Elkin R.

ISAAC

ALBION COLLEGE

EST 1990

STUDENT RESEARCH SYMPOSIUM

Thursday, April 10, 2025

Elkin R.

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ALBION COLLEGE

EST 1990

STUDENT RESEARCH SYMPOSIUM

8:30-10:15 am | Student Research Platform Presentations

Forum #1 Norris 100

Forum #2 Norris 101

Forum #3 Norris 102

Forum #4 Norris 104

10:45 am | Honors Convocation

Goodrich Chapel

1:15-4:15 pm | Student Research Platform Presentations

Forum #1 Norris 100

Forum #2 Norris 101

Forum #3 Norris 102

Forum #4 Norris 104

4-5 pm | Student Research Poster Session

Science Complex Atrium

MORNING SESSION

FORUM #1 – NORRIS 100

8:30	Zosia Bolde (Wiest, Metz)	Effects of Ruthenium on the Selectivity of Asymmetric Hydrogen Transfer
8:45	Ella Hardwick, Dana Parker (Metz)	Catalytic Methods for Bromate Remediation: An Exploration
9:00	Melanie Foust, Tricia Sankiewicz (Harris, Streu)	Synthesis and Evaluation of Enantioselective β-Amino Alcohols
9:15	Daniel Jeremiah (Harris)	Enantioselective Synthesis of Beta-Amino Alcohols
9:30	Boden Brown, Summer Gibson (Harris, Streu)	Optimization of an Enantioselective Aminoborane Catalyst for β-Amino Alcohol Synthesis
9:45	Zoya Ahmed (Rohlman)	The Effect of RNA Modifications on RNA Duplex Thermal Stability
10:00	Emma Schramm, Natalie Sweetland (Rohlman)	The Purification of Flavivirus NS5 Protein for RNA Transcription Analysis

FORUM #2 – NORRIS 101

8:30	Cindy Avila, Enkhmaa Buyanbadrakh, Paul Fremont, Kevin Herrera, Aurelia Lapin, Riley McKinney, Anna Meade, Enzo Rivere, Baptiste Scheffmann (Baker, Bruneteaux-Swann, Mathews)	Smart Recycling Bin: Waste Wiz
8:45	Chad Antone, Larissa Botega, Marvin Fresnay, Vanessa Fuentes, Louis Lagarde, Kevie Lamour, Killian Mars, Adriana Viscomi, Loic Willey (Baker, Bruneteaux-Swann, Mathews)	EcoEats Campus
9:00	Gerelmaa Batjargal, Carson Farkas, Sarah Kohler, Mathilde Malherbe, Brendan Morrison, Rachel Potter, Paul Rouas, Alexis Vinhas, Nicholas Wisniewski (Baker, Bruneteaux-Swann, Mathews)	De-Stress Box
9:15	Larissa Botega (Baker)	Strengthening Ties: Strategic Communication Strategies for Enhancing College-Community Partnerships in Experiential Learning
9:30	Yasmeen Azookari, Brinley McCaig, Alyssa Olley (Melzer)	Inside-Out Prison Exchange Program: Men and Masculinities
9:45	Killeen Javorsky (Quesenberry)	Between Performance and Authenticity: Historical Gender Expression in Japan Through Manga
10:00	Kelvin Crone-Willis (Christensen)	Mapping the Life and Works of Holling Clancy Holling

FORUM #3 – NORRIS 102

8:30	Zoya Ahmed (Rabquer, Cahill, Price)	Spilled Ink: Cultural Dynamics in Health Journalism
8:45	Tess Anthony (Oswald)	Increasing Your Chances of Success in the Medical Professions Through the Study of Spanish
9:00	Aishat Fagun (Rabquer, Sacks, Price)	The Legacy of Medical Racism: Examining Social Determinants, Maternal Mortality, and Healthcare Disparities Among African Americans
9:15	Ikatari Swope (Rabquer, Olapade, Jechura)	Examining Endometriosis in Women of Color—Barriers to Care and the Burden of Chronic Illness
9:30	Maria Nachivula (Yoshii)	Expanding Access: Telehealth as a Solution for Zambia's Rural Healthcare Challenges
9:45	Damion Gehres (Cho)	The EEG Simulation of Epileptic Seizures in an Artificial Neural Network
10:00	Vincent Miller (Harnish)	The Anthropology of Blood

FORUM #4 – NORRIS 104

8:30	Brayden Rowley (Marshall)	Investigating the Relationship of Biodiversity and Environmental Conditions in Idaho's Permian-Aged Rocks
8:45	Isaac Hautala (Marshall)	Glauconitic greens, Ancient seas, What does it mean?
9:00	Tessa Falan (Marshall)	Devonian Root Fossils in the Grand Canyon
9:15	Katherine Dudenhoefer (Menold)	Petrographic Analysis of Himalayan Schists
9:30	Aniyah Lindo (Cahill)	Salinity, Symbiosis, and Species Richness: An Ecological Genomics Approach to Microbial and Invertebrate Diversity
9:45	Alexa Heerema (Cahill)	A Comparative Analysis of Commercial and Raw Meat-Based Diets in Canine Nutrition and Health
10:00	Harper Lienerth (Bollman, University of North Carolina - Charlotte)	TAPChecker: Checking AI-Generated Automation Rules

AFTERNOON SESSION

FORUM #1 – NORRIS 100

1:15	Max Griffin (Streu)	Synthesis of Multiple Azologue Versions of Tyrosine Kinase Inhibitors
1:30	Melanie Symons (Streu)	Biological Activity of BCR-ABL Azologues
1:45	Alex Zoschke (Streu)	Progress Towards the Synthesis of a Photoswitchable Inhibitor for Drug Resistant BCR-ABL Mutants
2:00	Ernest Njoroge (Streu)	Progress Toward the Synthesis of Azo-Danuglipron
2:15	Madison McGraw (Streu)	Synthesis and Reaction of a Novel Bidentate Warhead Ligand for Transition Metal-Based Kinase Inhibitor Screening
2:30	Logan Hutchinson, Tejal Richardson (Streu)	Synthesis of a Light-Activatable Checkpoint Inhibitor as a Targeted Chemotherapeutic for the Reduction of Unwanted Side Effects
2:45	Cindy Avila (Streu)	Comparing the Functionality of Putative Cullin Ring Ligase Adapter Proteins, PCMTD1 and PCMTD2
3:00	Nicholas Miller (Streu, Levine)	Activity of a Mutant Calcium/Calmodulin Kinase II δ Associated with Congenital Cardiomyopathy
3:15	Medha Mohan (Streu, Rabquer, Roy)	Understanding the Downstream Signaling of Plureceptor in NK cells
3:30	Natalie Altayeb (Streu, Schulman)	Investigation Into Inhibition of LXRα Pathway in Liver Sections of W441F Mice
3:45	Iris Patel, Isabelle Patel (Streu)	Progress Toward the Development of Nanobodies Targeting the Moonlighting Activity of S. aureus GAPDH *via* Directed Evolution
4:00	Tess Anthony (Streu)	Synthesis of a Novel Photoswitchable Allosteric Inhibitor of the BCR-ABL Kinase

FORUM #2 – NORRIS 101

1:15	Fox Dionysus (Merriman)	Sacred Forms
1:30	Caemon McKeel (Abbott, Kim)	Wolfgang Amadeus Mozart: Piano Concerto No. 23 in A Major, K 488
1:45	Katriona Voogd (Fischer, Henderson, MacInnes)	The Modern Galatea: Play and Process
2:00	Maya Vonderau (Brown)	Moving On: A Collection of Gothic Horror Short Stories
2:15	Naomi Gut (Brown)	*Worth Remembering: Hazel*
2:30	Amariah Talley-Woodson (Solomon)	*Covered in the Blood*
2:45	Ben Yeasting (Wilch)	Abandoning Civilization to Watch Birds and Climb Mountains for a Living
3:00	Samuel Helmbreck (Solomon)	The Importance of Environmental Justice in a Comic Book
3:15	Isabelle Endsley (Cho)	Water Quality in Albion and Marshall: Can a Homemade Filter Reduce Metal Contaminants?
3:30	Kaen Patton (Parr)	When Duke Ellington Played Goodrich Chapel
3:45	Noah Zimmermann (Kirby)	Aristotle's Friendship
4:00	Carson Dunn (Marengoni)	Predicting MLB Free Agent Contracts With Machine Learning

FORUM #3 – NORRIS 102

1:15	Hannah Gillespie (Madhavan-Brown, Christopher, Kim)	The Relationship Between the Three M's: Mental Health, Music Mood Regulation, and Music Genre Preference
1:30	Maxwell Honiss (Christopher, Hill, Young)	The Effects of Writing Styles on Feelings of Stress and Control
1:45	Jeremy Klooster (Hill, Christopher, Broekema)	The Effects of Music Tempo and High-Thrill Activities on Emotion and Brand Memory
2:00	Rhiannon Slotnick (Melzer)	Negative Effects of Codependent Relationships Between a Disabled Parent and Their Child
2:15	Kate Faglie (Hill, Francis, Elischberger)	The Role of Trust in Understanding the Relationship Between Attachment Styles and Transphobia
2:30	Makeba Bantu (Wieth, Madhavan-Brown)	Unpacking ABA: A Critical Examination of Its History, Controversies, and Current State
2:45	Jana Rajab (Wieth)	The Effect of Culture on Attitudes Towards Alcohol Use: Comparing Young Adults in Austria and the United States
3:00	Phoebe Holm (Knowlden, Madhavan-Brown)	Tech Savvy Seniors: Bridging the Digital Divide through Service and Experiential Learning
3:15	Riley Kunkel (Rose, Gemechu, Yoshii, Wilch)	The Politics of Public Distrust in Environmental Science: Restoring Trust in our Scientific Institutions
3:30	Kevie Lamour (Roberts, Rose, Quesenberry)	Beyond Legal Jargon: Fostering Legal Awareness in College Students through Reproductive Rights Cases
3:45	Dahalia Aguilar-Tabares (Jacobson, Wilch)	Forgotten Footprints: Environmental Warfare and the Erosion of Historical Memory
4:00	Jaylene Martinez (Harnish)	Mishandled Memories

FORUM #4 – NORRIS 104

1:15	Serenity Dean (Myers, Elischberger)	Comparing the German Epic Poem *Das Nibelungenlied* to *Game of Thrones: House of the Dragon*
1:30	Kristina Dolgacheva (Adamczyk, Li, Wilch)	Do U.S. Free Trade Agreements Affect CO2 Emissions of Partnering Countries?
1:45	Egshiglen Batjargal (Uddin)	The Political Carbon Divide: Analyzing State-Level Emissions Over Three Gubernatorial Cycles
2:00	Aadhya Mohan (Baker, Mathews, Uddin, Zhang)	The Market's Reaction to M&A: A Study on Post-Acquisition Stock Returns
2:15	Joseph Dorsch (Bollman, Mason, Baker)	Probability of Profitability for Stock Option Contracts
2:30	Owen "Zhongmin" Poling (Zhang, Bollman, Baker)	Stock Market Prediction Using NLP and Deep Learning: Analyzing Tesla Tweets with RNN and LSTM
2:45	Maralgoo Ariunbaatar (Uddin)	Do Larger Corporate Assets Lead To Higher Profitability?
3:00	Maralgoo Ariunbaatar (O'Brien)	Increasing Recovery Rates of Organizations in Bankruptcy
3:15	Enkhmaa Buyanbadrakh (O'Brien)	Exploring Factors Behind the Significant Decline in Accounting Graduates in Recent Years and Strategies for Promoting Accounting Careers
3:30	Egshiglen Batjargal (Yoshii)	Ethnic Identity of Mongolians in China
3:45	Caroline Lippitt (MacInnes)	The European Great Famine of 1315-1317: Encoding and Curating Pre-Modern Texts on Natural Disaster

POSTER SESSION

SCIENCE COMPLEX ATRIUM, 4-5 P.M.

Dahalia Aguilar-Tabares, Aiyana Atas, Connor Clark (Wilch, Day)	Establishing an EcoReps Program at Albion
Chetachi Agunanne, Medha Mohan, Madison Spurlock (Saville)	Mapping Mutant 6D.44 in *Drosophila melanogaster*
Tess Anthony (Streu)	Inhibiting Crystallin Aggregation *via* Amphiphilic Dendrons
Ta'Liyah Austin (McCaskill, Nelson)	Housing grants: Albion Economic Development Corporation
Makayla Bailey, Amani Williams (Lyons-Sobaski)	Consequences of Declining Cacao Tree Populations
Gerelmaa Batjargal (Li)	Landlocked Developing Countries Trade Policy Analysis
Phillip Betz, Azaria Cummings, Margo Gilbert, Audrey Kauk, Katie Woerner (Cahill)	Invaders and Native Species: Using Metabarcoding to Compare Microbiomes of North American & European Blue Crabs
Zosia Bolde, Ava Emary, Alexandra Hays (Saville)	Genetic Mapping and Characterization of a 6D.44 Mutation in Drosophila melanogaster Through the Fly-CURE Project
Cooper Bright, Hannah Fife, Olivia Perfili (Francis)	Learning Iconic and Arbitrary Signs in American Sign Language
Naomi Cloostermans (Wilch, Day)	Annual Thrift Fair and Move-In/Out Sale To Reduce Waste
Elliot Cooper, Francisco Izquierdo (Lyons-Sobaski)	Exploration Into the Potential to Reintroduce Predators to Albion, MI
Mia Crawford, Katherine Dudenhoefer, Caleb Galvan, Noah McCollum, Kathleen Quimby (Cahill)	Invaders and Native Species: Using Metabarcoding To Compare Population Structure in Introduced Blue Crabs and Their Microbiomes
Kelvin Crone-Willis, Melany Duenas Lopez, Eli Eubank, Miles Newman, Hope Wolf (Cahill)	Invaders and Native Species: Using Metabarcoding to Compare Diseased and Healthy Microbiomes of Blue Crabs in North America and Europe
Kelvin Crone-Willis (Lee-Cullin)	Relationships Between Stream Biogeochemistry and Land Cover Throughout Southern Michigan
Delaney Diment, Ali Murray, Valeria Molina (Saville)	Genetic Mapping in Drosophila
Katherine Dudenhoefer, Tessa Falan, Jesus Leana, Anaka McCoy, Abby Meade, James Norvey, Brayden Rowley, Noah Zimmermann (Menold)	Mineral and Clast Mode Assessment of Lunar Pyroclastic Rocks from Apollo 17
Aishat Fagun (Streu, Harris)	Effect of Maternal Stressors on Prenatal Offsprings With Necrotizing Enterocolitis
Bayasgalan Gantulga (Li)	Investigating the Impact of Seasonal Air Pollution on Public Health, Productivity, and Production in Ulaanbaatar, Mongolia
Margo Gilbert, Delana Jaiyesimi, Shaylaa Madine (Cahill)	Biodiversity Within Kalamazoo River Mnomen Beds
Nathaniel Golden (Metz)	Pyrolysis of Wood Towards the Development of Sustainable Electrodes
Isaac Hautala (Chase)	Mapping the Surficial Geology and Geomorphic Changes of the WNC and Calhoun County
Daniel Jeremiah, Aniyah Lindo, Ikatari Swope (Saville)	FlyCure: Mapping a Potential Cancer Gene Identified by Mutation in Drosophila melanogaster
Riley Kunkel (Wilch)	Simulating Climate Solutions: Unlocking the Power of En-ROADS
Jesus Leana (Menold)	Petrology of Apollo 17 Lunar Samples 74001/2
Brianna Lopez (Bieler, Dong)	Iridium Catalyzed Asymmetric Secondary-Alkylation of Aldehydes
Ian MacDonald, Zoey Reyes, Patrick Tolsma (Saville)	The Annotation of Several Venom Genes From the Parasitoid Wasp *Ganaspis sp.*
Ian MacDonald, Ben Schlaff, Patrick Tolsma (Ken Saville)	Flycure Project
Ian MacDonald, Alex Zoschke (Streu)	Progress Towards the Synthesis of a Photoswitchable BCR-ABL1 Inhibitor

POSTER SESSION CONTINUED >

POSTER SESSION CONTINUED

Owen McDaniel (Young)	Campus Cab
Liam McLaughlin, Andrew Miller (Wilch, Christensen, Magyar)	Beese-Havens Boathouse Revitalization
Nicholas Miller (Streu)	Progress Toward the Synthesis of a Photo-Switchable NMDA-Antagonist
Rachel Adwoa Ntiako-Ennin (Rabquer)	Understanding Eating Disorders: Causes, Effects, and Treatment Approaches
Louis Raffaelli (Lyons-Sobaski)	Amphibians as Indicator Species of Environmental Health
Omar Saeed (Marengoni)	Building and Implementing a Chess Playing System
Alaina Shepardson (Lee-Cullin, Chase)	Developing an Interactive Website for the WNC Archeological Site
Mya Simpson, James (JP) Spybrook (Lyons-Sobaski)	Intruders: the Muscovy Ducks
Demetrius Smith (Rohlman)	The Purification of Full-Length Dengue NS5 Protein for RNA Transcription Assays
Ikatari Swope (Cahill)	Connected or Isolated: Exploring Pond Isopods' Diversity to Reveal Potential Movement Between Neighboring Ponds
Camila Tapia (Knowlden)	Historical and Socioeconomic Impacts on Homes in Albion: Analyzing Home Repair Grant Data at the Albion Economic Development Corporation
Catherine VanderWeg (Cervantes)	Conditions that Stabilize eccDNA in *Tetrahymena thermophila*
Hope Wasoski (Farrow, Betz, Rabquer)	The Influence of Preferred Music Genre on Resistance Exercise
Tailynn White (Betz, Knowlden)	Tech Savvy Seniors: The Exploration of Technology on a Home Exercise Program
Victoria Wooley (Betz, Farrow, Rohlman)	Assessment of Nutritional Knowledge and Dietary Intake in Division III Collegiate Athletes

Dahalia Aguilar-Tabares '26
Major: Environmental Studies
Hometown: Dallas, Texas

Forgotten Footprints: Environmental Warfare and the Erosion of Historical Memory
Faculty Sponsors: Sarah Jacobson, Thomas Wilch

This research examines the often overlooked relationships between military conflict, environmental deterioration, and the preservation of historical memory in Kherson, Ukraine - a city whose complex past and present challenges frequently escape broader attention. Through an in depth case study, I conducted a detailed analysis of how armed conflicts simultaneously affect the natural environment and the maintenance of cultural heritage, with specific emphasis on Holocaust memorialization, their preservation challenges, and recent Russian occupation. The study examines three critical dimensions: first, the extensive environmental ramifications of warfare, particularly the overlooked carbon footprint of military activities, infrastructure destruction, and ecosystem disruption; second, the challenges of maintaining and preserving historical memory during active conflict periods, especially regarding the forgotten victims of the Holocaust and their memorial sites; and third, the long term consequences for both ecological systems, heritage site preservation, and human health outcomes in war-affected regions. By examining Kherson's experience with both historical trauma and contemporary warfare, this research illuminates how historical memory preservation becomes increasingly complex during active conflicts while raising awareness about this overlooked region and advancing our understanding of how environmental justice and memory preservation intersect in contested spaces. The findings emphasize the critical need for more comprehensive approaches to protect both environmental resources and cultural heritage during periods of conflict to ensure these forgotten footprints - both environmental and human - are properly acknowledged. Ultimately, this study highlights the urgent need for international collaboration in documenting and preserving both environmental data and historical narratives in conflict zones, ensuring that future generations can understand the full scope of war's impact on both natural and cultural heritage.

Aguilar-Tabares

Dahalia Aguilar-Tabares '26
Major: Environmental Studies
Hometown: Dallas, Texas

Aiyana Atas '25
Major: Environmental Studies
Hometown: LaPorte, Indiana

Atas

Connor Clark '26
Major: Earth Science
Hometown: White Lake, Michigan

Establishing an EcoReps Program at Albion
Faculty Sponsors: Thomas Wilch, Monica Day

Clark

This project was created in the Environmental Projects class (ENVN 217/218). Currently, the college lacks a coordinated approach to environmental awareness, leading to inefficient resource use and missed opportunities for environmental education. Our project is working to establish a structured 0.5 credit class that will train student leaders to promote and implement sustainable practices. Research from other institutions show that structured peer-to-peer sustainability programs can significantly impact campus environmental practices. We want to continue educating students and help promote environmental awareness, while increasing the community's interest.

Sponsored by: CSE

Agunanne

Chetachi Agunanne '25
Major: Biology
Hometown: El Paso, Texas

Mohan

Medha Mohan '25
Major: Biology, Data Science
Hometown: Bangalore, India

Spurlock

Madison Spurlock '25
Major: Biology
Hometown: Clarkston, Michigan

***Mapping Mutant 6D.44 in* Drosophila melanogaster**
Faculty Sponsor: Ken Saville

We are attempting to genetically map the mutant 6D.44 to a specific gene on the 2R chromosome of *Drosophila melanogaster*. This mutant gene is suspected to cause uncontrolled cellular growth in *D. melanogaster* and is one of several mutants being mapped by the FlyCure collaboration. This mutant was originally identified in a mutant screen by creating mosaic eyes and looking at differential growth (Harvey, Pfliger, and Hariharan, 2003). This screen led to the identification of several potential cancer genes, including Hippo (hpo). Our goal is to localize the 6D.44 gene using deficiency mapping. Once located, bioinformatics techniques will be used to identify potential genes within the region and molecular biology techniques will be used to isolate and sequence the mutant and wild type versions of the gene in the region.

Zoya Ahmed '25
Major: Chemistry
Hometown: Rochester Hills, Michigan

The Effect of RNA Modifications on RNA Duplex Thermal Stability
Faculty Sponsor: Chris Rohlman

The primary function of RNA is to translate DNA, or genetic information, into proteins. Determination of optical melting points of these nucleic molecules provides thermodynamic measurements for generalized predictions of nucleic acid stabilities. Different types of RNA molecules like messenger (mRNA) and transfer RNA (tRNA) play key roles in the protein synthesis process. Modifications to RNA molecules can affect translation and have been linked to deleterious effects. This study develops and optimizes a protocol for UV/Vis spectrophotometric thermal melts to analyze individual mRNA modifications. More accurate estimations of the effects of RNA modifications on the stability of RNA duplexes can be achieved if the position of the modification within the duplex as well as adjacent RNA sequences are

considered. UV/Vis spectrophotometry is used to measure absorbance and temperature at specific wavelengths. UV melting will allow for the measurement of optimal melting points of oligomers. Thermodynamic measurements are the core of most RNA structure prediction algorithms. Free energy minimizations help in the determination of comparative sequences. To perform thermal melts, mRNA samples will be placed into semi-microcells with inserted temperature sensors. Through UV/Vis analysis, multiphasic absorbance vs temperature profiles will be observed, and the transition temperatures and changes in energetics will be analyzed. The development of frameworks to understand how individual modifications impact translation in different sequences is important in figuring out which modifications are more likely to have severe consequences.

Sponsored by: National Science Foundation, National Institute of Health

Zoya Ahmed '25
Major: Chemistry
Hometown: Rochester Hills, Michigan

Spilled Ink: Cultural Dynamics in Health Journalism
Faculty Sponsors: Brad Rabquer, Abigail Cahill, Katey Price

Mass media health communication is critical in informing public health decisions, at both individual and community levels. Increasing availability of news and information has placed significant demands on the sector. Synergistic approaches to health journalism are known to be most effective and efficient in simplifying the transmission of information. In this study, I examine common practices and trends in health journalism, particularly in digital news articles. I consider the interaction of health and economic systems, focusing mainly on the U.S., France, Germany, and India. I seek to find rising global trends along with regional aspects of systemic value and efficiency. Through mixed methods analysis, I explore the structure of each country's health care system along with deeply rooted cultural norms and values. I then examine how these relate to recent health related news trends. Common trends show that health messages targeted for specific populations in local and regional contexts maximize relevance and promote healthy behaviors. It is also found that utilizing contextualization and framing is key to building audience engagement. Agenda setting theories and framing analysis are used to address more recent changes in health journalism. I conclude with best practices and insights on the global progression of health-based journalistic media.

Natalie Altayeb '26
Majors: Biochemistry, Spanish
Hometown: Novi, Michigan

Investigation Into Inhibition of LXR*α *Pathway in Liver Sections of W441F Mice
Faculty Sponsors: Craig Streu, Ira Schulman

Liver receptor alpha (LXRα) is a molecule in the body that helps control the processing of fats and cholesterol in the liver. It also plays a role in reducing inflammation. Normally, LXRα is activated by a diverse array of molecules derived from cholesterol, which then help manage cholesterol levels by turning on specific genes. These genes help move cholesterol out of cells and out of the body. The inhibition of LXRα increases cholesterol in cells and causes liver thickening, which results in liver disease that may be fatal. This project aimed to determine the specific effects of LXRα deactivation between mice with and without functional LXRα. This was done by examining liver tissue between both types of mice through a special staining technique called immunofluorescence, which is used to visualize specific proteins in tissues using fluorescently labeled antibodies. Results of immunofluorescence displayed a high amount of fat-filled cells and macrophages in the liver tissue of mutated mice, which suggests that the mutation caused significant changes in metabolism, leading to the development of a more severe liver condition called Metabolic Dysfunction-Associated Steatohepatitis (MASH).

Sponsored by: American Society for Pharmacology and Experimental Therapeutics (ASPET), UVA Summer Research Program (SRIP)

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

Increasing Your Chances of Success in the Medical Professions Through the Study of Spanish
Faculty Sponsor: Kalen Oswald

While many may consider the U.S. as a solely English speaking country, this is not necessarily the case as the U.S. is home to the second largest number of Spanish speaking individuals in the world, falling only behind Mexico. Correspondingly, the widespread presence of Spanish language as well as Hispanic/Latino culture in the U.S. have tangible effects on the function of the professional world in the U.S. Despite this, rates of language study, including Spanish, at all levels of education are decreasing across the country, with effects being seen at Albion College as well. For this project, I have chosen to focus on the role of Spanish language and associated cultures within one sector of the U.S. professional world, the field of medicine. Through investigation of statistics, examination of primary source experiences, and conduction of interviews with bilingual physicians, this presentation will demonstrate the importance of Spanish language skills for pre-health students as well as the opportunities for professional advancement and future patient connections available with these skills. One key goal of this project is to encourage more pre-health students to take advantage of Spanish language courses offered to them.

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

Inhibiting Crystallin Aggregation via Amphiphilic Dendrons
Faculty Sponsor: Craig Streu

Proteins are some of the most prevalent biomolecules found in cells and are necessary for many vital cellular functions such as cell division and metabolism. Protein function is heavily determined by protein structure, and when the protein folding process goes awry not only can the protein become nonfunctional, it becomes possible

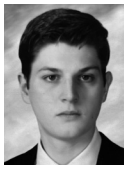
for aggregates to form. Protein aggregates have been implicated in several diseases including Alzheimer's(Aβ) and cataracts (crystallin). Cells are equipped with molecular chaperones, proteins which combat protein misfolding and aggregate formation. Native molecular chaperones have shown limitations in practice due to their relative generality. Scientists have studied possible synthetic alternatives that have the ability to overcome this specificity issue. There have been systems designed which have successfully aided in protein refolding; however, these systems display several of the same limitations found in native molecular chaperones such as a lack of specificity and a large amount of optimization required. This project aims to design a synthetic chaperone molecule which is compatible with many different protein substrates while still maintaining similar function to native chaperone proteins.

Sponsored by: National Science Foundation

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

Synthesis of a Novel Photoswitchable Allosteric Inhibitor of the BCR-ABL Kinase
Faculty Sponsor: Craig Streu

While there have been several advancements in the development of cancer treatments, the prevalence of negative side effects for patients is still a major limitation for many drugs. One way to limit these side effects is to address the possibility for off-target binding of the drug. An approach to combat this off-target binding is to explore the possibility of photoisomerization within the drug itself. Azo-stilbenes have been shown to reversibly isomerize between cis- and trans- isomers when exposed to specific wavelengths of UV-light. By incorporating an azo group into a drug, it is possible to manipulate the three dimensional shape of the molecule, allowing for the drug to be selectively activated during treatment. Specifically, we aim to incorporate an azo group into an allosteric inhibitor of BCR-ABL with the potential to treat Chronic Myeloid Leukemia (CML). This drug targets the mutant BCR-ABL kinase derived from the Philadelphia Chromosome, a chromosome caused by the translocation of chromosome nine and chromosome twenty two, via allosteric inhibition. Progress towards the synthesis and photokinetic characterization will be described.


Antone

Chad Antone '25
Major: Finance
Hometown: Rochester Hills, Michigan


Bottega

Larissa Bottega '27
Majors: Economics, Computer Science
Hometown: Santa Catarina, Brazil

Marvin Fresnay '25
Major: Business
Hometown: Paris, France

Vanessa Fuentes '27
Major: Finance
Hometown: Dallas, Texas


Fuentes

Louis Lagarde '25
Major: Business
Hometown: Tours, France

Kevie Lamour '25
Majors: Political Science, Economics
Hometown: Cap-Haitien, Haiti


Lamour

Killian Mars '25
Major: Business
Hometown: Paris, France

Adriana Viscomi '25
Majors: Marketing Management, Communication Studies
Hometown: Dearborn, Michigan


Viscomi

Loic Willay '25
Major: Business
Hometown: Limay, France

EcoEats Campus
Faculty Sponsors: Vicki Baker, Catherine Bruneteaux-Swann, Roy Mathews

EcoEats Campus is a sustainability-focused business that reduces food waste on university campuses by redistributing extra, pre-consumer meals from dining halls and campus cafes. Through our app, students can access discounted meals that would otherwise be discarded, with food conveniently packaged in kiosks for easy pickup. We address food insecurity on campus, particularly for students who miss dining hall hours due to classes, extracurriculars, or jobs. By partnering with campus dining services and local businesses, EcoEats Campus not only minimizes food waste but also provides an accessible solution for student hunger. Our program operates on a subscription model for colleges, making it a scalable and sustainable initiative.

Maralgoo Ariunbaatar '26
Major: Accounting
Hometown: Ulaanbaatar, Mongolia

Increasing Recovery Rates of Organizations in Bankruptcy
Faculty Sponsor: Connie O'Brien

This study examines how businesses in the United States recover from bankruptcy, exploring why some succeed while others struggle. Through comparative analysis, detailed case studies, and quantitative examination of financial metrics, the research investigates recovery strategies and outcomes. By analyzing financial statements, court filings, and market trends, the study identifies factors influencing recovery and offers practical recommendations for stakeholders. The anticipated outcomes include a nuanced understanding of recovery strategies and actionable insights for businesses facing financial distress.

Maralgoo Ariunbaatar '26
Major: Accounting
Hometown: Ulaanbaatar, Mongolia

Do Larger Corporate Assets Lead To Higher Profitability?
Faculty Sponsor: Azhar Uddin

This study examines the relationship between a company's asset size and its profitability, focusing on whether having larger assets translates into higher profits. To analyze this relationship, we employ a multiple linear regression model using data from companies across various industries listed in the 2024 Fortune 500 rankings worldwide. By exploring these patterns, our research aims to offer valuable insights for investors, corporate managers, and policymakers. The findings will help inform strategic decisions on asset allocation, financial planning, and workforce management, ultimately contributing to more effective business growth and economic policies.

Ta'Liyah Austin '25
Major: Business
Hometown: Albion, Michigan

Housing grants: Albion Economic Development Corporation
Faculty sponsors: Ari McCaskill, Bruce Nelson

Given the significant economic downturn in the City of Albion beginning with the closure of Union Steel in 1995. Subsequent divestment followed with the closure of the city's only hospital grants and loans have become increasingly valuable resources for both business owners and homeowners. Therefore, I have chosen Albion Economic Development Corporation to research home improvement housing grants. My goal is to assess the eligibility criteria, qualifications, success and failure rates, as well as identify any emerging trends in the housing grant landscape.

Sponsored by: Build Albion Fellows

Ávila

Cindy Ávila '25
Major: Biochemistry
Hometown: Los Angeles, California

Buyanbadrakh

Enkhmaa Buyanbadrakh '26
Majors: Accounting, Computer Science
Hometown: Ulaanbaatar, Mongolia

Herrera

Kevin Herrera '26
Major: Finance
Hometown: Irving, Texas

Riley McKinney '25
Major: Economics and Management
Hometown: Watervliet, Michigan

Anna Meade '25
Majors: Marketing Management, Sports Communications
Hometown: Garden City, Michigan

Smart Recycling Bin: Waste Wiz
Faculty Sponsors: Vicki Baker, Catherine Bruneteaux-Swann, Roy Mathews

Recycling in the United States faces numerous challenges, including low recycling rates and the contamination of bins with non-recyclable materials. These issues make the recycling process inefficient, with much of the waste still ending up in landfills. To address these challenges, improving recycling systems is essential for reducing waste, conserving resources, and protecting the environment.

McKinney

Meade

One promising solution is the implementation of smart recycling bins equipped with artificial intelligence (AI) to better sort waste and reduce contamination. These bins can automatically identify and sort materials into appropriate categories, making the recycling process more efficient. Additionally, they can send alerts when full, allowing for timely collection and reducing the risk of overflow. This technology is particularly beneficial in large-scale events, such as sports games, concerts, and festivals, where waste is generated in large volumes. Smart bins can ensure that recyclables are correctly sorted and disposed of in real time, improving the overall recycling rates at these events.
This research explores the potential of smart recycling bins to enhance recycling efficiency, particularly in large public events. It also examines the market opportunities and challenges related to scaling this technology. The findings provide insights into how AI-powered recycling solutions can contribute to more sustainable practices at events and encourage organizers to adopt environmentally responsible waste management systems.

Cindy Ávila '25
Major: Biochemistry
Hometown: Los Angeles, California

Comparing the Functionality of Putative Cullin Ring Ligase Adapter Proteins, PCMTD1 and PCMTD2
Faculty Sponsor: Craig Streu

Proteins are susceptible to various damaging influences that can compromise their structure and functionality. One type of damage is the formation of L-isoaspartyl residues which are a post-translation modification that destabilizes protein structures. The enzyme protein-L-isoaspartyl (D-aspartyl) O-methyltransferase (PCMT1) plays a key role in repairing these damaged proteins. Recent studies suggest that protein-L-isoaspartate O-methyltransferase domain containing protein 1 (PCMTD1), a closely related enzyme, may function similarly and have additional E3 ubiquitin ligase activity. Recent work has improved our understanding of the structure and function of PCMTD1, but a second, closely related protein, protein-L-isoaspartate O-methyltransferase domain containing protein 2 (PCMTD2), remains unexplored. We therefore sought to characterize PCMTD2 and compare its function to PCMTD1. We hypothesized that PCMTD2, like PCMTD1, functions as both a repair enzyme and an E3 ubiquitin ligase. Our study hopes to enhance the understanding of the functional roles of both PCMTD1 and PCMTD2. This could aid in comprehending why these two homologous proteins exist and could be of clinical importance.

Sponsored by: Amgen Foundation

Azookari

Yasmeen Azookari '25
Majors: Psychological Science, Sociology
Hometown: Reading, Michigan

Brinley McCaig '26
Majors: Anthropology,Sociology
Hometown: Ann Arbor, Michigan


McCaig


Olley

Alyssa Olley '25
Majors: Psychological Science, Communications
Hometown: Romeo, Michigan

Inside-Out Prison Exchange Program: Men and Masculinities
Faculty Sponsor: Scott Melzer

The Inside-Out Prison Exchange Program is an innovative educational initiative that bridges the gap between incarcerated individuals and college students, fostering dialogue and shared learning experiences. Founded in 1997 by Lori Pompa at Temple University in Philadelphia, the program brings together students from both prison and college environments to engage in discussions on key social justice topics, including mass incarceration, race, justice, and inequality. The program challenges stereotypes and promotes mutual understanding while encouraging personal growth for all participants.

At Albion College, the Inside-Out program has been implemented at the Cotton Correctional Facility in Jackson, MI since 2014. Participants like Yasmeen Azookari and Alyssa Olley have highlighted the transformative impact of the program on their personal and professional lives. Azookari, inspired by her interactions with incarcerated students, pursued an internship at the Calhoun County Youth Center, applying the insights gained from the program to help at-risk youth. Olley shared that the class profoundly changed her perspective, emphasizing the power of connection and mutual respect in fostering growth and learning.

The mission of Inside-Out is to create transformative learning experiences that emphasize collaboration, dialogue, and leadership in addressing social justice issues. By facilitating encounters between individuals from profoundly different social contexts, the program promotes a deeper understanding of societal challenges and empowers participants to take active roles in addressing inequality and injustice in their communities.


Bailey


Williams

Makayla Bailey '27
Majors: Biology, Music
Hometown: Marshall, Michigan

Amani Williams '26
Major: Biology
Hometown: Detroit, Michigan

Consequences of Declining Cacao Tree Populations
Faculty Sponsor: Sheila Lyons-Sobaski

Climate change has a negative impact on specialty crops; it can also cause severe droughts which can lead to declines in crop production. Droughts are one of the biggest factors impacting the loss of cacao trees, the plants that are the source of chocolate. The objective of our project was to inform others on how climate change directly impacts the food we eat, especially Theobroma cacao, the cacao tree. During Green Day at Albion College, we taught college students and community members about how climate change impacts the cacao tree using an informative poster, explaining the biggest factors impacting the health of the cacao tree. We assessed their learning using a short survey. Through these efforts, we hope that students will be more environmentally conscious in the future.

Makeba Bantu '25
Majors: Psychological Science, Communications
Hometown: Boston, Massachusetts

Unpacking ABA: A Critical Examination of Its History, Controversies, and Current State
Faculty Sponsors: Mareike Wieth, Shanti Madhavan-Brown

Applied Behavior Analysis (ABA) has become one of the most well-known and used therapeutic methods for individuals diagnosed with autism spectrum disorder (ASD). This study explores the history and evolution of ABA, its formalization, the controversies that have shaped the field, and its current state and practices. ABA has been found to significantly contribute to social, language, and communication development through early interventions (Lovaas, 1987), which are heavily supported by evidence-based research. Over 50% of children in ABA programs developed functional language skills within 1-2 years of therapy, compared to less than 10% in control groups (Smith & Iadarola, 2015). However, ethical concerns about its past uses of aversive techniques, overly intense therapy, the focus on 'curing' ASD, and other dehumanizing aspects during therapy have engendered a lot of discourse about its contributions to the perceptions of autism and its interventions (Wilkenfeld & McCarthy, 2020). In addition to examining the evolution and scientific foundations of ABA, this current project incorporates interviews with Behavior Technicians (BTs), Registered Behavior Technicians (RBTs), and Board Certified Behavior Analysts (BCBAs) as firsthand perspectives to provide insight into the current practices and realities of working in the ever-growing field of ABA. Using these interviews I will draw conclusions about common themes in regards to neurodiversity-affirming approaches used in ABA clinics, individualization of interventions, and the involvement of various support systems such as family in conjunction with treatment. Furthermore, these explorations will inform my future approach to behavioral therapy, emphasizing the importance of ethical, individualized, and client-centered interventions.

Egshiglen Batjargal '25
Majors: International Studies, Economics
Hometown: Ulaanbaatar, Mongolia

The Political Carbon Divide: Analyzing State-Level Emissions Over Three Gubernatorial Cycles
Faculty Sponsor: Azhar Uddin

This study examines the relationship between political governance and environmental impact across U.S. states. Environmental impact is measured using carbon footprints, while political regimes are defined by the dominant political party (Democratic or Republican) over the last three election cycles. Using state-level data, a multiple regression model evaluates whether the political party in power correlates with a state's environmental performance, shedding light on the political dynamics of carbon emissions.

This research is particularly significant given the urgent need to address climate change and develop effective mitigation strategies. By exploring how governance and political ideologies influence environmental outcomes, the study provides valuable insights into the role of policy decisions in shaping sustainability efforts. The findings aim to inform discussions on climate policy and offer guidance for aligning political leadership with environmental goals in the U.S.

Egshiglen Batjargal '25
Majors: International Studies, Economics
Hometown: Ulaanbaatar, Mongolia

Ethnic Identity of Mongolians in China
Faculty Sponsor: Midori Yoshii

As of 2024, six million ethnic Mongolians live in the People's Republic of China (PRC) while another three million reside in the independent state of Mongolia. Mongolians in Mongolia enjoy self-determination, but ethnic Mongolians in China face severe cultural restrictions under the strict assimilationist policies by the PRC. These policies, enacted in 2020, have limited the use of the Mongolian language in schools and public expressions of cultural heritage, and exerted pressure to adapt into the dominant Han Chinese culture. All of these threaten the survival of Mongolian identity within China. This research seeks to highlight the often overlooked cultural suppression that ethnic Mongolians endure in the so-called Inner Mongolia Autonomous Region (IMAR), revealing the reality of their daily struggles and their resilience in maintaining their unique cultural identity. Utilizing Mongolian language sources such as poetry, song lyrics, political comments by Mongolian statesmen and vlogs by the ethnic Mongolians in China, this study offers sentiments of Mongolians in China, both the hardships they face and their unwavering determination in preserving their cultural identity. For the analysis of the Chinese ethnic policies, this research relies on data and information from governmental sources based in the U.S. and U.K., non-governmental organizations for human rights issues, think tanks based in the U.S. and Germany, as well as Chinese government sources. As a conclusion, this research calls for an end to the cultural suppression ethnic Mongolians face in China by raising international awareness.

Sponsored by: FURSCA, Bethune Fellows Student Research Endowment

Gerelmaa Batjargal '26
Majors: Accounting, Computer Science
Hometown: Ulaanbaatar, Mongolia

Landlocked Developing Countries' Trade Policy Analysis
Faculty Sponsor: Zhen Li

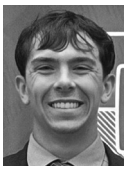
Landlocked developing countries (LLDCs) face significant trade challenges due to high transportation costs and limited access to international markets. This study analyzed trade patterns in 32 LLDCs from the 1990s to 2023, focusing on key indicators such as GDP, trade volumes, inflation rates, and tariffs. The research employed analytical tools like the Herfindahl-Hirschman Index (HHI) and product diversification index to evaluate the concentration of exports and reliance on a narrow range of products. The findings showed that many LLDCs are highly dependent on a small number of raw materials for export, making their economies vulnerable to market fluctuations and external shocks. The study also highlighted the positive impact of regional trade agreements (RTAs), membership in the World Trade Organization (WTO), and geographic proximity to major markets in facilitating trade. Based on these insights, the study suggests that LLDCs focus on diversifying their export bases, optimizing tariff policies, and making strategic investments in infrastructure and technology to encourage more sustainable economic growth. The results of this research offer practical recommendations that can help inform trade policies focused on improving market access and promoting greater economic stability for LLDCs.

Sponsored by: FURSCA, Bethune Fellows Student Research Endowment

Batjargal

Farkas

Kohler



Morrison

Potter

Gerelmaa Batjargal '26
Majors: Accounting, Computer Science
Hometown: Ulaanbaatar, Mongolia

Carson Farkas '27
Major: Finance
Hometown: Battle Creek, Michigan

Sarah Kohler '27
Majors: Economics, Public Policy
Hometown: South Lyon, Michigan

Mathilde Malherbe '25
Major: Business Engineering
Hometown: Paris, France

Brendan Morrison '26
Majors: Finance, Integrated Marketing Communications
Hometown: Saline, Michigan

Rachel Potter '27
Major: Psychological Science
Hometown: Springport, Michigan

Paul Rouas '25
Major: Business Engineering
Hometown: Paris, France

Alexis Vinhas '25
Major: Business Engineering
Hometown: Paris, France

Nicholas Wisniewski '25
Major: Business Engineering
Hometown: Paris, France

De-Stress Box
Faculty Sponsors: Roy Mathews, Vicki Baker

In today's fast-paced corporate environment, workplace stress has become a significant concern, impacting employee productivity, engagement, and overall well-being. To address this challenge, we introduce the AI-Powered De-Stress Box—an innovative, technology-driven solution designed to promote mental wellness in professional settings. This smart device integrates artificial intelligence with stress-relief techniques to provide personalized relaxation strategies tailored to individual needs.

The De-Stress Box utilizes biometric sensors to monitor stress levels, analyzing physiological indicators such as heart rate variability and skin temperature. With real-time data processing, the AI recommends and delivers customized interventions, including guided meditation, breathing exercises, mood enhancing light therapy, and soothing soundscapes. Additionally, it incorporates conversational AI to offer mindfulness coaching and supportive affirmations, fostering emotional resilience.

This presentation will explore the design, functionality, and benefits of the De-Stress Box, demonstrating its role in creating a healthier work environment. By incorporating well-being solutions, organizations can proactively support employees' mental health, reducing burnout and enhancing job satisfaction. The De-Stress Box serves as a practical, accessible tool for stress management, aligning with corporate wellness initiatives and fostering a culture of self-care.

With stress related workplace challenges on the rise, integrating AI technology into well-being programs represents a forward-thinking approach to employee support. This presentation aims to highlight how the De-Stress Box can transform workplace wellness, providing a simple yet effective method to cultivate a more balanced and productive workforce.


Cummings

Phillip Betz '26
Major: Biology
Hometown: Albion, Michigan

Azaria Cummings '28
Major: Biology
Hometown: Albion, Michigan


Gilbert

Margo Gilbert '26
Major: Environmental Science
Hometown: Ortonville, Michigan

Audrey Kauk '26
Majors: Biology, Anthropology
Hometown: Shelby Township, Michigan


Kauk

Katie Woerner '26
Major: Environmental Science
Hometown: Grosse Pointe, Michigan


Woerner

Invaders and Native Species: Using Metabarcoding to Compare Microbiomes of North American & European Blue Crabs
Faculty Sponsor: Abigail Cahill

Maintaining a balanced microbiome is essential for crabs' health. An unhealthy microbiome can lead to epizootic shell disease (ESD), which causes bacterial lesions and infections of the carapace. Blue crabs (*Callinectes sapidus*) are an important species along North America's Gulf and East Coast but have recently been introduced to the Mediterranean Sea. It is unclear how this new environment, with new biotic and abiotic factors, has affected the crabs' microbiome. DNA was extracted from the carapace of individuals infected with ESD in the Mediterranean, from areas with bacterial lesions on the carapace, and from other areas unaffected by the disease. A PCR and genotyping of the 16S barcoding gene were then conducted, followed by bioinformatics to compare the microbiomes of native and introduced populations. To our knowledge, this is the first study to compare microbiomes of blue crabs in native and introduced populations.

Sponsored by: Albion College Biology Department


Bolde

Zosia Bolde '25
Major: Chemistry
Hometown: Traverse City, Michigan

Ava Emary '25
Major: Biology
Hometown: Lake Orion, Michigan


Emary

Alexandra Hays '25
Major: Biology
Hometown: Watervliet, Michigan


Hays

Genetic Mapping and Characterization of a 6D.44 Mutation in* Drosophila melanogaster *Through the Fly-CURE Project
Faculty Sponsor: Ken Saville

The fruit fly *Drosophila melanogaster* is a powerful model organism for studying fundamental biological processes, including cancer development. This study, conducted within the framework of the Fly-CURE (Fly Course-Based Undergraduate Research Experience) project, aimed to map and characterize a novel mutant in *D. melanogaster.* Comparative genomic analysis has revealed that *D. melanogaster* shares most of the known tumor suppressor genes and oncogenes with humans, reinforcing its utility as a model system for cancer research. FlyCure has previously identified several genes associated with tumor suppressor activity and oncogenesis. The specific mutation we will be analyzing is the 6D.44 mutation, which was identified in a mutant screen looking for an overgrowth phenotype in the eye. The mutation is also a homozygous lethal mutation. Our methods will involve repeating the genetic crosses to confirm the overgrowth in specific sections of the eye. We will then map the position of the mutation by complementation of deficiencies that cover chromosome 2R. Analysis of fly crosses that complement versus those that don't complement will direct us to the location of the mutation. Once the region is identified, candidate genes in the region will be further analyzed using molecular techniques and bioinformatics. This project not only deepens our understanding of the genetic mechanisms underlying cancer but also demonstrates the effectiveness of the Fly-CURE approach in enhancing undergraduate students' research skills and fostering scientific inquiry. Our findings will contribute to the growing body of knowledge in cancer genetics, while also empowering the next generation of researchers.

Zosia Bolde '25
Major: Chemistry
Hometown: Traverse City, Michigan

Effects of Ruthenium on the Selectivity of Asymmetric Hydrogen Transfer
Faculty Sponsors: Olaf Wiest, Kevin Metz

When the exact structure of a drug molecule can mean the difference between toxicity and the curing of an illness, it is

imperative to ensure efficient production of the correct drug molecule in high yield and accuracy. Electronic structure calculations of Ruthenium-catalyzed reactions can provide significant aid in determining the stereoselectivity of transition state systems that are vital in the synthesis of these drug molecules.

Noyori introduced his chiral Ruthenium complexes for asymmetric transfer hydrogenation reactions. Ligands have been worked on to increase the selectivity of this reaction. Ongoing work in the Wiest-Helquist group is being done to design novel ligands with phosphine and amine linkage to Ruthenium. Prior work by Hall et al. studied the configuration of the metal in these reactions. This work will examine the effect of the configuration of the metal on the catalyst proposed by the Wiest-Helquist group.

This comparison is built on the assumption that when the catalysts of both Ruthenium stereochemistries are in solution together they interconvert. Though this evidence is limited, there is no research to show that it does not occur.

In the future, the results of this study will be compared to those of an identical system with opposite Ruthenium stereochemistry, with the goal of determining if the structures compete in solution together. Competition will be determined by ΔΔG comparison, and if those numbers are roughly within 1.0 kcal/mol of each other, the structures will be determined to be competing.

Sponsored by: NSF Center for Computer Assisted Synthesis (C-CAS), University of Notre Dame

Larissa Botega '27
Majors: Economics, Computer Science
Hometown: Joinville, Brazil

Strengthening Ties: Strategic Communication Strategies for Enhancing College-Community Partnerships in Experiential Learning
Faculty Sponsor: Vicki Baker

What would Albion be without Albion College and what would the College be without the community? It is undeniable that one depends on the other, but unfortunately communication between them is not the most effective for both sides. Over eight weeks, I plan to talk to the staff and faculty of Albion College, as well as to entrepreneurs and residents of Albion, to elaborate a better and more strategic communication between them to help each other evolve. Specifically, I plan a deeper dive into how, and in what ways, experiential learning opportunities on campus can add a greater, more meaningful value for community partners and contribute to student learning.

Sponsored by: FURSCA, Gerstacker Funds

Bright

Cooper Bright '26
Major: Psychological Science
Hometown: Alpena, Michigan

Hannah Fife '25
Majors: Exercise Science, Kinesiology
Hometown: Roscommon, Michigan

Fife

Olivia Perfili '25
Major: Psychological Science
Hometown: Chesterfield, Michigan

Learning Iconic and Arbitrary Signs in American Sign Language
Faculty Sponsor: Andrea Francis

Perfili

This project examines learning iconic signs and arbitrary signs in American Sign Language. Iconicity occurs when there is a resemblance between the form of the communicative signal and the sensory-motor characteristics of its referent. In sign language, this would be an action that represents that word's action or a gesture that looks like the noun it is referring to (Ortega, 2017). Arbitrariness, on the other hand, refers to cases where the sign or sound of the word is arbitrary and does not have any relationship with the object or action it conveys.

Studies suggest that hearing adults often use iconicity to remember signs during the initial stages of learning sign language (Karadoller et al., 2024). This helps because iconic signs cue the learner to recreate the sensory-motor features of the referent. This benefit has been explained by the embodiment hypothesis, in which cognition is rooted in perception and action (Metayard et al., 2012). Based on the lack of spatial cues, arbitrary signs would be the most difficult to learn for hearing adult sign learners. Interestingly though, Rodriguez-Cuadrado and colleagues (2022) found that iconic signs facilitated learning abstract foreign spoken vocabulary. This experimental study compares learning iconic and arbitrary signs by manipulating the order in which the signs are taught to participants.

Brown

Boden Brown '25
Majors: Biology, Biochemistry
Hometown: Jackson, Michigan

Summer Gibson '25
Major: Biology
Hometown: Onsted, Michigan

Gibson

Optimization of an Enantioselective Aminoborane Catalyst for β-Amino Alcohol Synthesis
Faculty Sponsors: Clifford Harris, Craig Streu

Chiral amino alcohols are important molecules in a variety of consumer products. A variety of methods to produce chiral amino alcohols exist. However, they are often hampered by the requirement for toxic or expensive heavy metals or harsh reaction conditions. We outline a microwave-assisted method for the asymmetric production of chiral amino alcohols using an asymmetric aminoborane catalyst. This presentation looks at optimizing the parameters, including solvent, time, and temperature. for a microwave-assisted synthesis of chiral amino alcohols.

Sponsored by: Chemistry Alumni Fund, Josh Taylor Fund

Enkhmaa Buyanbadrakh ’26
Majors: Accounting, Computer Science
Hometown: Ulaanbaatar, Mongolia

Exploring Factors Behind the Significant Decline in Accounting Graduates in Recent Years and Strategies for Promoting Accounting Careers
Faculty Sponsor: Connie O’Brien

The American Institute of Certified Public Accountants (AICPA)—a nonprofit professional organization representing certified public accountants (CPAs) in the United States—reported in its recent 2023 Trends Report that the number of bachelor’s and master’s degree graduates in accounting had dropped significantly since 2021. This research focused on learning more about why the number of U.S. graduates with bachelor’s and master’s degrees in accounting has been declining and finding the influential factors for the significant drop in recent years. The study primarily examined historical trends and statistical data related to the enrollment and graduation rates of accounting majors across U.S. educational institutions. Quantitatively, it analyzed numerical patterns while considering factors such as changes in student preferences, economic conditions, and technological advancements that may have contributed to the observed decline. This study is crucial for informing educational institutions, industry stakeholders, and policymakers to help ensure the sustained growth of the accounting profession in the U.S. Through a comprehensive exploration, it aims to contribute to accounting education and the profession, with the goal of encouraging a revived and sustained interest in pursuing accounting careers in the United States.

Sponsored by: FURSCA, Clarence Christensen / FURSCA Faculty Challenge

Naomi Cloostermans ’25
Major: Environmental Science
Hometown: Saint-Pierre-de-Chartreuse, France

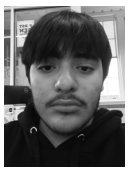
Annual Thrift Fair and Move-In/Out Sale To Reduce Waste
Faculty Sponsors: Thomas Wilch, Monica Day

This project was created in the Sustainability Projects class (ENVN 217/218). With this project we planned to coordinate and develop this year’s CSE Thrift Fair and develop a new Move In/Out Sale. The Thrift Fair is an annual sustainability initiative where students donate unused clothes, which are then sold at affordable prices to other students and the community. It promotes sustainable shopping practices, encourages reducing fast fashion waste, and fosters a community committed to environmental awareness. Additionally, the Move-In/Out Sale will allow outgoing students to donate gently used dorm items, which will be resold to incoming students at the beginning of the year. Both projects promote sustainability by reducing the waste generated on campus and providing affordable second-hand items to students and community members. Both events hope to make sustainability a tradition at Albion College, positively impacting both the environment and participants.

Sponsored by: CSE

Cooper

Elliot Cooper
Majors: Biology, Environmental Science
Hometown: Dallas, Texas



Izquierdo

Francisco Izquierdo
Major: Biology
Hometown: Chicago, Illinois

Exploration Into the Potential to Reintroduce Predators to Albion, MI
Faculty Sponsor: Sheila Lyons-Sobaski

A healthy, fully functioning ecosystem is critical for both humans and the biological communities that surround them. This project is focused on restoring the ecosystems and food webs in central Michigan. Specifically, we developed a restoration plan to reintroduce ecologically important species to the Greater Albion area. Since this plan involved helping the Albion community, we conducted outreach in several ways, including Albion College’s Green Day, to raise awareness of the importance of ecosystem health for human communities. Additionally, we worked with reporters from the Pleiad to publish an article on our work. To assess the effectiveness of our management plan, we conducted surveys on community approval of our program.

Crawford

Mia Crawford ’25
Major: Biology
Hometown: Wixom, Michigan

Dudenhoefer

Katherine Dudenhoefer ’25
Majors: Biology, Earth Science
Hometown: Harborcreek, Pennsylvania

Galvan

Caleb Galvan ’26
Major: Biology
Hometown: St. Louis, Missouri

Quimby

Noah McCollum ’28
Major: Biology
Hometown: Jackson, Michigan

Kathleen Quimby ’26
Major: Biology
Hometown: Coldwater, Michigan

Invaders and Native Species: Using Metabarcoding To Compare Population Structure in Introduced Blue Crabs and Their Microbiomes
Faculty Sponsor: Abigail Cahill

Blue crabs (*Callinectes sapidus*) are native to the North American Atlantic Coast, but recently have been classified as an invasive species off the French coast in the Mediterranean. Studies have shown the presence of bacterial infections in the North American crabs, but not in the Mediterranean blue crab populations. To compare the genetic structure of crabs and their microbiome, we conducted Polymerase Chain Reaction (PCR) on two genes: CO1 for eukaryotic material and 16S for bacterial material. We then used bioinformatics to look at genetic diversity and structure in crabs and bacteria. To our knowledge, this is the first study investigating the microbiomes of introduced blue crabs.

Sponsored by: Albion College Biology Department

Kelvin Crone-Willis ’25
Major: Environmental Studies
Hometown: Ferguson, Missouri

Relationships Between Stream Biogeochemistry and Land Cover Throughout Southern Michigan
Faculty Sponsor: Joe Lee-Cullin

The chemical composition of streams plays an important role in the health of ecosystems, the productivity of farmland, and the quality of our drinking water. It has been previously established that land cover in a region will affect the chemical composition of water within a stream. To characterize this relationship between land use and water within Michigan streams, we used samples of water chemistry taken from streams throughout the state and compared this to the National Land Cover Database. This study will fill a gap in freshwater science that exists due to a paucity of lowland stream network studies. Using ArcGIS Pro, we derived surface watersheds from sampling sites and established the composition of the land cover within each watershed. We then used R-Studio to generate spatial models that show the most important variables within the stream system based on the surrounding land. We used Moran’s I to determine spatial autocorrelation within a suite of models derived from our sample area. Moran’s I determined there were significant levels of correlation and therefore we used mixed regressive-spatial autoregressive modeling to account for the geographic correlation within our variables. Once we had established the models we used Akaike’s Information Criteria and pseudo R-squared values to establish best-fit models. These models will boost understanding of chemical cycling within Michigan surface waters and the relationship that our water systems have to anthropogenic landscape changes.

Kelvin Crone-Willis ’25
Major: Environmental Studies
Hometown: Ferguson, Missouri

Mapping the Life and Works of Holling Clancy Holling
Faculty Sponsor: Nels Christensen

Holling Clancy Holling was an author and artist who wrote and painted throughout the mid-twentieth century. Known for his imaginative children’s books, Holling often features rich environmental information about North America in his work. This project analyzes Holling through an environmental studies lens by focusing on the intersection of humans and the environment within both his books and the story of his own life. Holling’s interdisciplinary approach to environmental storytelling emphasizes the importance of the environment in the development and continuation of human culture while also recognizing the effects human societies have on the environment. Inspired by Holling’s own multi-media style, as well as his (and my) love of maps, I employ ArcGIS Story Maps and its accompanying suite of interactive mapping tools to craft an experience that explores and reflects Holling’s life and works. Within this interactive map, Holling’s biography and his representations of people and their environments provide insight into current environmental issues. An important aspect of this intellectual exploration is Holling’s relationship with Indigenous peoples. Holling deeply respected and valued Indigenous communities, yet his books consistently ignore the legacy of colonial exploitation faced by Indigenous Americans. Examining the relationship between Holling’s representations of Indigenous peoples and his portrayals of the environment opens the door to understanding the role representations play in shaping understanding of nature and society. This project hopes to draw important insights from Holling’s work into the intersection of people and nature that can help us better understand ways to solve today’s complex environmental problems.

Sponsored by: FURSCA, Harriet E. Elgin ’36 Endowed Fellowship

Crone-Willis

Kelvin Crone-Willis ’25
Major: Environmental Studies
Hometown: Ferguson, Missouri

Duenas Lopez

Melany Duenas Lopez ’27
Major: Biology
Hometown: Dallas, Texas

Newman

Eli Eubank ’27
Major: Environmental Science
Hometown: Gaylord, Michigan

Quimby

Miles Newman ’25
Majors: Biology, Communication Studies
Hometown: Rolesville, North Carolina

Hope Wolf ’26
Major: Biology
Hometown: Marshall, Michigan

Invaders and Native Species: Using Metabarcoding to Compare Diseased and Healthy Microbiomes of Blue Crabs in North America and Europe
Faculty Sponsor: Abigail Cahill

Blue crabs (*Callinectes sapidus*) that are native to North America have been increasingly found within the waters of the Mediterranean Sea. Within these invasive populations, we have found instances of Epizootic Shell Disease (ESD). ESD is a bacterial disease that affects the carapace of arthropods. Previous research has suggested differing microbiomes within the carapace of infected arthropods and healthy ones. We used metabarcoding techniques, including PCR and bioinformatics, to examine the genetic data between the microbiomes within samples taken from crabs, those without ESD, and those affected by the disease. The samples were taken from the Mediterranean and North America; the healthy were in both samples and the sick were just from the Mediterranean samples. To our knowledge, we are the first team to study ESD in introduced populations of blue crabs.

Sponsored by: Albion College Biology Department

Serenity Dean ’25
Major: German
Hometown: Port Huron, Michigan

***Comparing the German Epic Poem* Das Nibelungenlied *to* Game of Thrones: House of the Dragon**
Faculty Sponsors: Perry Myers, Holger Elischberger

My thesis explores the thematic and narrative parallels between *Das Nibelungenlied*, a seminal work of Germanic epic poetry, and *Game of Thrones: House of the Dragon*, a popular fantasy television series by George R.R. Martin. Both works are deeply rooted in the traditions of medieval heroism, familial conflict, and the pursuit of power, while also being marked by their portrayal of tragic fates. At the heart of *Das Nibelungenlied* lies the story of Siegfried, Kriemhild, and the deadly consequences of betrayal and vengeance. These themes resonate in *House of the Dragon*, where the Targaryen dynasty is torn apart by internal strife and the conflict for the Iron Throne. The exploration of the corrupting nature of power is evident in both narratives, where characters often seek control at the cost of their personal relationships and integrity. Both *Das Nibelungenlied* and *House of the Dragon* are the tragic inevitability of fate, and the idea that the thirst for power can obliterate noble ideals and familial bonds. Additionally, I investigate the role of women in these narratives—Kriemhild's quest for revenge in the *Nibelungenlied* and Rhaenyra Targaryen's struggle for the throne in *House of the Dragon*—highlighting how female characters navigate and manipulate patriarchal systems. My analysis demonstrates how both the medieval epic and contemporary fantasy series offer a rich tapestry of human emotion, moral complexity, and political intrigue, linking the past to the present in their portrayal of the timeless struggle for power and justice.

Diment

Delaney Diment '25
Major: Biology
Hometown: Clio, Michigan

Ali Murray '26
Major: Biology
Hometown: Dearborn, Michigan

Murray

Valeria Molina '26
Major: Biology
Hometown: Dallas, Texas

Genetic Mapping in Drosophila
Faculty Sponsor: Ken Saville

Molina

Cancer is one of the most significant challenges in health today, driving the need for genetic insights to understand its mechanisms. This study aims to investigate the Drosophila flies as a model for mapping genetic mutations responsible for uncontrolled cell growth, thus ultimately forming a basis for cancer development. The mutation investigated in this study (6D.44) was identified in a mosaic mutant screen designed to identify cellular overgrowth in the Drosophila eye. Similar work has led to the identification of several cancer genes, including the hippo gene, which was shown to control cell growth, as well as programmed cell death, or apoptosis. By performing mapping crosses we will map the 6D.44 mutant to a specific chromosomal region, which will allow us to ultimately identify and study the underlying gene. We will cross-mutant flies with over 100 deletion strains to identify and locate potential genes of interest. Drosophila serves as the ideal model in its genetic similarity to humans in cancer-related pathways. Overall, we hope to uncover novel mutations that mimic cancer mosaic genes by way of genetic mapping.

Fox Dionysus '25
Majors: Art, Art History
Hometown: Albion, Michigan

Sacred Forms
Faculty Sponsor: Shauna Merriman

Sacred Forms is a sculptural FURSCA project that aims to portray facets of identity and how parts of identity form. This project presents things like personal relationships, trauma, sex, and sexuality as being visible on the surface of a person to encourage the absence of shame in one's body, needs, and processing of grief. I aim to inspire a healthier relationship between mind and body, where the viewer can meet the self and embrace it lovingly and with clarity.

This project emphasizes the representation of genderqueer individuals, focusing on non-binary identities. Based on my experience as a genderqueer person, non-binary people are severely underrepresented and underappreciated in not only the art world but also the greater academic world. In addition, the importance of environmental sustainability is recognized through the intentional use of recycled materials in each sculpture and imagery, reflecting the natural world in harmony with human activity.

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

Kristina Dolgacheva '25
Major: Finance
Hometown: Ann Arbor, Michigan

Do U.S. Free Trade Agreements Affect CO2 Emissions of Partnering Countries?
Faculty Sponsors: Caroline Adamczyk, Zhen Li, Thomas Wilch

World trade as a percentage of global gross domestic product has more than doubled in the last five decades. Interestingly, global greenhouse gas emissions are also 40% higher than in 2000 and 55% higher than in 1990. This simultaneous influx has motivated a wealth of research on the relationship between international trade and environmental emissions. However, the results of such research are heterogeneous, causing debate on the effect of global trade involvement on carbon dioxide emissions. Studies on trade-emissions elasticity show CO2 emissions are the most consistently significant environmental emission positively correlated to trade. In addition, trade-emission elasticity differs qualitatively and quantitatively for developed versus developing nations. This paper analyzes the effect of Free Trade Agreements with the US on partnering nations' CO2 emissions using the volume of exports and imports with the US as an indicator of the impact on trade.

Joseph Dorsch '25
Majors: Mathematics, Economics and Management
Hometown: Bloomfield Hills, Michigan

Probability of Profitability for Stock Option Contracts
Faculty Sponsors: Mark Bollman, Vicki Baker, Darren Mason

Option trading is a subcategory within stock trading that only costs a small premium to purchase and allows an individual to set a target price for the underlying stock. If that stock hits its growth or recession target, then the Option may be executed to purchase the stock at a discounted rate. If it is missed, the Option only loses the cost of the premium. However, certain strategies don't execute the contracts, they focus on the cost of the premium. This trading is referred to as day trading or options trading. Many strategies are employed to price these contracts, one of which is the Monte Carlo Approximation Model. With this application, I plan on creating an easy-to-use platform to determine the chance of making a profit from trading options.

Katherine Dudenhoefer '25
Majors: Biology, Earth Science
Hometown: Harborcreek, Pennsylvania

Petrographic Analysis of Himalayan Schists
Faculty Sponsor: Carrie Menold

The Main Central Thrust (MCT) is a ductile shear zone that extends across the Himalayas and marks the fault boundary between the Greater Himalayan Crystallines (GHC) and the Lesser Himalayan Sequence (LHS). Due to the nature of this thrust fault, the GHCs are being stacked on top of the LHS despite their older age and higher grade of metamorphism. Samples were collected in central Nepal along the Marsyangdi River from Manang (above the MCT) to Bhulbhule (below the MCT). Through thin section analysis, pressure and temperature conditions will be estimated. Determination of metamorphic conditions will be used to develop an understanding of how these rocks formed in the mountain building process including their formation and tectonic activity present. Comparison between the data collected from the samples and research papers on the Marsyangdi region will reveal if there are any inconsistencies. If the data is consistent, then no changes exist. However, if there are inconsistencies, then different forming conditions exist suggesting changes in tectonic activity.

Sponsored by: FURSCA

Dudenhoefer

Katherine Dudenhoefer '25
Major: Biology, Earth Science
Hometown: Harborcreek, Pennsylvania

Tessa Falan '25
Major: Environmental Science, Geology
Hometown: Ann Arbor, Michigan

Falan

Jesus Leana '25
Major: Environmental Studies
Hometown: Minneapolis, Minnesota

Anaka R. McCoy '25
Major: Earth Science
Hometown: Jackson, Michigan

Leana

Abby Meade '25
Major: Earth Science
Hometown: Garden City, Michigan

McCoy

James Norvey '25
Majors: Communication Studies, Earth Science
Hometown: Battle Creek, Michigan

Brayden Rowley '25
Major: Geologic Science
Hometown: Grand Haven, Michigan

Rowley

Noah Zimmermann '25
Major: Anthropology, Earth Science
Hometown: Farmington Hills, Michigan

Mineral and Clast Mode Assessment of Lunar Pyroclastic Rocks from Apollo 17
Faculty Sponsor: Carrie Menold

Zimmermann

This year the Mineralogy and Petrology students assisted with the petrologic characterization of Apollo 17 lunar samples as part of NASA SSERVI CASA Moon project. The Center for Advanced Sample Analysis of Astromaterials from the Moon and Beyond (CASA Moon) team goals are (1) building the ancient lunar crust; (2) shaping the lunar crust through impact processes; (3) evolution of the ancient lunar mantle (>3.8 Ga); (4) origin, evolution and utilization of lunar volatile reservoirs; and (5) Preparing for sample return from the Moon by the Artemis program. The class partnered with Dr. Carrie Menold and scientists from Johnson Space Center to assist with goal (4). Their job was to develop a methodology to collect mineral and clast data on pyroclastic deposits collected near Shorty Crater during the last manned mission to the Moon. The two goals were to conduct accurate assessments of type and amount of each mineral and clast as well as identify and locate olivine crystals and metal droplets for future geochemical analysis. The samples are part of a 60 cm deep core collected at the famous "orange" dirt locality.

Sponsored by: NASA

Carson Dunn '25
Major: Computer Science
Hometown: Kentwood, Michigan

Predicting MLB Free Agent Contracts With Machine Learning
Faculty Sponsor: Mauricio Marengoni

As predictive modeling advances, teams and players can leverage these technologies to gain a competitive edge in contract negotiations and roster planning. This research enhances regression-based machine learning models, improving their accuracy and applicability in MLB free agency forecasting. By analyzing player statistics and historical contract data, the study evaluates predictive performance using metrics like mean squared error and R-squared values. Through preprocessing data techniques such as normalization, dimensionality reduction, and feature engineering, this research aims to generate accurate predictions for the 2024 free agent class. Building on previous MLB contract prediction research, this study utilizes regression models from Scikit-Learn, examines different data preprocessing techniques, and evaluates model performance against real-world signings.

Isabelle Endsley '26
Major: Combined Engineering: Physics
Hometown: Marshall, Michigan

Water Quality in Albion and Marshall: Can a Homemade Filter Reduce Metal Contaminants?
Faculty Sponsor: Demian Cho

Access to clean drinking water is critical for public health, yet contamination can occur even after municipal treatment. This research investigates the reduction of metal contaminants—iron, copper, zinc, and lead—in the tap water of Albion and Marshall, Michigan. Contaminants can enter drinking water through aging infrastructure and transportation, posing health risks to residents. A homemade water filter was developed, and water samples were collected from four locations in Albion and four in Marshall. These samples were then processed through the filter and tested to assess the filtration system's effectiveness in removing contaminants. The results indicated that iron and lead concentrations were generally higher in the filtered samples than in the control, suggesting that the filter was ineffective at reducing these metals. Copper levels showed minor reductions in some cases, while zinc concentrations varied, reflecting inconsistent performance. These findings highlight the need for further modifications to improve the filter's ability to remove contaminants. In addition to testing, this project aimed to raise awareness of water treatment challenges and explore potential solutions for communities facing water quality issues. The results highlight the complexity of water filtration and emphasize the need for continued research to improve treatment methods.

Sponsored by: FURSCA, Robert M. Teeter Research Fellowship Endowment

Kate Faglie '25
Majors: Psychological Science, Spanish
Hometown: Rochester Hills, Michigan

The Role of Trust in Understanding the Relationship Between Attachment Styles and Transphobia
Faculty Sponsors: Eric Hill, Holger Elischberger, Andrea Francis

The present study expands upon existing research linking transphobia to ideological constructs like conservatism and religiosity (e.g., Prusaczyk & Hodson, 2020; Kanamori & Xu, 2020) and explores a less-commonly examined factor: attachment styles. Bowlby's (1969) attachment theory suggests that early interactions with caregivers shape future relationship experiences. To date, no research has directly linked attachment styles with transphobia. However, there is some, although limited, research suggesting a connection between attachment and prejudice in general (see Carnelley & Boag, 2019 for a review). For example, Boag and Carnelley (2016) found that securely attached individuals showed less prejudice toward immigrants. My study examines whether attachment styles are associated with transphobia through their connection to trust. Rempel et al. (1985) suggest that trust is a key component in successful relationships, and Kros and Hewstone (2020) suggest that positive intergroup interactions reduce prejudice and increase trust. In the present study, one hundred thirty-six participants completed a questionnaire on their experiences with close relationships, attitudes toward transgender individuals, and levels of trust in people more generally. Contrary to my hypotheses, results indicated that individuals with greater comfort with closeness (a dimension of secure attachment) were more likely to view transgender individuals as confused about their identity. Additionally (and surprisingly) attachment anxiety correlated with rejecting beliefs that transgender individuals are deceptive about their identities. Attachment anxiety is the tendency to worry that others don't love us, or that they will leave us. So, it is possible these unexpected relationships might be due in part to some sort of social desirability pressure.

Aishat Fagun '25
Major: Biochemistry
Hometown: Lagos, Nigeria

The Legacy of Medical Racism: Examining Social Determinants, Maternal Mortality, and Healthcare Disparities Among African Americans
Faculty Sponsors: Bradley Rabquer, Katey Price, Marcy Sacks

Racial disparities in healthcare have persisted throughout United States history, disproportionately affecting marginalized communities, particularly African Americans. This thesis research conducts a cross-sectional analysis of these disparities, examining how systemic factors perpetuate inequities in healthcare access and outcomes. It begins by exploring the social construct of race in America, providing historical context through key periods such as the Civil War, Reconstruction, and the Civil Rights Movement, as well as broader socio-political influences on racial inequality. A central focus of this analysis is the impact of social determinants of health, including socioeconomic status, education, housing, and implicit bias, in shaping healthcare disparities. The research highlights historical cases of medical exploitation, such as the experiments conducted by J. Marion Sims and the Tuskegee Syphilis Study, to illustrate the long-standing medical mistreatment of African Americans and its lasting effects on trust in the healthcare system. Maternal mortality emerges as a critical and urgent consequence of these disparities. Through a case study analysis, this research further examines real-life instances of Black women who have lost their lives due to systemic failures in maternal healthcare. Finally, the research discusses current initiatives aimed at addressing and reducing maternal mortality among Black women while advocating for broader reforms to eliminate racial inequities in healthcare.

Aishat Fagun '25
Major: Biochemistry
Hometown: Lagos, Nigeria

Effect of Maternal Stressors on Prenatal Offsprings With Necrotizing Enterocolitis
Faculty Sponsors: Craig Streu, Clifford Harris

Necrotizing enterocolitis (NEC) is a severe condition characterized by the necrosis of intestinal tissue, primarily affecting premature infants with a mortality rate of up to 80% in severe cases. The condition's etiology is linked to an abnormal microbiome and activation of the toll-like receptor

4 (TLR4). This study hypothesizes that maternal stressors exacerbate NEC severity through increased intestinal injuries and higher mortality rates in mouse pups. To test this hypothesis, C57BL/6J and TLR4 knockout neonatal mice were subjected to maternal separation and gavage fed with infant formula mixed with pathogenic bacteria from a NEC-affected infant's stool. Control groups remained with their mothers and received breast milk. The severity of NEC was assessed through histological analysis, quantification of inflammatory cytokines (TNF-α) via qRT-PCR, and the observation of intestinal tissue changes using H&E staining and DHE fluorescence for oxidative stress. Preliminary results indicate that maternal separation leads to significantly higher NEC severity, evidenced by intestinal bubbles. qRT-PCR analysis showed a rise in TNF-α expression, indicating heightened inflammation. Furthermore, maternal stressors, including LPS injections, led to upregulation of TLR4, exacerbating NEC severity. TLR4 knockout mice subjected to the same stressors displayed reduced NEC severity, confirming the role of TLR4 in NEC pathogenesis. This study demonstrates that maternal separation significantly increases NEC severity in mouse pups through TLR4-dependent mechanisms. These findings highlight the critical role of maternal factors and TLR4 signaling in NEC development, offering potential targets for preventive and therapeutic interventions against NEC.

Tessa Falan '25
Majors: Environmental Science, Geology
Hometown: Ann Arbor, Michigan

Devonian Root Fossils in the Grand Canyon
Faculty Sponsor: Madeline Marshall

Sandwiched between major unconformities in the Grand Canyon is the Temple Butte Formation, a key unstudied rock formation. It comprises Devonian-aged carbonates and paleosols, as well as tree root trace fossils. In the succession of Paleozoic marine rocks of Grand Canyon, the Temple Butte stands out as being largely deposited in nonmarine conditions. My goal is to better understand the ancient environments and how these root traces came to be. For my project, I have been working to analyze thin sections from different stratigraphic layers in the Temple Butte, looking at their composition and the presence of root microfossils in each. In addition, I have been using ArcGIS Pro to map hypothesized ancient drainage patterns of the Grand Canyon by matching up exposures of the Temple Butte Formation incised valley fills along the Colorado River. By creating this map, we can potentially understand the extent of some of the earliest forests on Earth, the river valleys they occupied, and contribute to reconstructing these ecosystems of the Devonian time period in the Grand Canyon.

Sponsored by: FDC, John E. Warme Geology Fund

Foust

Melanie Foust '25
Major: Biochemistry
Hometown: Hillsdale, Michigan

Tricia Sankiewicz '25
Major: Biochemistry
Hometown: St. Clair Shores, Michigan

Sankiewicz

Synthesis and Evaluation of Enantioselective β-Amino Alcohols
Faculty Sponsors: Clifford Harris, Craig Streu

Our study of the reactions of simple cyclohexene oxide with lithium amine derivatives 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: Alumni Fund

Bayasgalan Gantulga '26
Majors: Biology, Economics
Hometown: Ulaanbaatar,Mongolia

Investigating the Impact of Seasonal Air Pollution on Public Health, Productivity, and Production in Ulaanbaatar, Mongolia
Faculty Sponsor: Zhen Li

In recent years, the Mongolian capital city of Ulaanbaatar has faced an issue that significantly affects the quality of life of its residents. Our research investigates the impact of seasonal air pollution on public health and economic productivity in Ulaanbaatar. We aim to quantify the economic costs of air pollution by developing a conceptual model to analyze its impact on labor productivity and public health statistics. Past studies have established the concerns of air quality in public health and the issue of air pollution in Mongolia. Our proposed study would allow us to connect these lines of research to determine the consequences of health-related productivity and production quality on seasonal air pollution.

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

Damion Gehres '25
Majors: Physics, Mathematics
Hometown: Elsie, Michigan

The EEG Simulation of Epileptic Seizures in an Artificial Neural Network
Faculty Sponsor: Demian Cho

Epileptic Seizures are a common brain disorder, however we do not know what causes them as the main clinical device used can't know which individual neurons are fired. The electroencephalogram (EEG) can only tell us the average electrical signal of an area of the brain. Thus, we will take the two main proposed causes of seizures known as the Supercritical Brain Avalanche and Neuron Synchronization and simulate them by creating artificial neural networks that allows us to see which neurons are fired. This is done by using a mathematical model for neurons. Then we simulate the EEG on them and thus can connect the event that caused the epileptic seizure to the signal shown by the EEG.

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

Gilbert

Margo Gilbert ’26
Major: Environmental Science
Hometown: Ortonville, Michigan

Delana Jaiyesimi ’26
Major: Biology
Hometown: Birmingham, Michigan

Jaiyesimi

Shaylaa Madine ’28
Major: Biology
Hometown: Dallas, Texas

Biodiversity Within Kalamazoo River Mnomen Beds
Faculty Sponsor: Abigail Cahill

Mnomen (wild rice) is an essential source of food for Indigenous people in the Great Lakes region, including the Nottawaseppi Huron Band of the Potawatomi (NHBP). The NHBP has embarked on a fusion of Indigenous knowledge traditions and Western scientific knowledge in collaboration with Albion College. Our project is connected to previous work that has included many Albion College students. Along the Kalamazoo River are many mnomen beds of varying sizes. Our overall goal was to understand the effects of size and other abiotic factors of the mnomen beds on the level of biodiversity found within the beds. Data was collected in June and July of 2023 from four sites with different-sized mnomen beds to examine the effects of abiotic factors, such as bed size, river depth, or water temperature, on factors such as community composition, species diversity, and abundance. Birch bark collectors, known as wigwasmkok, were deployed in mnomen beds close to Albion College’s campus to collect samples of invertebrates, which were then identified utilizing dichotomous keys. We hypothesized that larger mnomen beds in the Kalamazoo would be home to a more diverse community than smaller beds in other locations along the river. We also compared our results to previous results of composition and species diversity. Determining the impacts of abiotic factors on biodiversity will provide more insights into community relationships within the river, which is essential in the conservation efforts for mnomen and the broader Kalamazoo River ecosystem.

Sponsored by: Scholarship Assistant Program, FURSCA

Hannah Gillespie ’25
Major: Psychological Science
Hometown: Kalamazoo, Michigan

The Relationship Between the Three M’s: Mental Health, Music Mood Regulation, and Music Genre Preference
Faculty Sponsors: Shanti Madhavan-Brown, Andrew Christopher, Ji Hyun Kim

Preference for music genres is significantly correlated with the use of music as a mood regulation strategy (MMR). There is evidence that individuals seek out specific music genres for different MMR strategies, but the reason why is unclear. There have also been studies connecting neuroticism to the use of MMR. Neuroticism is a personality trait defined as a tendency to experience worry, sadness, and anger. As such, neuroticism has been linked to a higher risk of mental health diagnoses such as anxiety and depression. Personality traits have also been linked to a preference for certain music genres. For example, neuroticism has been positively correlated with intense music genres and negatively correlated with mellow music genres.

One hundred and one students taking an Introduction to Psychology course received class participation credit to complete surveys measuring music genre preferences, MMR, and facets of neuroticism (particularly depression and anxiety). Statistical analyses were used to analyze the correlations between each variable. Results indicated that higher levels of the depression facet were significantly related to a higher preference for intense music genres. The depression facet was also significantly correlated with the use of music to invoke a strong sensation. Additionally, this strong sensation MMR strategy was correlated with a preference for intense music. A hierarchical regression was used to further analyze these relationships. Implications of these results on mental health and mood regulation treatment will be discussed.

Nathaniel Golden ’27
Major: Chemistry
Hometown: Dallas, Texas

Pyrolysis of Wood Towards the Development of Sustainable Electrodes
Faculty Sponsor: Kevin Metz

Wood is a promising candidate for use as an inexpensive and sustainable electrode. Previous studies utilizing wood as electrodes have been limited to a few, specific wood types, for example, balsa or basswood. While these woods are commonplace there is no clear reason as to why studies have been limited to them. These limitations have caused a gap in knowledge as it pertains to a diverse selection of wood types. Expanding the use of pyrolysis to a variety of woods will both maximize sustainability and limit cost as it will allow local wood sources to be used. This study examined and evaluated the use of basswood, oak wood, and maple wood as precursors for electrode development. The wood samples were washed in ammonia, oven-dried, and then carbonized at high temperatures in a tube furnace. The activity as an electrode was characterized using cyclic voltammetry. In addition to our initial method, a thorough examination of the literature surrounding pyrolysis will be conducted to optimize our methodology. Our current findings will be presented.

Sponsored by: Albion College Chemistry Department

Max Griffin ’25
Major: Biochemistry
Hometown: Birmingham, Michigan

Synthesis of Multiple Azologue Versions of Tyrosine Kinase Inhibitors
Faculty Sponsor: Craig Streu

Recently the world of drug development has been flourishing as computational models have made discoveries in medical chemistry faster than ever. While new molecules are being proposed to fight against illness it is a much longer process to get those molecules to the market. After a lead compound is proposed it must be synthetically created in a lab for in vitro and in vivo testing. My lab specializes in the synthesis of azologue-containing molecules that

function as light-activated cancer therapeutics. We have been able to identify dozens of molecules that would serve as good candidates for an azologue version. It has been difficult to practically synthesize the molecules in the lab due to a variety of technical constraints, so improved azologue synthesis could prove to be pivotal in improving the lives of cancer patients. During my past four years in the Streu group, I have been able to successfully synthesize two cancer therapeutics and have worked on four distinct projects, all of which deal with azo-containing drugs.

Sponsored by: FURSCA, Strosacker Faculty Student Research Endowment

Naomi Gut '26
Majors: Creative Writing, German
Hometown: Oakwood, Ohio

Worth Remembering: Hazel
Faculty Sponsor: Danit Brown

I spent this past summer drafting a novel that explores the same story from two different perspectives. For writers, the choice of perspective is critical because the person telling the story determines how the reader sees the events of the plot. My thesis is the part of this story that is told by Hazel, a successful writer who is reflecting on an important relationship and how it changed her writing. Hazel's story is told a decade after the events she is describing and is an exploration of Hazel's realization that her ideas about relationships were formed in childhood and prevent her from making true connections with others. At the heart of this project is the way harmful cycles can perpetuate missed opportunities. In my presentation, I discuss my process and reflect on the choices I made about point of view, plot, characterization, etc.

Sponsored by: FURSCA, Richard L. and Barbara J. Meyer Student Research Endowment

Hardwick

Ella Hardwick '25
Major: Chemistry
Hometown: Seattle, Washington

Dana Parker '25
Major: Chemistry
Hometown: Madison, Wisconsin

Parker

Catalytic Methods for Bromate Remediation: An Exploration
Faculty Sponsor: Kevin Metz

Oxyanions have been identified as emerging contaminants in both municipal and environmental waters. Some enter water sources through anthropogenic means, while others form during water treatment processes. For example, when ozonolysis is used for water purification, many chemical byproducts are formed, including bromate. Bromate—an oxyanion of the common bromide ion—is a known carcinogen, thus its introduction during water treatment is problematic. While the concentrations of many of these contaminants remain below the Environmental Protection Agency's limit, they compound over time, leading to ever-increasing abundance. Many remediation methods have been proposed, but few address the reduction of bromate at environmentally relevant concentrations. This project explores the removal of bromate at environmental concentrations via catalytic reduction using different chemical and electrochemical methods. Metal nanoparticle-carbon microsphere composites and electroless metal deposition are leveraged as approaches for these modifications. Palladium incorporation has been the line of inquiry thus far, as palladium is a well-studied catalyst for this reaction. This project aims to develop sustainable catalytic systems for water remediation.

Sponsored by: FURSCA, Anna and Carl Weiskittel Endowed Chemistry Fellowship, Richard K. Vitek,'56 FURSCA Endowment

Isaac Hautala '25
Majors: Geology, Anthropology
Hometown: Caledonia, Michigan

Glauconitic Greens, Ancient Seas, What Does It Mean?
Faculty Sponsor: Madeline Marshall

The green clay mineral glauconite is prevalent spatially and temporally in sedimentary rocks, however, the conditions surrounding its formation remain ambiguous. Conditions such as water depth, energy conditions, and sediment input are highly variable with each occurrence of glauconite. Furthermore, glauconite at the microscopic scale varies in color, size, shape, and associated characteristics.
This study focuses on assessing glauconite at the outcrop scale and the microscopic scale to better understand what aspects of the ancient environment control the distribution and microscopic appearance of each individual glauconite grain. To do this, fieldwork was conducted on the glauconite-rich, Cambrian-aged (540 Mya) Tunnel City Group in WI and MN, which formed in the shallow seas that covered the Midwest in the past. In the lab, I analyzed 47 rock samples, identified 47,000 individual grains, and built a robust dataset of the characteristics of 5,117 individual glauconite grains. Analysis of this dataset has revealed trends in size, shape, abundance, and traits of glauconite linked to the environmental conditions within which the grains were formed. These trends will be used to develop a model of formative conditions of glauconite, to permit more robust predictions and interpretations of glauconite-hosting rock units. Preliminary results showed that the different shapes and abundances of glauconite are indeed influenced by the host bed's depositional conditions (e.g burrowed beds host more rounded glauconite grains, and massive beds host the most glauconite overall), and grain size is fairly consistent based on morphology and conditions, but varied by location.

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

Isaac Hautala '25
Majors: Geology, Anthropology
Hometown: Caledonia, Michigan

Mapping the Surficial Geology and Geomorphic Changes of the WNC and Calhoun County
Faculty Sponsor: Brad Chase

The goal of this project was to reconstruct the landscape surrounding the approximately 1,000- year-old Native

American (Geté Anishinaabe) archeological site within the Whitehouse Nature Center. In the last 200 years, the landscape of South Central, Michigan has undergone intensive human driven geomorphic changes such as the removal of forests to create farmland, the creation of dams and drainage ditches, sand quarries, and landfills. I began by conducting research on the landforms that shaped the modern environment, primarily glacial moraines and rivers. I then explored how these have been changed throughout the history of recent American settlement in Calhoun and Jackson Counties. These changes are represented through a series of maps created through ArcGIS.

Sponsored by: Albion College Anthropology and Sociology Departments

Alexa Heerema '25
Major: Biology
Hometown: Novi, Michigan

A Comparative Analysis of Commercial and Raw Meat-Based Diets in Canine Nutrition and Health
Faculty Sponsor: Abigail Cahill

Finding the ideal dog diet is a widely debated topic, with commercial dog food and raw meat-based diets (RMBDs) being two of the most common feeding methods. Commercial kibble is formulated to meet nutritional guidelines, offering convenience and consistency for pet owners. However, the high-heat extrusion process in its production depletes essential nutrients, including heat-sensitive vitamins, amino acids, and fatty acids, which may impact long-term canine health. In contrast, RMBDs retain their natural nutrient composition, providing better digestibility and higher moisture content. While these diets may offer better nutrient bioavailability, they also come with risks, including bacterial contamination and nutritional imbalances if not correctly formulated. Deficiencies in key nutrients such as thiamine, folate, and calcium can lead to severe health issues. I will examine the nutritional implications of both commercial and raw diets, evaluating their effects on canine well-being. While RMBDs provide more natural and bioavailable nutrients, a balanced approach incorporating high-quality kibble with fresh, whole foods may be the most practical and nutritionally sound solution. Tailoring a dog's diet based on individual needs and consulting with veterinary professionals can help ensure long-term health and overall wellbeing.

Samuel Helmbreck '25
Majors: Art, Earth Science
Hometown: Albion, Michigan

The Importance of Environmental Justice in a Comic Book
Faculty Sponsor: Emmeline Solomon

Greenview's Toil is a comic book that illustrates and provides narrative to the impacts, changes, and problems that can arise in both individual lives and communities as a result of environmental injustice. The story follows characters who are impacted by these issues and what actions and steps they have taken to solve them. The creation of this comic includes a variety of artistic and writing techniques such as drawing, script writing, storyboarding, using ink to create lines and shading, layouts, and other techniques used in the comic book industry. Much of the research and knowledge gained for this project took place during my time working as part of the Center for Sustainability and the Environment (CSE) Internship. This experience, art courses, and readings informed the creation of *Greenview's Toil*. This project was created and established through FURSCA in the summer of 2024. This comic book aims to tell a story and inform the reader of the importance of access to quality food, quality air, and community, as well as inform the reader about the impacts of environmental injustice and environmental racism/classism on citizens that fall victim to improper, dangerous, and inequitable environmental practices.

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

Phoebe Holm '25
Major: Psychological Science
Hometown: Albion, Michigan

Tech Savvy Seniors: Bridging the Digital Divide through Service and Experiential Learning
Faculty Sponsors: Lindsey Knowlden, Shanti Madhavan-Brown

Tech Savvy Seniors is a community-based program founded in 2023 by the Albion College AmeriCorps program in collaboration with several local community organizations. The program provides comprehensive technological assistance to older adults in the Albion community to help bridge the digital divide and support aging in place. As a member of the Albion College AmeriCorps program and through the Psychology Department's practicum experience I have served as the program coordinator, team lead, and volunteer for Tech Savvy Seniors. I have grown in multiple spheres of my existence: my academics, skills, professional development, and even my personal life and abilities. The purpose of this compilation of my research and experiences is to highlight the importance of intergenerational relationships and older adult-focused initiatives, the impact of service initiatives, and the importance of experiential learning opportunities in academic settings.

Sponsored by: AmeriCorps, Calhoun County Senior Millage

Maxwell Honiss '25
Major: Economics and Management
Hometown: South Lyon, Michigan

The Effects of Writing Styles on Feelings of Stress and Control
Faculty Sponsors: Andrew Christopher, Eric Hill, Steven Young

The act of self-reflection can affect the way we think about and interact with the world around us. For instance, a study completed at Eastern University found that in a sample of 101 student athletes, the reflection-based group saw large improvements in leadership qualities. However, there are many different forms of self-reflection that people can use on a daily basis. The current study analyzed the effect of directed self-reflective journaling

prompts on (1) self-reported feelings of stress and (2) the perceived role of effort, ability, context, and luck on educational outcomes. One hundred eight students at Albion College participated in this study during the Fall 2024 semester. Each student first signed a consent form and provided demographic information. They next responded to the writing prompt to which they were randomly assigned. One group journaled about their feelings revolving around schoolwork that week; another wrote a directed to-do list of their academic tasks for the week; the third group wrote about their feelings related to their favorite foods; and the last group received no journaling prompt to serve as the control group. Following these prompts, participants completed a questionnaire analyzing their stress levels and a second measure of their perception of effort, ability, context, and luck in their academic achievement. We found that those who completed the to-do list also demonstrated higher levels of stress and felt that effort was the most important variable for academic success.

Hutchinson

Logan Hutchinson '26
Major: Biochemistry
Hometown: Scotts, Michigan

Tejal Richardson '26
Major: Biochemistry
Hometown: Saginaw, Michigan

Richardson

Synthesis of a Light-Activatable Checkpoint Inhibitor as a Targeted Chemotherapeutic for the Reduction of Unwanted Side Effects
Faculty Sponsor: Craig Streu

This study explores the synthesis of a light-activated checkpoint inhibitor as a targeted chemotherapeutic to minimize adverse side effects. Cancer cells have evolved mechanisms to evade immune detection, and chemotherapy works by stimulating the immune system to attack these malignant cells. The incorporation of a photoswitchable drug enables precise spatial activation, limiting toxicity to healthy tissues and enhancing treatment specificity. This approach holds promise for improving the efficacy and safety of cancer immunotherapy.

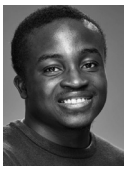
Sponsored by: FURSCA, Anna and Carl Weiskittel Endowed Chemistry Fellowship

Killeen Javorsky '25
Major: History
Hometown: Belleville, Michigan

Between Performance and Authenticity: Historical Gender Expression in Japan Through Manga
Faculty Sponsor: Krista Quesenberry

Discussions of gender identities in comics often center a Western perspective, overlooking the long history of gender non-normativity in visual art forms of the Far East. This digital literature review focuses on a range of manga series spanning different genres, all holding one thing in common—the representation of gender identities dated from the Edo period through post-World War II Japan. By reading a wide range of manga and critical works in gender studies, I have taken a step back to immerse myself in the visual world these characters live in to discern the growth in how these stories understood and represented gender.

Sponsored by: FURSCA, Strosacker Faculty Student Research Endowment



Daniel Jeremiah '25
Major: Biochemistry
Hometown: Abuja, Nigeria

Enantioselective Synthesis of Beta-Amino Alcohols
Faculty Sponsor: Clifford Harris

Over the years, the chemical and pharmaceutical industry has focused on developing drugs to treat medical conditions like atrial fibrillation. This condition, commonly known as Afib in the medical industry, is a heart condition characterized by irregular, fast rhythms and potential blood clot formation. Beta-blockers, many of which contain amino alcohols, are used to manage Afib. This project explores a green and cost-effective method to synthesize these drugs in a chiral manner, emphasizing minimizing allylic alcohol byproducts. Our research has advanced the study of meso-epoxide reactions with lithium amides using a chiral amine-borane catalyst. This work describes the influence of solvent and N-substitution variations on the allylic to amino alcohol ratio and the reaction efficiency. Additionally, we will describe the 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: FURSCA, Robson Family Fellows Endowment

Jeremiah

Daniel Jeremiah '25
Major: Biochemistry
Hometown: Abuja, Nigeria

Aniyah Lindo '25
Major: Biology
Hometown: Chicago, Illinois

Lindo

Ikatari Swope '25
Major: Biology
Hometown: Clinton Township, Michigan

Swope

***FlyCure: Mapping a Potential Cancer Gene Identified by Mutation in* Drosophila melanogaster**
Faculty Sponsor: Ken Saville

Drosophila melanogaster, commonly known as the fruit fly, is a valuable model organism due to its conserved cellular pathways with humans. It is widely used to study cancer-related mechanisms such as cell growth and apoptosis evasion. One approach to identifying potential cancer genes involves generating mutant clones in somatic tissues like the eye to observe abnormal cell proliferation. The Hippo signaling pathway, which regulates organ size by controlling cell proliferation and apoptosis, was discovered using this method. Mutations in key components such as *warts (Wts)* and *salvador (Sav)* cause excessive tissue growth and reduced apoptosis, mimicking tumor development in humans.

The *Hippo (Hpo)* gene is crucial for understanding protein regulation within the caspase family, which is involved in apoptosis inhibition. In *Drosophila*, apoptosis inhibition is mediated by DIAP1, a protein that suppresses apoptotic pathways, ensuring cell survival and tissue homeostasis. Studies by Harvey et al. suggest that a mutant *Hpo* gene regulates DIAP1, with co-regulation by additional gene complexes.

To further explore these pathways, we performed a complementation analysis to map the *SD.66* mutant in *Drosophila*. A test cross with 100 flies was conducted to identify the mutant region, aiding in the identification of the specific gene. Tissue analysis, using the presence or absence of the adult eye, allowed us to examine mutant effects, contributing to a better understanding of apoptotic regulation and potential cancer gene identification

Jeremy Klooster '25
Majors: Integrated Marketing Communications, Psychological Science
Hometown: Ann Arbor, Michigan

The Effects of Music Tempo and High-Thrill Activities on Emotion and Brand Memory
Faculty Sponsors: Megan Hill, Katie Broekema, Andrew Christopher

The advancement of virtual reality (VR) technology has created a new era of social science research. This study adds to the growing body of work in this area by using a high-thrill VR experience to examine the influence of music tempo on participants' expressed levels of anxiety and decision-making, including their ability to remember musically congruent brand signage. The study's results will add to our understanding of the role music plays in both decision-making and brand recognition, with implications for how marketers may target and apply specific musical genres in high-anxiety, high-thrill spaces like amusement and theme parks.

Sponsored by: Albion College Communication Studies Gift Fund

Riley Kunkel '25
Majors: Environmental Studies, Political Science
Hometown: Eaton Rapids, Michigan

The Politics of Public Distrust in Environmental Science: Restoring Trust in our Scientific Institutions
Faculty Sponsors: William Rose, Milkessa Gemechu, Thomas Wilch, Midori Yoshii

As each day passes, so too does the severity of the climate crisis increase. As this happens questions from the general public naturally arise: "How is this happening?" "Where is the science?" "What can we do?" However, obtaining concise answers to these questions is difficult. There are many inconsistencies and discrepancies within scientific results. The goal of this research is to analyze relevant literature on the topic of public distrust in environmental science, identify why there is distrust, and identify new ways to ensure the general public has access to relevant scientific research. The climate crisis, being a multifaceted, interdisciplinary issue, is inherently complex which leaves the general public susceptible to misinformation whether it be through corporate interest, poor scientific communication, or political affiliation. By exploring the politics of public distrust in environmental science I developed a project that effectively addresses this interdisciplinary crisis.

Sponsored by: FURSCA, CSE, AmeriCorps, Julia Robinson Burd '31 Memorial Fellowship

Riley Kunkel '25
Majors: Environmental Studies, Political Science
Hometown: Eaton Rapids, Michigan

Simulating Climate Solutions: Unlocking the Power of En-ROADS
Faculty Sponsor: Thomas Wilch

Bridging the gap between real science and the general public has become increasingly challenging, especially recently as scientific institutions and scientists face growing political pressures. As the climate crisis worsens, it's important to find innovative ways to work around this problem and restore trust in science. The En-ROADS Climate Simulator is a perfect tool to help the general public better understand the science and factors behind the climate crisis. En-ROADS is an intersectional and interactive climate simulator developed by Climate Interactive, MIT Sloan, and Ventana Systems. It's grounded in the best available science, completely free, and highly user-friendly, making it accessible and easy for anyone to use, regardless of their background. I am trained in facilitating workshops using The En-ROADS Climate Simulator, and helping others to engage with it. My expertise in this simulation will allow me to organize grassroots events that help fellow students and the general public develop a deeper understanding of the climate crisis and how we can manage it in the years to come.

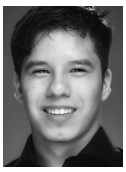
Sponsored by: AmeriCorps, CSE

Kevie Lamour '25
Majors: Political Science, Economics
Hometown: Cap-Haitien, Haiti

Beyond Legal Jargon: Fostering Legal Awareness in College Students through Reproductive Rights Cases
Faculty Sponsors: Jess Roberts, Krista Quesenberry, Bill Rose

This thesis explores the importance of raising legal consciousness among college students through an accessible and engaging approach to landmark abortion cases argued before the United States Supreme Court. Focusing on four pivotal abortion-related cases, the project rewrites these legal decisions using language and formats tailored to resonate with college students. By presenting these cases in a more relatable and compelling manner, the project aims to not only inform but also engage students with the legal principles, historical context, and societal implications of these rulings. The central goal is to foster an understanding of how legal decisions in general impact individuals' rights and freedoms, and why it matters for students to grasp their relevance in today's society. The thesis consists of two parts: the first is a document crafted for students, designed to raise legal consciousness through engaging presentation of abortion cases; the second is an analysis of the rhetorical choices made in creating that

document, explaining why this format is necessary for encouraging student engagement with legal issues and how it can empower students to navigate and influence the legal landscape.



Jesus Leana '25
Major: Environmental Studies
Hometown: Minneapolis, Minnesota

Petrology of Apollo 17 Lunar Samples 74001/2
Faculty Sponsor: Carrie Menold

This project supports the ongoing investigation of the NASA Apollo 17 sample core 74001/2 (Shorty Carter) by the NASA SSERVI CASA Moon team. The main objective of the Apollo 17 mission is to conduct extensive scientific exploration of the moon's surface by collecting geological samples, deploying surface experiments, and performing detailed surveying within the area of the Tarus-Lithow region (Shorty Carter). Samples 74001 and 74002 were selected to investigate the lunar regolith (moon dust) and lunar impact breccias (impact-formed rocks). These samples have been identified as useful in characterizing the volatile content of lunar volcanic rocks. The first step is carefully assessing the mineral and rock modes (volume %). To calculate the modes, I used the optical scans (PPL, XPL, RL) of thin sections from throughout the core as the samples are not allowed out of the Johnson Space Center. To accomplish this step, I created a documentation methodology, conducted volumetric analysis (point counting), and read scientific papers related to the lunar petrology of this set of rocks. The documentation will also allow us to identify potential minerals and clast analysis targets for the volatile study. We will share our results with the NASA CASA Moon team in a written report.

Sponsored by: NASA

Harper Lienerth '25
Majors: Mathematics, Computer Science
Hometown: Potterville, Michigan

TAPChecker: Checking AI-Generated Automation Rules
Faculty Sponsor: Mark Bollman, University of North Carolina - Charlotte

The integration of large language models (LLMs) in smart home systems holds significant promise for automating the generation of Trigger-Action Programming (TAP) rules, potentially streamlining smart home user experiences and enhancing convenience. However, LLMs lack a holistic view of smart home Internet of Things (IoT) deployments and may introduce TAP rules that result in hazards. This paper explores the application of LLM for generating TAP rules and applying formal verification to validate and ensure the safety of TAP rules generated by LLMs. By systematically analyzing and verifying these rules, we aim to identify and mitigate potential security vulnerabilities. Furthermore, we propose a feedback mechanism to refine the LLM's output, enhancing its reliability and safety in generating automation rules. Through this approach, we seek to bridge the gap between the efficiency of LLMs and the stringent security requirements of smart IoT systems, fostering a safer automation environment.

Sponsored by: NSF-REU

Aniyah Lindo '25
Majors: Biology, Educational Studies
Hometown: Chicago, Illinois

Salinity, Symbiosis, and Species Richness: An Ecological Genomics Approach to Microbial and Invertebrate Diversity
Faculty Sponsor: Abigail Cahill

In the Great Lakes region near Lansing, MI, the Maple River inland salt marshes are rare habitats created from salt deposits during the Silurian period. Understanding the genetic adaptation of microbial and invertebrate communities in these habitats can provide insight into evolutionary divergences in salt marshes and freshwater ecosystems. We examined salinity's influence on community composition by comparing microbial (16S rRNA) and invertebrate (COI) communities in salty and freshwater habitats. Using metabarcoding techniques, we compared intact and degraded marsh sites sampled in 2020 and assessed freshwater and saltwater sites from 2019, comparing them to earlier datasets from 2018. DNA was extracted using Qiagen soil kits, quantified with Qubit, purified, and amplified with PCR in triplicate for both COI and 16S rRNA. Metabarcoding sequencing was performed at Michigan State University. Species richness varied with salinity level, while high-salinity seep showed reduced genetic variation and inversely correlated to low-salinity seep with the highest genetic diversity. These findings provide insights that extreme salinity may constrain genetic variation much as intermediate conditions promote greater diversity and adaptive potential. Therefore, these patterns are vital for predicting ecosystem resilience to environmental changes and exploring microbial-invertebrate interactions for seasonal and biogeographical potential applications.

Sponsored by: FURSCA, Albion College Biology Department

Caroline Lippitt '26
Majors: Psychological Science, History
Hometown: Commerce, Michigan

The European Great Famine of 1315-1317: Encoding and Curating Pre-Modern Texts on Natural Disaster
Faculty Sponsor: Ian MacInnes

Because global climate change is likely to cause an increase in natural disasters in the coming years, it is crucial for scholars to research human reactions to natural disasters of the past. One such disaster was the European Great Famine of 1315-1317. This famine began when the beginning of Europe's Little Ice Age triggered one of the wettest three-year summer periods in Europe for over 700 years, creating flooding that resulted in crop failure. Up until that point, Europe had been experiencing a period of relatively mild climate known as the Medieval Warm Period, so the sudden climate change came as a great shock to the Europeans. With the ensuing famine came widespread starvation, which affected the lives of around 30 million people all across Europe. This project aims to make narratives about this natural disaster widely available to researchers and scholars by creating a list of primary sources from 1315- 1322 that pertain to the European Great Famine, transcribing and translating these primary sources, and then encoding them using TEI. TEI is a form of XML

encoding that is suitable for this project because it develops and maintains a standard for the represation of texts in digital form. The newly TEI encoded sources are then contributed to UnfortunateCreatures.org, a crowdsourced online database of pre-modern natural disaster narratives. This allows the primary sources to become searchable on the internet, which makes them much more accessible to those looking to research pre-modern natural disasters like the European Great Famine.

Sponsored by: FURSCA, Strosacker Faculty Student Research Endowment

Brianna Lopez '25
Major: Biochemistry
Hometown: Dallas, Texas

Iridium Catalyzed Asymmetric Secondary-Alkylation of Aldehydes
Faculty Sponsors: Craig Bieler, Guangbin Dong

Asymmetric synthesis is crucial in organic chemistry as it enables the production of chiral compounds. These chiral compounds are often applied in pharmaceutical and agricultural use for their effectiveness and safety. Chiral aldehydes play a prominent role in organic chemistry: due to their versatility, they can serve as essential building blocks in modern organic synthesis for preparing chiral compounds. Asymmetric alkylation of aldehydes is an ideal method for obtaining chiral aldehyde compounds. However, until recently, only primary alkylation has been achieved and no asymmetric secondary alkylation reaction has been reported for aldehydes. Here, using the directing group (DG) strategy, we achieved the iridium catalyzed secondary alkylation of aldehydes. By converting an aldehyde to an alkenyl pyrazole intermediate, we used terminal alkenes as the alkyl source and achieved a highly enantioselective and branched-selective alkylation. During the exploration, we also found an interesting alkene migration reaction that led to cyclic tetra-substituted alkene products. This reaction provided a new method to construct β-chiral aldehydes and simplified the synthesis of important intermediates in total synthesis.

Sponsored by: Leadership Alliance

MacDonald

Ian MacDonald '27
Majors: Biochemistry, Music
Hometown: Ann Arbor, Michigan

Reyes

Zoey Reyes '27
Major: Biology
Hometown: Palatine, Illinois

Tolsma

Patrick Tolsma '26
Major: Biology
Hometown: Jackson, Michigan

The Annotation of Several Venom Genes From the Parasitoid Wasp Ganaspis sp.
Faculty Sponsor: Ken Saville

The fruit fly, *Drosophila melanogaster*, is frequently infected with venom from various parasitoid wasps. During host infection, parasitoid wasps inject their venom and eggs into fly larvae, resulting in a suppressed immune response, and the developing wasp will eventually terminate the fly host. Genes within *Ganaspis sp*. that encode virulence proteins were identified by a transcriptomic-proteomic approach (Mortimer et al., 2013; Goecks et al., 2013). This research focuses on annotating several of these venom genes using a variety of software tools provided by the contributors of the Genomics Education Partnership (GEP) project, such as the UCSC Genome browser, tblastn, Gene Record Finder, FlyBase and Gene Model Checker, in order to facilitate the identification of gene models and their subsequent annotations. Understanding these genes will serve as a tool for researching the regulation of signaling events involved in the host/parasite relationship. With complete annotations of said genes, scientists can analyze the evolutionary correlations between gene structure and function and use this information in new areas of research.

MacDonald

Ian MacDonald '27
Majors: Biochemistry, Music
Hometown: Ann Arbor, Michigan

Ben Schlaff '27
Major: Biology
Hometown: Chicago, Illinois

Schlaff

Patrick Tolsma '26
Major: Biology
Hometown: Jackson, Michigan

Flycure Project
Faculty Sponsor: Ken Saville

Tolsma

Drosophila melanogaster is a powerful research tool for identifying genes in important cellular pathways, including those controlling cell division and cell death. One approach for identifying such genes is mosaic analysis where normal and mutant tissues are created in the Drosophila eye and differential growth rates are observed. This can be observed as the presence of normal eye tissue being marked with red color, while mutant tissue remains white. Mutations that cause the white tissue to be overproduced could indicate an oncogenic effect or show a survival advantage. One such genetic screen identified the Hippo (Hpo) gene and demonstrated its connections to the regulatory apoptotic functionality of the Warts (Wts) and Salvado (Sav) genes (Harvey et al., 2003)). We are investigating another mutant from this same genetic screen to find additional genes that could deregulate the cell cycle. The first step of the research process is to map the location of the mutation of interest by crossing mutant flies with a series of deletions missing specific chromosomal regions to identify the mutations' location on a specific region of chromosome 2R. After a candidate gene is selected in the genomic region, further analysis will be performed to determine if the candidate gene causes the overgrowth phenotype. Bioinformatics tools will be utilized to identify if there is an evolutionary relationship between the candidate gene and human homologs.

MacDonald

Ian MacDonald '27
Majors: Biochemistry, Music
Hometown: Ann Arbor, Michigan

Alex Zoschke '26
Major: Chemistry
Hometown: Coloma, Michigan

Zoschke

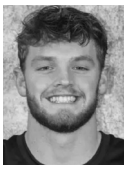
Progress Towards the Synthesis of a Photoswitchable BCR-ABL1 Inhibitor
Faculty Sponsor: Craig Streu

Chronic Myeloid Leukemia (CML) is a type of cancer originating when myeloid cells (cells in the tissue of the bone marrow) start dividing uncontrollably. These rapidly dividing cells become cancerous and enter the bloodstream. Chemotherapies have been developed to target these cancer cells, but they act systemically, affecting the entire body and often causing a range of adverse side effects. Ponatinib is a drug used to treat CML. Ponatinib contains an amide bond that can be synthesized into an azo bond, enabling the compound to change its conformation when exposed to ultraviolet light. This property is advantageous as it reduces the likelihood of harmful side effects and allows for the application of the drug to be targeted.

Jaylene Martinez '25
Major: Anthropology
Hometown: Bronx, New York

Mishandled Memories
Faculty Sponsor: Allison Harnish

Death is an inevitable aspect of life, yet it remains a topic often avoided in our society and is written off as taboo. This presentation, which focuses on one chapter of my Departmental Thesis, explores the complexities of death in the United States—specifically, the funeral industry—and how it compares to practices in other cultures around the world. The discussion to be had is centered around the financial burden associated with funerals, highlighting the high costs of cremation, burial, and other disposition methods, while also comparing this to the costs associated with these same methods in other countries. For this project, I studied scholarly literature related to rituals of death in various cultural contexts and reviewed multiple funeral home websites breaking down the costs they advertise, while operating under the guise of being the best choice for your late family members. I also rely on autoethnographic analyses of my own experiences with death and events that set me on my career path of becoming a mortician. Death, although a silenced topic in conversation, has been made into something akin to a cash cow by the U.S. funeral home industry. Grief is difficult as it is, and families in America deserve to mourn their loved ones without worrying about their impending debt. I aim in my future career to bring solace to grieving families, assuring an affordable and alleviating experience to allow them to feel at peace with their late family members passing on to the afterlife.



Owen McDaniel '25
Major: Business
Hometown: Kalamazoo, Michigan

Campus Cab
Faculty Sponsor: Stephen Young

This study aimed to explore how campus transportation affected students at two institutions in Michigan and explored my business idea, Campus Cab. Campus Cab is like the current Uber app where students could request a ride, and payment would be arranged through a payment system like BritBooks. Throughout the summer, I aimed to compile qualitative data to investigate the efficacy of offering this campus-wide transportation system to students. I wanted this study to investigate options for two campuses and to address the potential concerns of students attending those institutions. Albion College and Michigan State University were the two selected institutions. I had the business idea of creating Campus Cab and could see this idea as a potential solution for members of a college campus with limited parking. With many colleges currently attempting to address student concerns and improve retention, I believe this business idea could address both strategic initiatives. While the outcomes are not known, the feedback I have received from my classmates has been tremendous to date. As a business major here at Albion, I have had a few ideas for business start-ups. I truly believe Campus Cab could be an extraordinary business venture that could be applied to schools across America with similar parking challenges while addressing the concerns of today's college students.

Sponsored by: FURSCA, Gerstacker Funds

Madison McGraw '25
Major: Biochemistry
Hometown: Clarkston, Michigan

Synthesis and Reaction of a Novel Bidentate Warhead Ligand for Transition Metal-Based Kinase Inhibitor Screening
Faculty Sponsor: Craig Streu

Kinases have proven to be important drug targets. However, kinase inhibitors, like many other other drugs, often display a myriad of side effects, which often arise from off-target interactions. The major approach to addressing these side effects is the development of inhibitors that selectively bind the target or targets of interest. In the human body, there are about 500 kinases, each of these are a part of a cellular process that controls a specific pathway in the body. The ubiquity of kinases poses an especially daunting challenge for developing a selective inhibitor. Much progress has been made in this area, but for some targets, selectivity is still lacking. Fortunately, transition metal-based drugs provide a unique opportunity for interrogating three dimensional space within kinase active sites given their unique geometries. This presentation outlines the synthesis and testing of a novel bidentate warhead ligand for the production of a new class of transition metal-based kinase inhibitors.

Sponsored by: The Joshua Raymond Taylor Fund

Caemon McKeel '27
Majors: Psychological Science, Piano Performance
Hometown: East Lansing, Michigan

Wolfgang Amadeus Mozart: Piano Concerto No. 23 in A Major, K 488
Faculty Sponsors: David Abbott, Ji Hyun Kim

One of Mozart's most famous piano concertos, No. 23, showcases his operatic approach to his concertos. He is one of the greatest opera composers of the Classical Period and this concerto includes similar operatic aspects in its musical dialogue and dramatic musical, story-like structure. It includes memorable melodies as well as quick-moving ornamental passages and finishes with a traditional cadenza showcasing the performer's virtuosity. Mozart lived from 1756-1791 and wrote this piece near the end of his life in 1786.

As the winner of this year's externally adjudicated Albion College Concerto & Aria Competition, I have been selected to present a slightly abbreviated version of the first movement of this piano concerto, accompanied by piano, at the Elkin R. Isaac Symposium. I will also be performing the complete first movement with the Albion College symphony Orchestra on April 13th, at 4pm in Goodrich Chapel.

McLaughlin

Liam McLaughlin, '25
Major: Earth Science
Hometown: Erie, Colorado

Miller

Andrew Miller '25
Major: Environmental Science
Hometown: Sylvania, Ohio

Beese-Havens Boathouse Revitalization
Faculty Sponsors: Thomas Wilch, Nels Christensen, Emily Magyar

The Beese-Havens Boathouse is a unique feature of Albion College that has long provided the student body with the opportunity to get up close and personal with the Kalamazoo River. Additionally, the boathouse was used competitively by the Canoe & Kayak Team when they won four consecutive national titles from 2007 to 2010. However, in recent years, access to the river has been limited due to a lack of structure and community around the boathouse. Given its rich history, our team in ENVN 218: Sustainability Projects is working to revitalize the Beese-Havens Boathouse and build a community that's centered around recreational canoeing and kayaking.

During the 2024 Fall Green Day tabling event, our team gauged student interest in the boathouse and found that an overwhelming number of people would be interested in a canoe/kayak check-out service. With this in mind, we have been working with AmeriCorps and the Center for Sustainability and the Environment (CSE) to develop a boathouse manager position for students. On top of this, our surveys from Green Day also showed support for a club that focuses on the culture and history of boating, rather than competition. With hopes for continued student support, we are in coordination with faculty members Emily Magyar and Nels Christensen to begin regular programming as the weather clears up in the Spring 2024 semester.

By building a community, increasing awareness, and developing an AmeriCorps position, we hope to leave a lasting impact on Albion's campus. The revitalization of the Beese-Havens boathouse will not only honor its history but also encourage future generations of students to engage with the river, build aquatic skills, and experience the mental and physical benefits of outdoor activity.

Sponsored by: CSE

Nicholas Miller '25
Majors: Biochemistry, Mathematics
Hometown: Grosse Pointe Woods, Michigan

Activity of a Mutant Calcium/Calmodulin Kinase II δ Associated with Congenital Cardiomyopathy
Faculty Sponsors: Craig Streu, Rodney Levine

CAMKII are dodecameric enzymes that couple an increase in calcium to the activation of ion channels and gene transcription. CAMKIIδ, the dominant isoform in the heart, has a central role in intracellular Ca2+ regulation and modulation of excitation-contraction coupling. Under pathological stress, CAMKIIδ has been shown to activate hypertrophic and inflammatory transcriptional pathways, promoting apoptosis. CAMKII has a regulatory domain that auto-inhibits its kinase activity under resting conditions. The binding of Ca2+/CAM relieves the inhibition, and inhibition is restored as Ca2+ undergoes reuptake. A recent publication suggests that CAMKIIδ with a Arg275His mutation is involved in congenital cardiomyopathy in a newborn. They hypothesize that the histidine mutation interrupts the arginine interaction with Gln118 and Ala279– disrupting the enzyme's non-active state and inducing CAMKII overactivation. CAMKII overactivation is known to be related to heart failure and cardiomegaly. In this work, our goal is to investigate if the arginine to histidine mutation affects CAMKIIδ activation.

Sponsored by: National Institute of Health (NIH)

Nicholas Miller '25
Majors: Biochemistry, Mathematics
Hometown: Grosse Pointe Woods, 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 three 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.

Sponsored by: Albion College Chemistry Department

Vincent Miller '25
Major: Anthropology
Hometown: Round Rock, Texas

The Anthropology of Blood
Faculty Sponsor: Alli Harnish

Blood has always fascinated me—not just as a biological substance but as something that carries deep cultural, historical, and even supernatural meaning. Growing up obsessed with horror movies, skeletons, and forensics, I couldn't have predicted that one day I'd be earning college credit as I complete a course in phlebotomy and actually learn to draw blood myself. This project brings my personal, autoethnographic experience into conversation with two books that explore the power of blood from very different angles. In *Blood Work*, anthropologist Janet Carsten follows blood as it moves through hospitals in Malaysia, showing how it connects people through donation, bureaucracy, and medical labor. Meanwhile, religious studies scholar Gil Anidjar's *Blood: A Critique of Christianity* traces how the world's largest religion shaped Western culture's obsession with blood, from religious rituals to oppressive legal and political systems. Combining these perspectives with my own life encounters, I explore how blood isn't just something that keeps us alive—it's a symbol loaded with meaning, from ancient sacrifice to modern horror films, from lab work to vampire myths. Through this project, I want to understand how the way we think about blood today is shaped by both science and deep-seated cultural fears, and how training to become someone who draws blood professionally for medical tests, transfusions, and donation has made me see it in a whole new way.

Medha Mohan '25
Majors: Biology, Data Science
Hometown: Bangalore, India

Understanding the Downstream Signaling of Plureceptor in NK cells
Faculty Sponsors: Craig Streu, Brad Rabquer, Marc Roy

Chimeric Antigen Receptor (CAR) technology has revolutionized adoptive cellular therapy, demonstrating significant efficacy in hematologic malignancies. However, challenges such as systemic toxicity, antigen-negative relapses, and logistical constraints in autologous T-cell therapy necessitate alternative strategies. Allogeneic natural killer (NK) cells offer an attractive solution due to their innate cytotoxicity and lack of graft-versus-host disease (GVHD), making them suitable for off-the-shelf cellular therapy. Despite their therapeutic potential, NK cells exhibit limited antigen specificity, restricting their efficacy against tumors. To overcome this, we developed a multi-targeting engineered NK cell product, Plureceptor NK cells (CD16.iTCR.CD3.IL-15 NK cells), incorporating a novel CAR-like receptor — Plureceptor — that enhances tumor recognition by engaging multiple tumor-associated antigens. This engineered receptor integrates antigen-binding domains with NK cell-activating elements to improve specificity and cytotoxicity while maintaining NK cell function. In this study, we assess the ability of Plureceptor NK cells to recognize and eliminate diverse tumor targets, providing a robust and adaptable platform for next-generation immunotherapy. Our findings highlight the potential of multi-targeting NK cell engineering to address antigen heterogeneity and improve durable responses in cancer immunotherapy.

Aadhya Mohan '25
Majors: Economics and Management, Computer Science
Hometown: Bangalore, India

The Market's Reaction to M&A: A Study on Post-Acquisition Stock Returns
Faculty Sponsors: Vicki Baker, Roy Mathews, Azhar Uddin, Yuming Zhang

This study explores the impact of mergers and acquisitions (M&A) on stock performance by examining publicly traded firms that have undergone M&A within a specified period. The research compares the stock returns of acquiring firms to those of non-acquiring firms to determine whether M&A activity affects post-merger stock performance.
The dataset comprises firm-level financial and market data from a specific timeframe, providing a snapshot of companies involved in M&A alongside a control group of firms that did not engage in such M&A. To evaluate the effect of M&A activity and stock performance, regression analysis is applied while accounting for factors such as firm size, industry, leverage, and market conditions.
The study aims to enhance the understanding of whether M&A transactions generate short-term value for shareholders and whether stock market reactions align with existing theories on M&A efficiency, synergies, or overvaluation. The findings will offer valuable insights into the financial implications of M&A transactions, helping investors, corporate leaders, and policymakers make informed decisions.

Maria Nachivula '25
Major: International Studies
Hometown: Lusaka, Zambia

Expanding Access: Telehealth as a Solution for Zambia's Rural Healthcare Challenges
Faculty Sponsor: Midori Yoshii

This thesis analyzes the causes of challenges in the healthcare system of Zambia and explores potential solutions. The post-colonial policies and international agreements brought initiatives such as the National Health Insurance Scheme and contributions from non-governmental organizations have reduced healthcare inequities and disease burden over the years. Zambia's healthcare system, however, continues to grapple with issues such as inadequate infrastructure, workforce shortages, and disparities in healthcare access, especially in rural and underserved regions. This paper explores the potential benefit of bringing telehealth to alleviate the health iniquity in rural Zambia. Telehealth has emerged as an alternative solution to bridge the gaps in healthcare delivery by improving access to care, optimizing resource utilization, and addressing infrastructural limitations. The

adoption of telehealth into Zambia, however, still sees some obstacles such as high implementation costs, the lack of policy framework, and digital literacy gaps. By drawing on successful telehealth implementations in other countries such as India, this study recommends new strategies for the Zambian government: 1) establish a policy to prioritize telehealth implementation; 2) foster strategic partnerships; and 3) investing in digital infrastructure and education. With these new measures, this research argues, Zambia can revolutionize healthcare by making services more accessible and cost-effective. Beyond improving the healthcare system, it also plays a crucial role in fostering social equality, bridging the gap between rural and urban areas.

Ernest Njoroge '26
Major: Biochemistry
Hometown: Nairobi, Kenya

Progress Toward the Synthesis of Azo-Danuglipron
Faculty Sponsor: Craig Streu

This research focuses on synthesizing and applying light-sensitive molecules for therapeutic and biological pathway investigation. Azo-stilbene, known since the 1930s for its light responsiveness, is gaining traction for biomedical purposes. We identify biologically active compounds resembling azo-stilbenes but lacking light sensitivity, modifying them with light-sensitive azo groups while preserving essential functions. Engineered azo molecules respond to light, enabling precise binding control within cells. Some molecules remain inert until exposed to a specific light, potentially allowing on-demand activation. This field, emerging since 2010, promises advancements in photopharmaceuticals. Applications include targeted drug activation in illuminated tumor regions, reducing off-target toxicities. Progress in developing light-sensitive inhibitors across various domains is outlined, offering significant implications for health and scientific advancement.

Sponsored by: Robson Family Fellows Endowment

Rachel Adwoa Ntiako-Ennin '26
Major: Public Health
Hometown: Nsawam, Ghana

Understanding Eating Disorders: Causes, Effects, and Treatment Approaches
Faculty Sponsor: Bradley Rabquer

This project explores the complex nature of eating disorders and their effects on both mental and physical health. Eating disorders, such as anorexia nervosa, bulimia nervosa, and binge eating disorder, are influenced by many factors, including social pressures and beauty standards in the media. By reviewing 16 academic studies, this research examines the causes, consequences, and best treatment options for these conditions. The findings show that a combination of therapy, medical care, and nutrition counseling is the most effective way to help those affected. Early prevention and education are also key in reducing the impact of these disorders, especially in communities where they are often overlooked.

Inspired by a strong interest in public health and a goal of becoming an epidemiologist, this project focuses on the connection between mental health and eating disorders. Many people struggling with these conditions go undiagnosed, making it even more important to spread awareness. With guidance from faculty sponsor Bradley Rabquer, this research highlights the need for better treatment and prevention strategies. By sharing this information, the project aims to help improve public health outcomes and encourage future studies on eating disorders. The ultimate goal is to support better care and early intervention, helping more people get the treatment they need.

Isabelle

Isabelle Patel '25
Major: Biology
Hometown: Saginaw, Michigan

Iris Patel '27
Major: Biology
Hometown: Saginaw, Michigan

Iris

Progress Toward the Development of Nanobodies Targeting the Moonlighting Activity of S. aureus GAPDH via Directed Evolution
Faculty Sponsor: Craig Streu

Antibiotic resistance poses a substantial global threat to human health in all parts of the world. New resistance mechanisms are emerging and spreading globally. These mechanisms jeopardize our ability to combat common infectious diseases and necessitate new strategies for developing antimicrobial compounds. A potential strategy for developing new antibiotics is to target virulence factors, which can have several advantages over traditional antibiotics. One advantage includes targeting pathogenic bacteria in preference to commensal bacteria. Some virulence factors are known to be moonlighting proteins, which are defined by their multifunctional nature, in which a single protein performs multiple independent functions in different cell compartments. Moonlighting proteins often have integral roles in conserved metabolic processes, allowing them to 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 approach to target these moonlighting proteins involves using nanobodies. Nanobodies are single-domain fragments generated from camelid antibodies and offer the advantages of both small molecules and monoclonal antibodies, 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 techniques, enabling accelerated drug discovery efforts in response to emerging resistance mechanisms. This poster outlines the expression and purification of a moonlighting protein and putative virulence factor from S. aureus and its use in the directed evolution of next-generation antibiotics.

Sponsored by: FURSCA

Kaen Patton '27
Majors: Music, Psychological Science
Hometown: Troy, Michigan

When Duke Ellington Played Goodrich Chapel
Faculty Sponsor: Clayton Parr

On October 18, 1966, Duke Ellington and his band took the stage at Goodrich Chapel, creating one of Albion College's most significant historical moments. While he performed alongside the Albion College Choir, Ellington left a lasting impact on the college community and the city of Albion. This research explores the historical and cultural significance of Ellington's performance through archival research, interviews, and content analysis. By examining the civil rights themes embedded in Ellington's multi-movement works, Sacred Concerts and Black, Brown, and Beige, we can gain insight into his intended message for Albion College at this time of great social change in US history. As we listen to the firsthand accounts from alumni who experienced and participated in this event, we can begin to understand the emotional and cultural resonance this performance carried. It shows the transformative power of Ellington's music and what he hoped to change with it. Ellington's event on campus not only reinforced the relevance of jazz in the community but also served as a moment of inspiration for students and faculty alike. This research intends to honor the efforts of Dr. Dave Strickler, Albion's Choir Director. It was his dream and mission to bring world-renowned musicians and artists to Albion College, creating a tradition that holds strong today. His vision aimed to expose students to the diverse artistic experiences this world has to offer and Duke Ellington's visit did just that. We reflect on the legacy of Ellington's performance and its broader implications for music, civil rights, and education to honor this moment in Albion's history.

Sponsored by: FURSCA, Jean A. Taffs and Anthony J. Taffs Endowed Fellowship for Music Research

Owen "Zhongmin" Poling '25
Major: Computer Science
Hometown: Lancaster, Ohio

Stock Market Prediction Using NLP and Deep Learning: Analyzing Tesla Tweets with RNN and LSTM
Faculty Sponsors: Yuming Zhang, Vicki Baker, Mark Bollman

In a highly fluctuating stock market, predicting stocks is challenging because traditional human expertise often falls short in navigating its unpredictability. With the rise of artificial intelligence, machine learning and big data, innovative advancements are reshaping these challenges. In fintech, these technologies are already being used to develop an edge for investors. While numerous factors influence stock values, how can humans impact them through communication — with a single qualitative 'tweet'? This independent research will analyze the complete analytics of predicting the stock value of Tesla ('TSLA') using 'tweets' related to 'TSLA' from Twitter (now X) in 2020, recurrent neural networks (RNN), long short-term memory (LSTM), and natural language processing (NLP). By comparing this data to the actual stock movements in 2020, we can determine whether human communication through social media affects the stock markets.

Louis Raffaelli '28
Major: Biology
Hometown: South Range, Michigan

Amphibians as Indicator Species of Environmental Health
Faculty Sponsor: Sheila Lyons-Sobaski

Frogs, toads, and other amphibians are under threat of widespread extinction across Earth, including here in Albion. Problems that commonly affect the amphibians of Michigan are pesticides, road salts, other pollutants, habitat loss, chytrid fungal infections, and global warming, although that last one affects amphibians everywhere. Without them, their predators would begin to lose significant numbers, as some species' survival hinges on the presence of amphibian prey. Another notable reason to ensure the survival of amphibians is the fact that they feed on billions of insects each year, which would otherwise be feeding on crops, and in the case of the mosquito, on us. As our outreach project, we placed informational posters on available spaces around the Albion College campus detailing the ecological distress impacting amphibians and what can be done to conserve the amphibians of Michigan. We also presented our information on the need for amphibian conservation at the Green Day event on the Albion College campus. To assess this strategy, we surveyed participants using a short quiz created in Google Forms, which was accessed via a QR code associated with the posters and was also presented at the Green Day event. We hope participants will develop a better conservation ethic after learning how important amphibians are as indicators of environmental health.

Jana Rajab '25
Majors: Psychological Science, German
Hometown: Damascus, Syria

The Effect of Culture on Attitudes Towards Alcohol Use: Comparing Young Adults in Austria and the United States
Faculty Sponsor: Mareike Wieth

Cultural attitudes can shape individuals' perceptions and behaviors. Attitudes towards alcohol use vary across different cultures. Some cultures integrate alcohol into everyday life while others are more likely to restrict its use (Johnstone, Courtenay, & Girard, 2023). Laws related to alcohol consumption often reflect a culture's attitude towards the consumption of alcohol (Castro, Barrera, Mena, & Aguirre, 2014). Across cultures, young people are more likely to engage in heavy drinking episodes than adults and are also more likely to engage in risky behaviors while intoxicated (Health Education Research, 2017). This study investigates the relationship between culture and attitudes towards drinking by comparing young adults (18–24 years old) in the United States and Austria. Participants read one of two scenarios, the alcohol condition describing a car crash involving alcohol or the non-alcohol condition simply describing a car crash. Participants then completed a series of surveys assessing their attitudes toward alcohol consumption. Results indicate that U.S. participants in the alcohol condition were more likely to approve of heavy drinking compared to participants in Austria. Furthermore, U.S. participants in the alcohol condition also approved of heavy drinking more than U.S. participants in the non-alcohol condition. These findings suggest that when U.S. participants are primed with a scenario involving alcohol

they become more accepting of heavy alcohol use while Austrian participants' attitudes toward heavy drinking do not differ depending on the scenario. Possible differences between the two different cultures, including different alcohol laws and different acceptance of alcohol use in everyday life, may relate to this finding.

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

Brayden Rowley '25
Major: Geologic Science
Hometown: Grand Haven, Michigan

Investigating the Relationship of Biodiversity and Environmental Conditions in Idaho's Permian-Aged Rocks
Faculty Sponsor: Madeline Marshall

Around 260 million years ago in southeastern Idaho, there was once a shallow marine environment that critters of all shapes and sizes called home. However, during this timeframe, these little guys experienced some serious changes to their environment with shifts in nutrient and oxygen levels that can be typified by two distinct sedimentary units: the basal phosphatic, nutrient-rich Meade Peak Member, and the upper carbonate, well-oxygenated Franson Member. Samples chosen for analysis were selected based on their rock type and geographical location to capture spatial variation in environmental factors during this time. Through fieldwork, detailed microscopic analysis, and comparison of previous literature on the topic, I aim to assess the change in biodiversity and abundance of these ancient fossils to create a comprehensive paleoenvironmental story of this Permian Phosphoria Sea.

Sponsored by: David B. Jones Foundation, FDC

Omar Saeed '25
Majors: Physics, Computer Science
Hometown: Chicago, Illinois

Building and Implementing a Chess Playing System
Faculty Sponsor: Mauricio Marengoni

In this project, we built a chess playing system which comprises a vision system, a chess library, and a robotic arm. The vision system recognizes a move made and shares it with the chess library. The chess library decides on the best move to play and shares it with the robot, which executes the move, waits on the player to make the next move, and repeats the process. The chess library is integrated into the vision system and the vision system is mostly built. It needs to be able to recognize the board in an image as opposed to manual input. The robot came as a kit. Parts were assembled according to instructions and we are currently working on the program that controls the movement of the robotic arm. Right now we have two major issues with implementing this step: the sway, and an error in the result of the kinematics equations.

Sponsored by: FURSCA, Anonymous Donor

Schramm

Emma Schramm '27
Major: Biochemistry
Hometown: Kalamazoo, Michigan

Natalie Sweetland '25
Major: Biochemistry
Hometown: Ann Arbor, Michigan

Sweetland

The Purification of Flavivirus 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. 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), using Powassan virus as a model for the flaviviral system. Powassan virus was first identified in Powassan, Ontario, in 1958. Between 2011 and 2015, the Center for Disease Control (CDC) reported 53 cases of Powassan virus in the United States (Yale Medicine). Case numbers have steadily increased since the initial report given in 2011, with cases between 2016 and 2020 peaking at 141. The Powassan virus NS5 RNA-dependent RNA polymerase protein will be purified from a cloned copy of the protein gene overexpressed in E. coli. The NS5 gene contains the RNA-dependent RNA polymerase the virus uses to replicate its genome. NS5 serves two roles during the virus' replication and maturation. The clone contains the region of the gene that codes only for the polymerase function. We will use this protein to develop a biochemical assay to measure the effects of natural chemical modifications found in the virus' RNA genome. This research will aid in understanding how RNA modifications affect viral zoonotic transfer and human health. The results from this experiment will help reveal previously unrecognized molecular mechanisms which lead to species specific viral mutation and adaptation in order to better understand how to prevent the transfer of RNA viruses from animals to humans.

Sponsored by: FURSCA, Research Corporation, Orpha Leiter Irwin Fellowship & Bruce A. '53 and Peggy Kresge '53 Endowed Science Fellows

Alaina Shepardson '25
Majors: Environmental Science, Anthropology
Hometown: Jackson, Michigan

Developing an Interactive Website for the WNC Archeological Site
Faculty Sponsors: Joe Lee-Cullin, Brad Chase

The project is a part of a larger initiative to educate the community about Albion's Anishinaabe history. This started when former archeologist and anthropology professor Elizabeth Brumfiel uncovered several projectile points, pottery pieces, and stone flakes from an ancestral Anishinaabe archaeological site, located at the Whitehouse Nature Center. Recently, Dr. Brad Chase and his students

have picked up the task of researching and relocating the exact location of where these artifacts were excavated by Albion College students from 1979-2001. That's where I come in. Using ArcGIS Experience builder, I am developing an interactive map website. This will include a working map using current GIS data for the old excavation maps, archival information and artifacts, a brief history of the ancestral site, and a map of Michigan's land treaties.

Simpson

Mya Simpson '28
Major: Biology
Hometown: Philadelphia, Pennsylvania

James (JP) Spybrook '27
Major: Math
Hometown: Kalamazoo, Michigan

Spybrook

Intruders: the Muscovy Ducks
Faculty Sponsor: Sheila Lyons-Sobaski

An invasive species is a non-native organism that can be a major threat to the biodiversity and environment of an ecosystem in ways such as out-competing native species, spreading diseases, and preying on other species. Learning how to mitigate invasive species is very important to making sure that ecosystems can be successful. The specific problem that we are going to be addressing is the Muscovy Duck, which is an invasive species in parts of the United States. Muscovy Ducks are native to Central and South America, but were introduced in states like Florida, Texas, and Alabama. These ducks can be harmful to other species because they compete with the same resources as native duck species, can damage properties, and pass viruses. The objective of our outreach project is to spread more information about invasive species as a whole and, in particular, on Muscovy Ducks. We propose to educate different groups of people about this important topic such as presenting at Green Day, talking to friends that are student-athletes, and informing sorority members. At the end of our presentations, we administered a short survey to assess the learning about invasive species including what they think should happen to fix this issue. We hope that people will learn about invasive species and how to better conserve biodiversity.

Rhiannon Slotnick '25
Majors: English - Creative Writing, Sociology
Hometown: Detroit, Michigan

Negative Effects of Codependent Relationships Between a Disabled Parent and Their Child
Faculty Sponsor: Scott Melzer

Despite our society's focus on children's wellbeing, sometimes their health comes second to that of their parents. Research has widely documented how a child's disability impacts family relationships, but there is much less understanding of how a parent's disability impacts these relationships. Minor children may be expected to care for a parent, regardless of their own wellbeing, especially if the parent-child relationship is marked by a major power differential. This situation can create toxic codependent relationships that negatively impact the mental health of the child while they live together and beyond. My research examines the psychological impact on kids of unhealthy codependent relationships with parents, drawing particular attention to how these situations are largely invisible to and ignored by society.

Demetrius Smith '27
Major: Biochemistry
Hometown: Woonsocket, Rhode Island

The Purification of Full-Length Dengue NS5 Protein for RNA Transcription Assays
Faculty Sponsor: Christopher Rohlman

Dengue virus is a serious global health problem, causing millions of infections every year. At the center of this virus' ability to spread is a protein called NS5. This protein enzyme helps the virus copy its RNA genome and caps it to protect it while it grows inside host cells. My project is focused on purifying the full-length NS5 protein from the DENV1 strain to get a better understanding of how it works. By studying this, we can determine how chemical changes in the virus' RNA affect its ability to replicate and mutate. Understanding these interactions at the molecular level could help lead to new methods to control the spread of the virus and possibly develop better treatments. This research builds on previous work done in Dr. Rohlman's lab, where they have looked at how RNA modifications impact viruses like Dengue. I am expressing the NS5 protein in E. coli bacteria and using different purification methods like affinity, ion exchange, and size exclusion chromatography to isolate it. Once the NS5 protein catalyst is purified, I will conduct RNA transcription assays to see how RNA modifications affect the speed and accuracy of the modified RNA replication . This project will give us deeper insight into how Dengue operates and how we might be able to fight it more effectively.

Sponsored by: Research Corporation, Chemistry & Biochemistry Alumni Research Fund

Ikatari Swope '25
Major: Biology
Hometown: Clinton Township, Michigan

Dismantling the Myth: Examining Endometriosis in Women of Color—Barriers to Care and the Burden of Chronic Illness
Faculty Sponsors: Bradley Rabquer, Tammy Jechura, Ola Olapade

Endometriosis is a chronic inflammatory disease that affects approximately 190 million women and girls of reproductive age worldwide. It is characterized by pelvic pain, infertility, and the presence of endometrial-like tissue outside the uterus. Despite the high number of affected women, research on the disease remains limited, particularly regarding its causes, prevention, and treatment. Additionally, symptoms present differently among patients, leading to delays, misdiagnoses, and unnecessary treatments. This disease often results in a reduced quality of life and disruptions to social life, work, and education. While endometriosis is a global condition, research has historically focused on middle-class women of European descent, leaving a significant gap regarding its impact on women of color. This gap in research is often overlooked and underexplored.

My undergraduate honors thesis aims to raise awareness of how the disease manifests differently in women of color while also addressing the stigma and barriers they face. This literature review will explore how the disease presents differently in various populations, healthcare disparities, diagnostic delays, and cultural factors, providing insights to inform more accurate diagnostics and culturally sensitive treatment approaches. By addressing these gaps, my research will help improve healthcare outcomes and enhance the accuracy of diagnosis and treatment for all women affected by endometriosis.

Ikatari Swope '25
Major: Biology
Hometown: Clinton Township, Michigan

Connected or Isolated: Exploring Pond Isopods' Diversity to Reveal Potential Movement Between Neighboring Ponds
Faculty Sponsor: Abigail Cahill

Often overlooked, ponds support high biodiversity compared to larger bodies of water. Many organisms, including isopods, are crucial in nutrient cycling and serve as food sources for various species such as fish. Despite this, little is known about freshwater isopods such as their behavior to other organisms, and their movement between close proximity ponds.

Iyengar et al. studied predator recognition in benthic macroinvertebrates, including isopods, in six ponds at the Graver Arboretum in Bath, Pennsylvania. Some ponds naturally have fish but others do not; the authors placed a caged fish in each pond to observe isopod responses. Unlike the other invertebrates, the isopods did not avoid the predators. This possibly indicates that isopods have not adapted to avoid high predatory areas. An explanation can be maladaptive behavior resulting from gene flow occurring between fishless pond isopods migrating to ponds with fish.

For our experiment, we analyzed genetic diversity in isopod samples collected from all six of these ponds. After DNA extraction, we performed electrophoresis, followed by Polymerase Chain Reaction (PCR) to amplify the COI gene, ensuring we had enough genetic material for sequencing and comparison. COI is a commonly-used marker for genetic analysis. By examining sequence similarities and differences among isopods from different ponds, we aimed to determine whether gene flow was occurring between fish and fishless ponds, which could help explain the observed lack of predator avoidance behavior in isopods.

Melanie Symons '26
Major: Biochemistry
Hometown: St.Charles, Michigan

Biological Activity of BCR-ABL Azologues
Faculty Sponsor: Craig Streu

In chemistry, azologues are molecules that are switchable when exposed to a specific wavelength. Inserting an azologue unit into a drug is beneficial if used correctly and effectively because we can minimize the side effects that are experienced when undergoing the traditional cancer treatment. A technique using a light at the desired wavelength can be done where the cancer patient takes the drug and then a light is shined at the tumor location. Through this, the active form of the drug will mostly be present at the site of tumor, potentially resulting in killing fewer healthy cells and minimizing harmful side effects. Biological activity testing of the drugs in the lab is important because it is the first step of determining whether the synthesized drug will be effective against treating the cancer cells. In biological testing, leukemia cells are grown in an incubator and fed regularly. This is a process that happens all semester long while biological testing is ongoing so that there is a continual supply of the cells needed to run the actual test. When a flask of cells reaches a desired concentration, the cells can be split up amongst a well plate, putting the same amount of cells in each well. The drug in differing concentrations is then applied to those same wells. The plates are placed in the incubator, one in a light environment and the other in a dark environment. What is wanted to be seen is that the drug is more effective at lower concentrations in the light environment than in the dark environment, proving that the UV flashlight therapy can be an effective way to best treat a cancer patient.

Sponsored by: FURSCA, Orpha Leiter Irwin Fellowship

Amariah Talley-Woodson '25
Major: Art
Hometown: Saginaw, Michigan

Covered in the Blood
Faculty Sponsor: Emmeline Solomon

What makes a human different from a monster? Where do you draw the line between yourself and monsters? Under a white supremacist standard, we are conditioned to believe that what is "other" from normative society is inherently monstrous. Those who fit into the norm are human, and all of us who are extra-marginal exist on a spectrum of monstrosity – deserving of isolation, exploitation, and violence. Based on my research into the social other, I created a large-scale relief print that confronts the viewer with the (Western) dominant cultural narrative that incentivizes ignorance and complacency. The Biblical imagery I use parallels how the institution of white supremacy has manipulated Christian narratives and language to justify its authority, reframing systemic oppression as a natural divine hierarchy.

Sponsored by: FURSCA, Strosacker Faculty Student Research Endowment

Camila Tapia '26
Major: Economics
Hometown: Katy, Texas

Historical and Socioeconomic Impacts on Homes in Albion: Analyzing Home Repair Grant Data at the Albion Economic Development Corporation
Faculty Sponsor: Lindsey Knowlden

The Community Development Block Grant (CBDG) Housing Improving Local Livability (CHILL) program was introduced to the Albion Economic Development Corporation (AEDC) to provide homeowner rehabilitation and home repair assistance in Albion. Through my AmeriCorps service at the AEDC, I have assisted in executing the CHILL program and communicating with applicants to help meet their

needs. Through this experiential learning opportunity, I have developed skills such as communication, time management, conflict resolution, and data analysis.

Additionally, I investigated the historical and socioeconomic factors in Albion that influenced applicants' decisions to seek assistance. I evaluated whether demographics such as income, race, employment, and age as well as their home address play a role in the current condition of their home. By analyzing applicant information and data, I observed patterns and insights to highlight the importance of home repair grants and programs. The outcome of the CHILL program will also determine its impact on the Albion community.

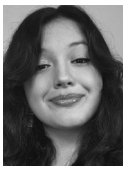
Sponsored by: AmeriCorps

Catherine VanderWeg '27
Major: Biology
Hometown: Portage, Michigan

***Conditions that Stabilize eccDNA in* Tetrahymena thermophila**
Faculty Sponsor: Marcella Cervantes

eccDNA is an extra circular piece of DNA found in humans and a wide variety of eukaryotes. In humans, eccDNA has a strong link to cancer and other diseases. My project uses the ciliate *Tetrahymena thermophila* to study eccDNA. In the ciliate, eccDNA is made during the rearrangement of chromosomes in development and the eccDNA is stably maintained. This is a continuation of Dr. Cervantes' work to learn how eccDNA replicates in *T. thermophila*. The goal of this project is to understand the conditions in which eccDNA replicates such as starvation or growth. The eccDNA isolation uses enzyme digestion, dialysis, precipitation, and resuspension. The experiment uses PCR and gel electrophoresis to confirm isolation of the eccDNA. Once we learn how eccDNA is stably maintained, we can further learn its function in *T. thermophila* which could help explain the purpose in mammalian cells.

Sponsored by: FDC



Maya Vonderau '25
Major: English Literature
Hometown: Pickford, Michigan

Moving On: A Collection of Gothic Horror Short Stories
Faculty Sponsor: Danit Brown

Gothic and horror literature have explored the depths of the human psyche for decades. Through the use of unsettling settings, supernatural circumstances, and intense, evocative language, these stories allow readers to confront the darker side of human nature and emotion, giving voice to hidden desires and repressed fears, while creating an unsettling uncertainty about the reality around us. In fact, the Gothic and horror genres often contain heavy social commentary on injustices that remain largely unspoken, forcing readers to engage with real societal anxieties in a way that is both fantastical and compelling. To pay homage to these themes, I have written a collection of my own Gothic, horror stories, drawing inspiration from renowned works such as Daphne du Maurier's *Rebecca*, Angela Carter's *The Bloody Chamber*, Charlotte Perkins Gilman's "The Yellow Wallpaper," as well as many others. By doing so, I hope to explore the depths of human emotion and societal pressures—particularly surrounding that of grief and recovery— using the Gothic and horror genres as a medium.

Katriona Voogd '25
Major: English
Hometown: Marquette, Michigan

The Modern Galatea: Play and Process
Faculty Sponsors: Zach Fischer, Stephanie Henderson, Ian MacInnes

Playwriting as a process was a mystery to me until I started to write my own. Like any creative process, it has its highs and lows, but rarely do you see the creators transparently acknowledge those moments. With my creative thesis, I aimed to explore the playwriting and new play development process through writing a full length play, as well as keeping a journal of that process to demystify for others what was a mystery to me.

This play is the first two-act play I have written. It is a modern retelling of the Greek myth of Pygmalion and Galatea where both Pygmalion and Galatea are female characters. I wanted to explore a version of the story that focuses more on the creator/creation relationship and the philosophy of human purpose, while moving away from the underlying sex based imbalance of the original myth. The presentation will consist of a brief exploration of the play's themes, adapting myth, and my writing process.

Hope Wasoski '25
Major: Kinesiology
Hometown: Bay City, Michigan

The Influence of Preferred Music Genre on Resistance Exercise
Faculty Sponsors: Ahalee Farrow, Heather Betz, Brad Rabquer

Music is widely utilized in athletic practices, games, meets, and commercial gyms today. Understanding how music influences exercise can optimize sports and exercise performance. Terry et al. (2020) suggested that music influences exercise performance through psychological, physiological, and psychophysiological mechanisms. The psychological mechanism influences affect, mood, and subjective feelings, and the physiological mechanism influences oxygen uptake, cardiac output, blood flow, hormonal response, and lactate clearance (Ballmann, 2021). In turn, these mechanisms also influence arousal, dissociation, and autonomic control of the psychophysiological mechanism during exercise from listening to music (Ballmann, 2021). Through the advancement of these mechanisms, much of the research has provided music as an ergogenic aid during varying types of exercise (Ballmann, 2021). These exercises include aerobic, anaerobic, and resistance exercises. Such research is essential as music can incentivize individuals during exercise to improve their performances. Improved fitness promotes healthier lifestyles and the prevention of chronic diseases such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, and osteoporosis (Warburton et al., 2006). We aim to provide a greater understanding of music's influence on exercise,

precisely resistance exercise, by filling in gaps in the current literature on music and resistance exercise. We hypothesize that particular but unknown preferred music genres will improve the strength-endurance performance (i.e., repetition volume, force, velocity, power) of a deadlift exercise and the performance of the handgrip dynamometer exercise. We also hypothesized that each participant's first preferred music genre will produce better performance results than their second and third preferred music genres.

Sponsored by: FURSCA, Albion College Kinesiology Department

Tailynn White '25
Major: Kinesiology
Hometown: Albion, Michigan

Tech Savvy Seniors: The Exploration of Technology on a Home Exercise Program
Faculty Sponsors: Heather Betz, Lindsey Knowlden

Sedentary behavior and isolation are very prevalent among seniors. I helped start the program Tech Savvy Seniors; which helps seniors connect to technology so they can stay connected to the world and their families. After passing down my role I wanted to take a deeper dive on how technology can help with physical activity. The purpose of this study is to investigate the exploration of technology on the benefits of exercise, the reduction of the barriers to exercise, the improvement of quality of life, and the well-being of seniors in the Albion Community.

Sponsored by: Build Albion Fellows

Victoria Wooley '25
Major: Exercise Science
Hometown: Bay City, Michigan

Assessment of Nutritional Knowledge and Dietary Intake in Division III Collegiate Athletes
Faculty Sponsors: Heather Betz, Ahalee Farrow, Christopher Rohlman

Proper nutrition is essential for the health, well-being, and performance of college athletes. However, research indicates that many college athletes follow poor dietary practices, potentially due to a lack of nutritional knowledge. The purpose of this study was to assess nutritional knowledge and examine in-season and out-of-season dietary intake among the Albion College men's and women's soccer and lacrosse teams to better understand the relationship between these variables. Athletes were asked to fill out a Sport Nutrition Assessment of Knowledge (SNAK) questionnaire and Automated Self-Administered 24-hour Dietary Recall (ASA24) once in the spring 2024 semester and once in the fall 2024 semester. The SNAK questionnaire assessed nutritional knowledge, while the ASA24 provided detailed information about dietary intake over the previous 24 hours. The findings of this study will help identify gaps in nutritional knowledge and offer insight into the dietary habits of collegiate athletes, potentially guiding future interventions to improve nutrition education, dietary practices, and overall athletic performance and health.

Ben Yeasting '25
Major: Environmental Science
Hometown: Chelsea, Michigan

Abandoning Civilization to Watch Birds and Climb Mountains for a Living
Faculty Sponsor: Thomas Wilch

All across the continent, bird populations are crashing. On the surface, the reasons are clear: climate change, habitat loss, human overexploitation. Dive a little deeper, though, and you'll see just how much there is left to be answered and accounted for in the race to save these incredible animals. Fifty-six applications and two interviews later, it's time to put boots on the ground. In 2024, I spent six months working as a field technician studying Pinyon Jays in the Great Basin and Black-backed Woodpeckers in the Sierra Nevada. Both species are integral to the existence of their respective ecosystems, and their future prospects are uniquely and inextricably tied to climate change. From frozen peaks and sheer cliffs to scorched forests and weeks off the grid in the most remote corners of the country, as our team motto grew to state: these birds… they ain't gon survey themselves.

Noah Zimmermann '25
Majors: Anthropology, Earth Science
Hometown: Farmington Hills, Michigan

Aristotle's Friendship
Faculty Sponsor: Jeremy Kirby

Aristotle wrote about friendship and its vices and virtues. He puts friendship into three categories: the useful friend, the pleasant friend, and the perfect friend. The perfect friend is held as a friendship of virtue, defined as a friendship between two virtuous people, one that wishes well upon their friend and shares in their virtues. The useful friendship and pleasant friendship are not grounded in virtue. The useful friendship is based on the relationship between two individuals who interact solely with one another because the other is useful. The pleasant friendship is one that is based on exchange of pleasant things between individuals. In my presentation I critically assess this taxonomy of friendship.

Alex Zoschke, '26
Major: Chemistry
Hometown: Watervliet, Michigan

Progress Towards the Synthesis of a Photoswitchable Inhibitor for Drug Resistant BCR-ABL Mutants
Faculty Sponsor: Craig Streu

Chronic myeloid leukemia (CML) and acute lymphoblastic leukemia (ALL) are cancers of the blood that affect tens of thousands of people in the United States alone. The main cause of the development of these cancers is the Philadelphia translocation, which causes the production of BCR-ABL fusion proteins in the affected cells. These BCR-ABL proteins lead to the replication of the cancerous cells, which then subsequently spread throughout the bloodstream of the body. One way of stopping this replication is to inhibit the effectiveness of the BCR-ABL protein via the introduction of a tyrosine kinase inhibitor (TKI). Though TKIs can be an effective tool for stopping the

replication of these cancerous cells, they are also known to have many negative side effects. One way to mitigate this flaw is to attempt to introduce an effective photoswitch into the drug. Among the most notable photoswitches known is the azo group. This functional group possesses the ability to be reversibly switched from the trans to cis conformation using specific wavelengths of light. Given that intermolecular drug binding is driven by a combination of electronic and shape complementarity, this isomerization can be accompanied by a change in bioactivity. This enables the drug to be selectively activated in the areas that are irradiated by light. This presentation describes the synthesis and testing of the next generation derivative of a validated BCR-ABL inhibitor that targets important resistance mutations.

Sponsored by: Chemistry Research Fund, FURSCA

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 162 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)
Katherine Hibbs (Marketing and Communications)
Lia Jensen-Abbott (Music, Director of Prentiss M. Brown Honors Program)
Renée Kreger (Associate Director of Prentiss M. Brown Honors Program and FURSCA)
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)

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 scholarly 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.

Elkin R.
ISAAC
ALBION COLLEGE
EST 1990
STUDENT RESEARCH SYMPOSIUM

by the Numbers

1990

The first symposium was held on April 20, 1990

544

Number of poster presentations 1990-2025

2,843

Number of students who have presented 1990-2024

118

Number of platform and poster presentations 2025

1,756

Number of platform presentations 1990-2025

162

Number of students presenting 2025

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