskill

This research examines how perceptions of race impact political and community engagement in the City of Albion Michigan. This research project stems from a previous paper that engages the historical racial dynamics of the city of Albion but includes how this might impact involvement in the community. The research includes registered voters ages 18 and up, and gauges how they understand race as a determinant in whether citizens participate in either form of engagement. Overall, this research will explore the question, "how might race influence how or if you engage in community or political engagement?"



Sheridan Leinbach, '24

Majors: Political Science, History
Hometown: Lansing, Michigan

Book Banning and Censorship Legislation and Their Connection to the Rise of Fascism

Faculty Sponsor: Trisha Franzen

This research paper analyzes historic and modern, domestic and international policies of banned and censored book legislation and the role they play in the rise of fascism. Surprisingly, there is minimal previous research done on this topic or the broader topic of banning and censoring books and other forms of literature. I was initially intrigued by the stark rise in book bans throughout the U.S. in the present moment and wondered why banning literature was such a powerful and important tool. My research began with an analysis of federal and state policies and court cases to understand the history of book banning. It then expanded internationally to understand the connection between nations and book banning patterns. The common factor in all was the rise of fascist parties in control of the government and state. My question is, is the U.S. currently following the same path?

As part of this research, I interviewed librarians to understand the complex effects of book censorship policies, read primary accounts of individuals affected by book censorship and those who attended book burnings, and studied some of the most banned books to immerse myself in the literature in an attempt to understand the justification provided by governments. In spite of the dearth of previous studies, my research helps bolster the understanding that censoring and banning literature, ideologies, and beliefs lead to a narrowing of understanding a variety of issues and a consolidation of power.

Sponsored by: FURSCA



Kyndall Lewis, '25

Major: Environmental Studies
Hometown: Albion, Michigan

The Relationship Between Albion College and the Nottawaseppi Huron Band of Potawatomi
Faculty Sponsor: Allison Harnish

This project is the documentation and exhibition of the developing relationship between Albion College and the Nottawaseppi Huron Band of Potawatomi (NHBP). The Nottawaseppi Huron Band of Potawatomi is one of twelve federally recognized tribes in Michigan. This partnership, which was initiated in 2020, is focused on researching and restoring wild rice (manoomin), a sacred plant for Indigenous peoples of the Great Lakes. Wild rice, or manoomin, as it is called in the Anishinaabe language, is a sacred plant for the NHBP and other Indigenous peoples of the Great Lakes. Despite massive social and environmental upheaval, manoomin is still regarded as a sacred plant for many Indigenous people. The aim of this project is to create an exhibit housed at the Whitehouse Nature Center that displays the relationship between the college and the NHBP as they attempt to combine their knowledge, traditions, and resources to restore manoomin. This will be completed by interviewing key stakeholders in each group, documenting the growth of manoomin, and implementing scientific methods such as photovoice, participant observation, and environmental interpretation.

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



Brianna B. Lopez, '25

Major: Biochemistry
Hometown: Dallas, Texas

Optimization of Natural Product Extraction Techniques

Faculty Sponsor: Craig Bieler

For centuries, humans have used plant materials for a variety of uses, including medicinal applications. This project aims to learn more about the chemical constituents which can be found in plants around Albion College that are the active ingredients in different medicines. Standard extraction and analysis techniques will be optimized and used on a variety of regional plants that have medicinal properties. As a benchmark for optimizing the methods, we report on the extraction and analysis of Echinacea Angustifolia. Echinacea root is well known as a natural antiseptic and has been previously studied to identify the plant's chemical active ingredients.



Bonnie Lord, '26

Major: Environmental Science
Hometown: Alma, Michigan

Surveying Dissolved Organic Carbon Reactivity in the Streambed of the Kalamazoo River
Faculty Sponsor: Joe Lee-Cullin

Dissolved Organic Carbon (DOC) is an important and abundant chemical and physical aspect of stream ecosystems. Urban environments, including infrastructure such as non-permeable concrete and storm drains, change

how the landscape conveys water, and therefore DOC, to rivers like the Kalamazoo River. When DOC reaches the river, it undergoes biogeochemical changes, particularly within the hyporheic zone. The hyporheic zone is the highly bioreactive, shallow subsurface of the stream bed where stream and groundwaters mix. We hypothesized that DOC degradation will vary across different DOC sources. We created a variety of DOC leaf "teas" from deciduous leaves obtained across the Kalamazoo River Watershed. To simulate the rapid input of landscape DOC into the hyporheic zone, we conducted push-pull tests with a solute that included environmental water, leaf leachates, and a conservative tracer. Samples were withdrawn from the area in regular intervals over approximately four hours, then analyzed for both DOC and Chloride content. We assessed the reaction rates of each different carbon source and have found that rates do appear to vary across sources, but that within the environment, the hyporheic zone has a homogenizing effect. This research has implications for future analysis of DOC reactivity in the environment versus within the lab, and for understanding environments as an aspect of stream restoration.

Sponsored by: FURSCA, Russell Bradshaw, '30 Endowment



Dulce 'Dany' Martinez, '24

Majors: Art, Religious Studies
Hometown: Las Vegas, Nevada

The Creation

Faculty Sponsor: Ashley Feagin

"The Creation" focuses on creating a voice for the Latino and Hispanic community as well as bringing awareness to Albion College. The project involved interviewing people from the Latino and Hispanic community on their experiences in growing up with two different cultures and how it has shaped or impacted their identity. I wanted people to see who these people were; I wanted my viewers to hear their stories and put a face to the stories. The process was collaborative. I took the participant's portrait and worked with the participant in creating an SFX (special effects) makeup look. I attempted to vividly convey their story or emotions by physically transforming a part of themselves into something else.

I made liberated choices in the way I chose to use photography in my research; I wanted to demonstrate that photographs can be presented in different ways and not just on a flat piece of photo paper. I chose to design and make a lenticular wall print so the audience can admire two photographs at the same time but from different angles. The concept of my project and the usage of photography go hand in hand because you have to admire both from different perspectives and take in the fact that the Latino community and photography are much more than the stereotypes.



Anaka McCoy, '25

Major: Environmental Science
Hometown: Jackson, Michigan

Mapping Mile-A-Minute Weed in Calhoun County

Faculty Sponsor: Joe Lee-Cullin

There is a growing problem in Calhoun county, an invasive species named *Persicaria perfoliata*, more commonly called Mile-a-Minute Weed (MAMW). This invasive weed

is native to Asia. It covers forest floors, killing off native plants. This plant has been observed in the White House Nature Center. To try and get ahead of the problem, I have attempted to create a model in ArcGIS Pro predicting where Mile-A-Minute Weed could reasonably take root. I used geoprocessing tools to create layers with attributes concerning the environment MAMW is hospitable in. Using data from the USDA Web Soil Survey, land data of the United States, and data collected from Barry/Calhoun/Kalamazoo Cooperative Invasive Species Management Area (BCKCISMA) on where Mile-A-Minute Weed has been confirmed to have taken root, I seek to map out where this invasive plant can survive in Michigan.



Paige McDowell, '24

Major: Geology
Hometown: Traverse City, Michigan

Chemical Heterogeneity of Phengite in Gniess From the Tso Morari Terrane, Himalaya

Faculty Sponsors: Carrie Menold, Micheal McRivette, Kevin Metz

The formation of the Himalayas is the result of an important and dramatic geologic process: continental collision. At the very start of this interaction, fluids from the subduction of Tethys Ocean were present in the region. Phengite, the high-pressure form of muscovite, can preserve pressure-temperature conditions and chemical signatures of the fluids present during its growth. The Tso Morari Ultra-High Pressure (UHP) Terrane in Northwest India is largely made up of gniesses bearing phengite. This makes it a region well suited for researching the importance and origin of fluids within subduction zones because it also preserves early and deeply subducted rocks.

Using samples collected along a 10m traverse, we look at the mineral chemistry and trace element concentration of mica grains from each rock, as well as the heterogeneity within individual grains displaying varying amounts of preservation and recrystallization. When we consider the Si and FeT/Mg values as markers of pressure and temperature respectively, we see we have grains that grew both at near-peak conditions and during exhumation.

Sponsored by: NSF, Taylor Fund, FURSCA



Madison McGraw, '25

Major: Biochemistry
Hometown: Clarkston, Michigan

Progress Towards the Synthesis of a Novel Bidentate Warhead Ligand

Faculty Sponsor: Craig Streu

Kinases play a central role in controlling the vast majority of cellular processes. As a result, kinases are among the most explored small molecule targets in all of medicine. However, there are hundreds of different kinases with a single cell, each controlling a unique cellular process, which makes targeting one in preference to the others extremely challenging. Nevertheless, it is possible, although difficult, to design drugs that exploit very small differences between their structures. This work outlines the use of transition metal-based drugs to facilitate the production of these selective kinase inhibitors. Metals are a common

component of many of the most utilized chemical tools in medicine from chemotherapeutics to MRI contrast agents. However, their unique ability to form architecturally complex scaffolds for the production of highly potent and selective inhibitors is comparatively underexplored. The first step in the development of a metal-based kinase inhibitor scaffold is the synthesis of a stable, multidentate warhead ligand. We herein describe the synthesis of target ligand for the generation of new selective kinase inhibitors.

Sponsored by: Faculty Development



Nicholas Miller, '25

Majors: Biochemistry, Mathematics
Hometown: Grosse Pointe Woods, Michigan

Natural Protein Sequences Inspire Catalytic Amyloids

Faculty Sponsors: Craig Streu, Ivan Korendovych

Short peptide sequences are capable of self-assembling into catalytic amyloids which show high efficiencies catalyzing a range of reactions. Building on this work, we looked at new ways to generate starting points for amyloids from natural enzymes, which can be used as catalysts for the reactions originally catalyzed by the natural enzyme. This was applied to amyloids derived from carbonic anhydrase, a naturally occurring enzyme that has efficiency close to the diffusion limit. An identified sequence that was part of the Zn²⁺ binding region of bovine carbonic anhydrase II was synthesized and found to be efficient at catalyzing the hydrolysis of para-nitrophenyl acetate (pNPA). The success of creating a catalyst out of a peptide derived from a natural enzyme establishes hope that simplistic, catalytically efficient peptide sequences that mimic natural enzymes can be produced outside of first principles.

Sponsored by: Syracuse University



Rodney Mitchell, '24

Majors: Psychological Science, Neuroscience Concentration
Hometown: Saginaw, Michigan

Circadian Rhythms and Pheromone Perception

Faculty Sponsors: Tammy Jechura, Mareieke Wieth, Jerry Fisher, Vicki Baker

The present study investigates how our bodies react to certain smells, called pheromones, at two times of the day and how it might influence how we judge personal characteristics of others. Pheromones are unconsciously detected chemical signals that animals, including humans, use to communicate. In this study, we focused on a specific pheromone called androstenedione (AND), which is found in men's armpits. Our main goal is to see if AND follows a circadian rhythm, which is an expression of our body's biological clock that is responsible for gene regulation, hormone release and sleep/wake cycle, and how our brains process it. We investigated whether human pheromones are processed in the same way as regular odors or if they have a unique pathway. To do this, we had participants in morning and evening groups, each exposed to AND or a control substance while reviewing a fictitious job applicant's resume. We collected data on how participants

evaluated resumes, assessed personalities, and their overall perception of the applicants. This study aims to help us understand how our senses, daily rhythms, and pheromones all work together to influence human behavior.

Sponsored by: FURSCA grant



Alexis Moss, '24

Major: Biochemistry
Hometown: Bloomfield Hills, Michigan

Combinatorial Derivatization of Hemithioindigo Compounds as Microtubule Inhibitors
Faculty Sponsor: Craig Streu

Abnormal cell division is a common characteristic of many diseases, including cancer. One vital step of mitotic cell division is the formation of microtubules, which unites the genomic DNA in preparation for subsequent stages of cell division. A variety of well-known chemotherapeutics interfere with microtubule assembly dynamics, ultimately ceasing the cell cycle and inducing apoptosis. Unfortunately, the ubiquity of microtubule formation in cell division processes generally results in unintended side effects as apoptosis is induced in other rapidly dividing cells. This may include hair cells or gut cells. Fortunately, there are many methods for the selective targeting of cancer cells including using drugs that can be selectively activated with light, which is among the most common strategies in the field of photopharmacology. We herein report the design, computational modeling, synthesis and combinatorial derivatization of a photoswitchable tubulin polymerization inhibitor for the selective targeting of tumor cells.

Sponsored by: FURSCA, Faculty Development



Tate Nelson, '24

Major: Music Education (voice)
Hometown: San Diego, California

Mozart's "Marriage of Figaro": How to Foil the "Lord of the Manor"

Faculty/Staff Sponsors: Maureen Balke, Nick Laban

Napoleon himself is said to have stated that the play "The Marriage of Figaro" was "the French Revolution" in action. This 1778 play by Beaumarchais dealt with abuses of privilege by the aristocracy.

Mozart's opera in 1784 down-played some of the political issues, yet the opening scenes of the opera show clearly that the servant Figaro is strongly incensed that his former "friend" the Count Almaviva (whom Figaro had helped to win his wife, the Countess Rosina) is now attempting to reinstate a feudal right called "le droit du seigneur"—or the right of "the Lord of the Manor" — to sleep with Figaro's own fiancée, Susanna.

In this aria, "Se vuol ballare, Signor Contino" (If you want to dance, my dear Count), Figaro states that he won't let this happen—but still has to figure out how he, relatively powerless with respect to the Count, can accomplish this.



Delia Nieves, '24

Major: Environmental Studies
Hometown: Cleveland, Ohio

Comparative Phylogenetic Analysis of Duetting and Other Life History Traits in the Avian Order Strigiformes

Faculty Sponsor: Daniel Goldberg

This project, led by Dr. Daniel Goldberg and Dr. Karan Odom (University of the Pacific) and assisted by Delia Nieves, is meant to analyze the relationship between vocal duetting behaviors and other aspects of life history across the avian order Strigiformes (the owls). Although anecdotal reports have described many species of owls that call in unison as mated pairs, behavioral correlations have never been attempted across owls to uncover the evolutionary associations of duetting. Owls are an ideal group for studying duets, as we hypothesized that these communal signals in owls are associated with a nocturnal lifestyle, densely vegetated habitats, long-term territoriality and social bonds, and a lack of white plumage patches (a visual signal for distant communication at night). We compiled a spreadsheet of species-specific information from Claus König and Friedhelm Weick's comprehensive 2008 book, *Owls of the World*, and from various academic journal articles across the published literature, which provided data on 63 well-studied owl species. We next ran a comparative phylogenetic analysis of duetting across this sample using R statistical software and Bayesian multilevel models. Our expectation is that duetting owl species show similar life history traits to duetting songbirds: owls should duet to maintain pair bonds and defend territories year-round, and duetting should also be common in nonmigratory species that inhabit tropical latitudes and maintain home ranges over many years. A relationship between duetting and nocturnality, inversely correlated with conspicuous white plumage patches for visual signaling, would be a novel discovery among birds as well.



Iris Patel, '27

Major: Biochemistry
Hometown: Saginaw, Michigan

Isabelle Patel, '25

Major: Biology
Hometown: Saginaw, Michigan

Progress Towards the Development of a Nanobody Binder of a Pathogenic Moonlighting Protein

Faculty Sponsor: Craig Streu



Isabelle Patel

Antibiotic resistance is a significant threat to human health in all parts of the world.

New resistance mechanisms are emerging and spreading globally, threatening our ability to treat common infectious diseases and necessitating new strategies for developing antimicrobial compounds. Moonlighting proteins are a key contributor to bacterial virulence. These proteins are multifunctional proteins in which a single protein performs multiple independent functions in different cell compartments, often making use of different conformations to do so. Moonlighting proteins that act as virulence factors tend to play key roles in conserved metabolic processes and elicit relatively muted responses from the immune

system. Their evolutionary conservation, evasion of immune response and critical role in pathogenesis suggest that moonlighting proteins may make excellent targets for therapeutic development. One way to target these moonlighting proteins is with nanobodies. Nanobodies are single-domain fragments generated from camelid antibodies that combine the beneficial properties of small molecules and monoclonal antibodies, thus making them an appealing agent for creating new antibiotics. Nanobodies are easier to produce cheaply in bulk than antibodies while maintaining excellent thermal and pH stability. Just as importantly, nanobodies may be developed using a combination of surface display and directed evolution methods allowing for expedited drug discovery in response to the development of resistance. This poster outlines progress toward the expression and purification of moonlighting proteins from *S. aureus* and *S. epidermidis* for use in the directed evolution of next-generation antibiotics.



Heather Phipps, '24

Majors: English, Theatre
Hometown: Thibodaux, Louisiana

The Art of the Bard: Integrating Irish Mythology Into Modern English Poetry

Faculty Sponsor: Helena Mesa

In English poetry, the mythology and folklore of the Celts are often overlooked in favor of more widely recognized myths, such as Greek, Roman, and Christian. The writings that do embrace Celtic lore fully can be intimidating without prior knowledge, especially when compounded with the complexities of poetry itself. Thus, this creative project seeks to expand the niche of English poetry based in Celtic folklore through newly written and extensively revised poems, allowing casual readers to connect with a topic they might not have been able to before.

Sponsored by: FURSCA, Bethune Fellows Endowment



Sathwik Reddy, '24

Major: Biology
Hometown: Canton, Michigan

Progress Towards a Novel Screening Approach to Photoswitchable Therapeutic Discovery Using a Commercially Available NSAID as a Model System

Faculty Sponsor: Craig Streu

Photoswitchable molecules are a promising area for the targeted activation of drugs. These molecules generally isomerize reversibly in response to specific wavelengths of light, which can be exploited to reversibly activate drugs. Azo-stilbenes, which contain a nitrogen-nitrogen double bond, are the most widely studied photoswitchable motifs for biological applications. Such compounds are generally rationally designed through careful structural analysis of the target biomolecule. Though this process may be effective, it could lead to molecules that need relatively challenging chemical syntheses. This poster outlines a novel screening approach to photoswitchable therapeutic discovery using a commercially available NSAID as a model system.

Sponsored by: FURSCA, Faculty Development



Vedha Reddy, '24

Major: Biochemistry
Hometown: Ann Arbor, Michigan

Progress Towards the Synthesis of Azo Danuglipron

Faculty Sponsor: Craig Streu

Small molecules, like most pharmaceuticals, exert their effects by binding to a very specific target molecule within cells. We propose to redesign these drug molecules in a way that incorporates a photosensitive group that changes shape in response to light. We can then exploit the shape change in response to light to control target binding and drug activity. One potential application is the specific activation of drugs within a very specific tissue, such as the liver, preventing the noxious off-target effects. This presentation outlines progress toward the synthesis and analysis of an azologue of a recent orally-available diabetes drug.

Sponsored by: FURSCA, Faculty Development



Ashlynn Reed, '24

Majors: Environmental Studies, English
Hometown: Palmyra, Michigan

Food Sovereignty in the Rust Belt and the Albion Community Cookbook Project: Examining Pressures or Food Insecurity Through Local Recipes and Food Stories

Faculty Sponsors: Trisha Franzen, Thomas Wilch

As food studies continue to gain more recognition as a driving force in environmental, racial, and gender justice, Albion, Michigan's food history can provide a local representation of these issues. A culturally rich but historically food-insecure area, Albion has persevered through significant social injustice and change throughout its history. Still today, many of its residents struggle with obtaining and enjoying healthy, fresh produce.

Following a preliminary study of Albion's archived cookbooks, it was determined the current collection did not accurately reflect Albion's diverse population. Thus began the Albion Community Cookbook project in partnership with the Albion Community Gardens. With thanks to FURSCA funding, through an extensive interview process, much community outreach, and recipe collection, the Albion Community Cookbook strives to showcase recipes and food-related stories unique to Albion and its residents. In this research, the interview process revealed not only historic and contemporary struggles of food accessibility, but also resilience and hope in Albion and among its community.

Sponsored by: FURSCA



Larry J. Reed Jr., '23

Majors: Kinesiology, Communication
Hometown: Detroit, Michigan

Mental Health, Cardiovascular Disease Risk Factors, and the College Student

Faculty Sponsor: Heather H. Betz

College is a time when many lifelong health habits start to form (Kemper & Welsh, 2010). It has been estimated that between 12-50% of college students have one or more of

the common mental health disorders (Hunt & Eisenburg, 2010). Mental health disorders in early adulthood have been associated with long-term physical health issues, such as cancer, cardiovascular disease (CVD), diabetes, etc. (Scott et al., 2016). The earlier these physical health issues can be identified, the earlier treatment (such as lifestyle modification) could be started. **PURPOSE:** To analyze the relationship between mental health status and CVD risk factors in first year college students. **METHODS:** 45 first year college students (27 females) were recruited from a small, liberal arts college. CVD risk factors (blood pressure (BP) and body composition) were measured, physical activity (PA) was self-reported and measured by accelerometry, and sleep was evaluated by use of the Pittsburgh Sleep Quality Index. Mental health was evaluated by the Depression, Anxiety, and Stress Survey. The cohort was divided into three categories based on their individual mental health scores: those who scored high in all three (depression, anxiety, and stress) (n=7), those who scored low in all three (n=14), and those who had some combination of high and low (mixed) (n=24). **RESULTS:** Participants in the mixed group had significantly higher systolic BP (110.8+0.1mmHg) than those in the high (102.7+5.7mmHg) or low groups (104.9+7.9mmHg) (p=0.033). Additionally, the mixed group had significantly lower (p=0.009) time spent in sedentary time (46.6% of the day) and significantly higher (p=0.020) time spent in moderate-to-vigorous PA (MVPA) (15.4% of the day) when compared to the low group (54.1%; 11.7%, respectively). No significant differences in days/week of PA, nightly sleep, diastolic BP, fat-free mass, fat mass, skeletal mass, or visceral adipose tissue were seen between groups. **CONCLUSION:** The mixed group had the lowest sedentary time and the highest time in MVPA, yet still had the highest systolic BP. This could be due to trying to control mental health issues with non-pharmacological methods. Additional research, including medication use, should investigate this relationship in a larger cohort so additional relationships could be explored.



Livia Rich, '25

Major: Biology
Hometown: Washington, Michigan

Changes in Receptor Localization During Early Mating of *T. thermophila*

Faculty Sponsor: Marcella Cervantes

Tetrahymena thermophila is a unicellular, freshwater ciliate. It is a model organism for displaying enzymatic and metabolic pathways vital to its survival and reproduction. Many of these pathways are conserved in multicellular organisms. *T. thermophila* has seven different mating types. The cells utilize self-nonsel recognition to choose a mate of a different mating type. This project delineates the conformational changes of the *T. thermophila* outer membrane during this mating recognition and subsequent mating.

I conducted a series of experiments in which I used conA, a marker for conformational change of the membrane during mating recognition. After cells of different mating types were mixed together, conA was added at several different time points. The anterior tip is the paramount site of change during mating. Using microscopy techniques, the appearance of conA over time is shown in green, fluorescent light. As the *T. thermophila* cell prepares itself for pairing with another cell, conA binds to the anterior tip

in a punctate pattern an hour into mating, denoting the prevalence of an unknown receptor at the tip of the cell. I am following the progression of the membrane change up to 2 and a half hours after mixing of different mating types. From this I will learn an essential part of the mating type pathway, which will aid in identifying the receptor involved in pairing.

Sponsored by: FURSCA



Cloud Rimer, '26

Major: History
Hometown: Concord, Michigan

Seeing the Past in the Present: Understanding Trilobites through Roly-Polies

Faculty Sponsor: Madeline Marshall

What is the most effective way to teach an audience about a topic with which they have no background knowledge? Connecting the topic to something with which they ARE familiar! While a general audience probably does not have a very clear understanding of what a trilobite is, I would argue that most people know what a roly-poly/pillbug/woodlouse is. My project is designed to use the general public's knowledge of the roly-poly as a starting point to learn about fossil trilobites, drawing upon both similarities and differences in these modern vs. ancient arthropods. My project also utilizes Latin roots as another way to support learning new terminology. By connecting the similarities between the names, shapes, functions, and positions of both animals' body parts, learning about the trilobite becomes much more feasible for a novice paleontologist. I designed two interactive pieces for this project: (1) a physical trilobite model with magnetic labels on correlating body parts, and (2) a roly-poly poster which has strings to actively connect the body parts to their matching labels. Explicitly guiding your audience to use their relevant prior knowledge proved an effective informal teaching strategy in this paleontological project. Moving forward, I plan to incorporate more interactive components when teaching or presenting, such as incorporating virtual 3D models of other ancient organisms to support the learning process in new ways.



Luke Rivard, '24

Major: Music (Flute Performance)
Hometown: Wilson, Michigan

A Theoretical Cross-Examination of the Late Wind Sonatas of Francis Poulenc

Staff Sponsor: Philip Wharton

Francis Poulenc (1899-1963) was a French composer who composed a large and varied repertoire of works. His sonatas for flute, oboe, and clarinet were written late in his life and exemplify his mature compositional style. Analyzing the formal structure, harmonic progressions, thematic content, performance practice, and historical information of each of these works assists performers in playing them more effectively. Reinterpreting these works as parts of a whole reveals Poulenc's intent to performers which aids in playing compelling performances.

Sponsored by: FURSCA

Luke Rivard, '24

Major: Music (Flute Performance)
Hometown: Wilson, Michigan

Wanderer Above the Sea of Sprites

Staff Sponsors: Emily Dierickx, Nicholas Laban

Wanderer Above the Sea of Sprites is an original flute concerto I wrote. It is comprised of multiple contrasting themes intended to be evocative of a painting by Caspar David Friedrich titled Wanderer Above the Sea of Fog. I reinterpreted this painting to include what I imagine is under the fog. There are contrasts between slow and fast tempi, soft and loud dynamics, and thematic materials. Some sections are broad and mysterious while others are playful and spirited. This performance will use the version for flute and piano, but there is also a version of this piece for flute solo with orchestral accompaniment.

**Noelle Robert, '24**

Majors: Biochemistry, Psychology
Hometown: Livonia, Michigan

Progress Toward Synthesizing a Photoisomerizable Antagonist of the 5ht2a Receptor for Use as a Chemical Probe

Faculty Sponsor: Craig Streu

This research aims to synthesize a novel photoisomerizable antagonist of the 5-HT_{2A} receptor to function as a switchable chemical research probe. 5-hydroxytryptamine (5-HT) receptors are widespread throughout the central nervous system as well as some peripheral tissues, and many preexisting medications already target the 5-HT_{2A} receptor. Antagonists aim to treat mood disorders like schizophrenia, obsessive-compulsive disorder, and bipolar disorder, whereas agonists of this receptor include serotonergic hallucinogenic drugs (classical psychedelics), which have demonstrated positive modulation of addiction, post-traumatic stress syndrome, and treatment-resistant depression. However, the biologically abundant distribution of this receptor and the limited availability of receptor subtype-selective probes make manipulating its activity in a targeted fashion difficult, preventing progress in highly effective research of its cellular function and involved mechanisms. The proposed research aims to address this issue by designing a photoswitchable antagonist of the 5-HT_{2A} receptor. This compound is rendered photoswitchable by incorporating an azo moiety, which can isomerize upon introducing UV-light, allowing for selective temporal and spatial activation. This novel molecule was selected using computational modeling approaches with the protein crystal structure of 5-HT_{2A}AR. This presentation will outline the rational design and computational modeling of the target compound, as well as progress toward its synthesis and the unique synthetic challenges and strategies associated with this novel process.

Sponsored by: FURSCA, Faculty Development

**Noah Rollison, '24**

Major(s): Biochemistry, Biology
Hometown: Grand Blanc, Michigan

Strategies for the Synthesis of Novel Azologues of Validated Kinase Inhibitors

Faculty Sponsor: Craig N. Streu

Chemotherapy treatments often come with life-altering side effects due to the non-selective nature of current therapeutics. This then allows for an opportunity in innovation and explains why so much money and time is dedicated to improving the selectivity of modern drugs. A promising new approach is known as photopharmacology, which involves modulating a drug's activity with light. Since drug binding is regulated by the complex interplay of shape and charge complementarity, a drug's ability to change shape in response to light may allow it to be reversibly activated. Such drugs may be administered in a deactivated state and activated selectively at the diseased tissue with specific wavelengths of light. Azo compounds, which contain a nitrogen-nitrogen double bond that can be reversibly isomerized between trans and cis forms in response to light, are among the most common types of photoswitchable pharmaceuticals given their general stability and robust photophysical properties. As a result of the tunable chemical structure of these compounds, it is possible to synthesize a wide variety of azo compounds, each of which has its own unique pharmacological properties. Herein, we describe the total synthesis, characterization, and synthetic challenges associated with a novel azologue of a commercial kinase inhibitor.

Sponsored by: FURSCA, Faculty Development

**Mackenzie Rundell, '24**

Major: Biology
Hometown: Kingsford, Michigan

CHARGE Syndrome and the CHD7 Gene

Faculty Sponsors: Shanti Madhavan-Brown, Ken Saville

CHARGE Syndrome is a genetic disorder caused by a mutation of the CHD7 gene on chromosome 8. First discovered in 1979, CHARGE syndrome is an acronym that stands for "C" - coloboma of the eye; "H" - heart defects; "A" - atresia of the choanae; "R" - restrictions of growth or development; "G" - genital defects; "E" - ear abnormalities or deafness. It is important to note that although an individual may be diagnosed with CHARGE, they might not have the CHD7 gene mutation, and better medical and client care can be provided and tailored to each individual's specific needs.

Although CHARGE and the CHD7 gene mutation—are still being researched, evidence has shown that CHARGE Syndrome is the leading congenital cause of deafblindness. As a result, many people with CHARGE have received Cochlear Implants to drastically increase their life experience.

This presentation gives a general overview of CHARGE Syndrome, genetics, and bioinformatics, as well as examines where in the CHD7 gene the mutation that causes CHARGE and any differences in the mutated gene versus the normal gene.


Diana Sanchez, '25

Major: Biochemistry
Hometown: Waterford, Michigan

The Purification of Powassan NS5 Protein for RNA Transcription Analysis

Faculty Sponsor: Christopher Rohlman

Flaviviruses are a family of RNA viruses that are commonly found in arthropods and can be transmitted to both animal and human hosts. A large portion of these flaviviruses are human pathogens, infecting up to 400 million people each year. These include Yellow Fever, Dengue, West Nile, Zika, and Powassan viruses. Transfer between hosts, combined with the high error rate of the RNA-dependent RNA polymerases found in these viruses, can drive increased rates of mutation and potentially increase viral pathogenicity. Current evidence indicates viral RNA genomes are modified post-transcriptionally, and that these modifications could affect viral RNA stability and replication. This work explores the effect these epigenetic RNA modifications have on the speed and accuracy of RNA transcription by flavivirus RNA-dependent RNA polymerase (RdRp). To examine the effect RNA modifications have on transcription rate and fidelity, we have designed and developed an in vitro assay, using enzyme purified from expression constructs of the flavivirus NS5 RdRp and model RNA transcription templates containing modifications that have been determined to be present in these viral genomes. With this system, we are assessing how these functional group modifications found within viral RNA genomes influence the flavivirus RNA polymerase and how it interprets the altered RNA templates. Understanding how RNA modification affects flavivirus RNA synthesis will help us determine its role in viral replication, evolution and the possible impact on human health.


McKenna Shearer, '24

Major: Biochemistry
Hometown: Salem, Virginia

The Effect of Exercise on Balance, Sleep, and Strength in Middle Aged Adults

Faculty Sponsor: Ahalee Farrow

Previous research demonstrates significant decreases in blood pressure (BP) and increases in vertical jump (VJ) height following 4 weeks of moderately strenuous exercise in young populations. However, to our knowledge, no other studies have looked at the effects of 6 weeks of moderate-vigorous anaerobic exercise training on BP and VJ in sedentary women across the age span, nor have any studies utilized a training program specifically focused on corrective, stabilizing, and strengthening exercises. The purpose of this study was to investigate the effects of 6 weeks of corrective, stability, and strength training on VJ and BP in aging, sedentary women. Seven women (31-59 yrs) who indicated living a sedentary lifestyle underwent 6 weeks of moderate-vigorous exercise training. Participants attended instructor-led exercise classes 3 days a week for ~45 minutes each. The novel training program was split into 2 week increments that progressed in intensity: 2 weeks of corrective exercises, 2 weeks of stability exercises, and 2 weeks of strength exercises. VJ height, via a countermovement jump, and BP were measured at week 0 (pre) and week 7 (post).

Sponsored by: FURSCA, Faculty Development


Alaina Shepardson, '25

Major: Environmental Science
Hometown: Jackson, Michigan

Effect of Warming Water Temperatures on Local Gastropod Growth, Reproduction, and Mortality

Faculty Sponsor: Abigail Cahill

For our research, we studied two species of local gastropods, the native species *Physa acuta*, and the invasive species *Bellamya chinensis*. We wanted to test how warming water temperatures caused by climate change would affect the growth, reproduction and mortality of these species. Our hypothesis was that rising water temperatures will create a new stress factor for gastropods and in turn will affect their growth, reproduction, and mortality.

We separated the two species into four tanks, two of which were kept at room temperature (20°C), and used aquarium heaters to heat two tanks at 27°C. Weekly, we would measure the growth, reproduction, and survival of adult snails. We kept juvenile snails in custard dishes in a heated water bath of 27°C or left them in dishes in 20°C. At the end of our research, we found that our hypothesis was supported for *Physa acuta* but not supported for *Bellamya chinensis*. We found that the heated treatment caused a significant decrease in survival rate and egg mass production in *Physa acuta*, but not in *Bellamya chinensis*. Our results could help shine some light on how climate change will affect the abundance of two local gastropod species, as well as how these two species will do in a changing environment.

Sponsored by: FURSCA, Robson Family Fellows Endowment


Malena Solis, '24

Majors: Psychology, Sociology
Hometown: Albion, Michigan

Plug, Play, Connect: Mapping Youth Programming Resources in Albion

Staff Sponsors: Lindsey Knowlden, Ari McCaskill

Albion Community has no shortage of youth-serving organizations, I have participated as a youth and work alongside many community partners as a student attending Albion College. In this experience, I have noticed that there has never been a central place for families to find all the great youth programs the city has to offer. Historically, the City of Albion's department of Parks and Recreation provided an array of youth activities. In recent years, with funding cuts and fewer resources, this has waned. This new normal makes connecting people to resources all the more important. For current residents and newcomers alike, it is a struggle to find all the different youth-targeted programming in Albion, let alone the programs that are best suited for their child. The goal of my project is to ensure access to programs and activities that enrich youth. My goal is to create a youth-community database on Albion College's website that serves as a "one-stop-shop" for all of the youth-targeted programming we have in the Albion community. It will be a place for the youth of Albion, their parents, and the directors of the programs to easily locate what is available for young people to participate

in, showcasing the programs that exist while sharing up-to-date information. This project aims to create an accessible and sustainable model to be scalable as youth programming continues to grow in Albion. By focusing on these two goals, I hope to have an informative resource that would provide long-term value to all parties involved but mainly to the families in Albion seeking programs tailored to their child's interests.



Sarah Starkey, '24

Major: Kinesiology
Hometown: Albion, Michigan

Thriving In Place: Aging Gracefully in Small Communities

Staff Sponsor: Ari McCaskill

The focus of this presentation is to explore the impact and benefits of aging in place in small communities in contrast to aging in assisted living facilities. Using a five part comprehensive plan, this plan looks at different aspects that can help aging adults maintain a level of independence as they grow older. A key component of this plan is recognizing one of the biggest challenges of aging in a small community which is the lack of access to essential resources due to low-income. Points of this plan will look at the importance of physical activity programs for seniors that can help reduce the risk of chronic health diseases and foster mobility. Emphasize the importance of having access to fresh & nutritious food and dietary counseling. Discuss access to safe and affordable housing allowing individuals to move freely and safely. Encouraging the great importance of social circles by living within proximity to family, friends and neighbors can help encourage a sense of community belonging and avoid some of the mental health outcomes that may arise from feeling a sense of isolation when there is a lack of connection to individuals around them for various reasons. Additionally the importance of extended community engagement and having access to various community groups and resources to continuously stay connected and feel like active participants of the community.



Taylor Strom, '25

Major: Psychology
Hometown: Mount Pleasant, Michigan

Helping-Seeking Behavior and Peer-to-Peer Support on College Campuses

Faculty Sponsor: Shanti Madhavan-Brown

According to the Rape, Abuse, and Incest National Network (RAINN), sexual assault refers to sexual behavior or contact that occurs without explicit consent. Forms of assault can include, but are not exclusive to: attempted rape, fondling or unwanted sexual touching, forcing to perform sexual acts to the perpetrator's body, or any penetration of the victim's body. Sexual assault can occur to anyone, regardless of their race, sex, gender, sexuality, or age.

There are many crisis centers that offer immediate or long term services to survivors of sexual assault. Many survivors may be unaware of the services, are afraid to seek support because of stigma, or cannot receive professional help due to multiple barriers (e.g., financial difficulties, travel distance to a center, etc.).

Albion College has the the Center for Gender Equity (also known as the Anna Howard Shaw Center) where students can talk to a trained campus advocate to get help or information regarding sexual assault or domestic violence. Students are also able to receive training in order to be able to give peer-to-peer support as Sexual Assault Advocates (SAA's). Research has shown that peer-to-peer support can be beneficial and allow survivors to feel more comfortable with reaching out for help (O'Callaghan et al., 2023).

This poster will cover sexual assault subtopics, the barriers to receiving professional help, the effectiveness of the Sexual Assault Advocates on campus, and a discussion of what peer-to-peer supports look like at other colleges.



Ikatari Swope, '25

Major: Biology
Hometown: Clinton Township, Michigan

The Genetic Diversity of Aphis nerii

Faculty Sponsor: Abigail Cahill

Aphis nerii (milkweed aphid) is a successful invasive species found in places such as Argentina, Poland, Pakistan, Romania, and Ukraine. They are known for being pests of milkweed and oleander. These insects reproduce asexually and are viviparous, which leads to low genetic diversity. Previous studies have indicated that they are unable to overwinter, because they do not produce overwintering eggs. This allows them to only successfully reproduce in warm temperatures; however, they inhabit cold habitats such as Northern America like Michigan. This raises the question of how they are able to inhabit this region if they are unable to overwinter.

To answer this question, we conducted two experiments. The first was to investigate the level of genetic diversity in seven populations of Aphis nerii: Michigan, Illinois, Ohio, Pennsylvania, Georgia, Indiana, and their native region France. We extracted the CO1-gene and used DNA extraction, electrophoresis, and PCR. Our second experiment involved testing their cold tolerance to identify the threshold necessary for their survival; we performed this experiment with a lab freezer. Our results revealed that low genetic diversity was present despite geographical differences between Aphis nerii in our study and that perhaps the aphids have difficulty withstanding cold temperatures for long periods of time. Despite this, some genetic diversity was present, and further research is needed to understand how aphids may survive in colder climates within their non-native ranges.

Sponsored by: FURSCA



Michaley Vieau, '24

Major: Biology
Hometown: Michigan Center, Michigan

Progress Toward the Synthesis of a Photo-Switchable NMDA-Antagonist

Faculty Sponsor: Craig Streu

In today's age, the rate of memory loss-based diseases is drastically increasing. There are over 55 million people worldwide living with dementia, with someone developing the disease every 3 seconds. Alzheimer's disease is the most common type of dementia and is thought to be due to

the over activation of the NMDA (N-Methyl-D-Aspartate)-receptor. Memantine is an antagonist of the NMDA-receptor subtype of glutamate receptor. It is used to slow the neurotoxicity thought to be involved in Alzheimer's disease. The goal of this project is to synthesize an azo-memantine. Azo compounds are useful tools for changing the structure of a molecule using something that is easy to control, light. Photoswitching could allow for a more effective result while using a drug by targeting specific areas. Using light would be helpful so that we wouldn't be inhibiting all glutamate receptors within the brain, but instead, we would be inhibiting only a few at a time so we can then decide what glutamate receptor is the most active in relation to Alzheimer's disease.



Paul Volesky, '24
Major: Biochemistry
Hometown: Midland, Michigan

Progress Toward the Synthesis and Incorporation of Photoswitchable Prosthetics Into Common Antibiotics
Faculty Sponsor: Craig Streu

Antibiotic resistance has been an emerging issue since the first case was observed for penicillin in 1947. Today, resistance has been accelerated due to non-essential medical and agricultural uses, which has affected antibiotic efficacy for common infectious diseases. Globally, antibacterial resistance affects public healthcare costs and causes complications in common surgical procedures, cancer therapies, organ transplants, and other areas. At the same time, the development of novel antibiotics has not kept pace with emerging resistance. One leading obstacle to the commercialization of new antibiotics is the challenge associated with developing new therapies that are highly toxic to bacterial cells, but are tolerable or safe for eukaryotic cells. New strategies must be developed to overcome this obstacle. A promising solution is the development of compounds that can be selectively activated in the infected tissue using light, reducing the potential for systemic toxicity, and expanding the number of potential lead compounds. Azo-stilbenes are an emerging class of molecules in the scientific community for their use as a photoswitchable therapeutic. We herein outline the rational design of a novel photoswitchable antibiotic containing a prosthetic azo-stilbene group, as well as progress toward its synthesis and evaluation.

Sponsored by: FURSCA, Faculty Development



Vanessa Ybarra, '24
Major: Art
Hometown: Detroit, Michigan

Turning Point: The Physical and Mental Struggles of a Chronic Illness Explored in Mixed Media Sculpture
Faculty Sponsor: Shauna Merriman

In 2021, I was diagnosed with microscopic endometriosis after an eleven-year journey of many doctor visits, various medications, and excruciating pain. My experience has revealed how taboo menstrual health is in our culture, so much so that debilitating chronic illnesses, such as mine, are often unheard of. Therefore, those who are

afflicted have trouble receiving a diagnosis and subsequent treatment. As an artist with endometriosis, my works are a physical deconstruction of myself to reveal how all-encompassing having a chronic illness is. All the pieces have a bodily aspect that is affected by my disease and highlight the experiences I have had as a result. I employ hard and soft sculpture techniques to represent the organic fragility of internal organs and the physical pain inflicted. I hope viewers who relate to my experiences can be comforted by the notion that they are not alone and spread awareness so others may have a better understanding of what it is like having a debilitating chronic illness and the importance of menstrual health education.



Riley Zoll, '24
Major: German
Hometown: Bluffton, Indiana

Astro Restoration Project Lesson Plans
Faculty Sponsors: Jillian Mortimer, Nicolle Zellner, and Kyle Shanton

This summer I worked on developing interdisciplinary lesson plans, aimed at fifth through eighth grade levels for the Astro Restoration Project exhibit of the Astro Payload at the U.S. Space and Rocket Center museum in Huntsville, Alabama. These telescopes are currently on display in Huntsville but will eventually be on display at the Udvar-Hazy Center, a Smithsonian Museum in Washington, D. C. The goal behind this project was to address the shortcomings in K-12 STEM education by utilizing an interdisciplinary approach that conjoins elements of physics, social studies, fine arts, and English language arts. This provides a more engaging learning experience for students, even those who may not come to the lessons with a deep interest in STEM. Another goal of the project was to provide students the opportunity to see scientists as more than just white men, those traditionally highly represented in STEM careers. When students see people who look like them in various roles, they are more likely to see a much greater range of possibilities for themselves. These lesson plans will eventually be made available online and in person to visitors, as well as to teachers all around the world to use in their classrooms.

Sponsored by: FURSCA, Bethune Fellows Student Research Endowment

About the Symposium

Albion College's Student Research Symposium is now in its fourth decade. 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 this year features the work of 140 students recommended by their faculty/staff 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 Endowment 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 are used to sponsor the Elkin R. Isaac Student Research Symposium.

The Elkin R. Isaac Endowment Committee

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

The 2024 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)
 Morgan Caroland (Cutler Center, Library)
 Andrew Christopher (Psychological Science)
 Nancy Demerdash (Art and Art History, Associate Director of Prentiss M. Brown Honors Program)
 Katherine Hibbs (Marketing and Communications)
 Lia Jensen-Abbott (Music, Director of Prentiss M. Brown Honors Program)
 Lisa Lewis (Office of the Provost)
 Jill Marie Mason, '01, Coordinator (Library)
 Vanessa McCaffrey (Office of the Provost)
 Ari McCaskill (Academic Affairs)
 Elizabeth Palmer, '10 (Library, Director of FURSCA)
 Erin Smith (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.

Research Grants—Students may apply for funds to support research or other creative projects. Students must work closely with a faculty advisor; 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 to work on research or creative projects while earning a stipend. In addition to working closely with a faculty advisor, students participate in weekly seminars with other students in the program.



by the Numbers

1990

The first symposium was held
on April 20, 1990

501

Number of poster
presentations 1990-2024

2,681

Number of students who have
presented 1990-2024

100

Number of platform and poster
presentations 2024

1,681

Number of platform
presentations 1990-2024

140

Number of students
presenting 2024



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