

Elkin R. Isaac  
Student Research Symposium  
Albion College



2017





# Albion College

## 2017 Elkin R. Isaac Student Research Symposium

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# The Twenty-Eighth Annual Elkin R. Isaac Student Research Symposium

Albion College | April 19-20, 2017

## SCHEDULE OF EVENTS

### Wednesday, April 19, 2017

7:30 p.m. Elkin R. Isaac Alumni Lecture: Nick Whitney, '00  
"How to Be a Shark Scientist (or Anything Else)"

Welcome: Mauri Ditzler, President

Speaker Introduction: Jeffrey Carrier, Professor Emeritus of Biology

*Towsley Lecture Hall/Norris Center 101*

*Reception immediately following the program  
Mitchell Museum, Norris Center*

### Thursday, April 20, 2017

9-10:15 a.m. Student Research Platform Presentations

Forum #1  
*Norris Center 100*

Forum #3  
*Norris Center 102*

Forum #2  
*Towsley Lecture Hall/  
Norris Center 101*

Forum #4  
*Norris Center 104*

10:45 a.m. Honors Convocation  
*Goodrich Chapel*

1:30-4 p.m. Student Research Platform Presentations  
*See locations above.*

4-5 p.m. Student Research Poster Session  
*Science Complex Atrium*

7 p.m. Joseph S. Calvaruso Keynote Address: Mary Jean Eisenhower  
"Supreme Allied Commander; President of the United States;  
Private Citizen"

Welcome: Mauri Ditzler, President

Speaker Introduction: Sydney Roeder, '17

*Goodrich Chapel*

*Reception immediately following the program  
Bobbitt Visual Arts Center Lobby*

## Elkin R. Isaac Alumni Lecture



### NICK WHITNEY, '00

Nick Whitney is a senior scientist with the Anderson Cabot Center for Ocean Life at Boston's New England Aquarium and is currently in residence at Newport Aquarium in Newport, Kentucky.

Born in Jackson, Michigan, he grew up knowing one thing about sharks: they eat you. By the time he finished high school—and after reading a lot about sharks—

Whitney was a bona fide shark nut and aspiring marine biologist. At Albion College, he learned the basics of field research, studying nurse sharks in the Florida Keys with Dr. Jeffrey Carrier. After graduating from Albion, Whitney pursued his master's and doctoral degrees at the University of Hawai'i at Mānoa, where he learned that sharks actually can be dangerous if you grab their tails and refuse to let go, or if you swim directly into their open mouths.

Whitney has spent the past several years developing the use of accelerometers that can sense sharks' fine-scale movements, measuring with great precision how they swim, tilt, roll, and dive. In the process, these tags are starting to shed light on a long-in-the-dark shark mystery: Although scientists have known where the animals go, they generally have had no idea what the sharks are actually doing when they go there. Whitney is using technology found in a wearable fitness tracker or smartphone to answer the "What are they doing?" question, and it turns out they are doing some surprising things.

The first to deploy accelerometers on wild sharks, Whitney has since used the tags on white sharks, sea turtles, Burmese pythons, and several other species. He has published numerous scientific papers, magazine articles, and encyclopedia articles, and has appeared on television on the History Channel, the Discovery Channel, and the National Geographic Channel.

Whitney received the "Top 10 in 10" Young Alumni Award from Albion College in 2010. He lives in Cincinnati, Ohio, with his wife of 16 years, Holli (Mezeske), '99, and their three children.

## Joseph S. Calvaruso Keynote Address



### MARY JEAN EISENHOWER

Mary Jean Eisenhower was born in Washington, D.C., during her grandfather Dwight D. Eisenhower's first term in office as president of the United States. She was christened in the Blue Room of the White House and grew up in Gettysburg, Pennsylvania, close to the Eisenhower Farm, where President Eisenhower eventually retired. Her father, John, was

named U.S. Ambassador to Belgium in 1969, and she lived in Brussels with her family until 1972.

Eisenhower is president and chief executive officer of People to People International, which was founded by President Eisenhower on September 11, 1956 and became a private organization in 1961. She joined PTPI hoping to carry on her grandfather's dream, but it has since become a dream of her own.

In 1999 she established the PTPI Friendship Fund following an inspirational visit to an orphanage in Morocco. To date, the fund has provided assistance to many causes, including the global humanitarian eradication of landmines; earthquake relief in India; disaster relief to victims of the September 11, 2001 attacks and their families; support of schools for the underprivileged in China and Sri Lanka; a home for leukemia victims and their families in Cuba; Japan tsunami relief; and efforts in Rwanda and Haiti.

Following September 11, 2001, Eisenhower's focus intensified toward getting young people from around the world together to learn about each other and to engage in conflict management. Her vision resulted in Peace Camp 2003: An Evolution of Thought and Action and The Global Peace Initiative. The efforts have brought people from diverse areas, representing more than 30 nationalities, together in Egypt, Jordan, and Turkey to discuss issues and reach a better understanding of their unique and individual cultures. The program remains active today.

Eisenhower has received the Knight of Peace Award from the International University in Assisi, Italy; the Medal of Honor from the Slovak Republic; the Consular Corps Award of Excellence; The Harry S. Truman Award for Public Service; Friendship Ambassador recognition from The Peoples' Republic of China; and the Friend of Foreign Service Award, Taiwan, among others. A recipient of four honorary doctorate degrees, Eisenhower has also served as a fellow at Stanford University and in the Churchill Institute at Westminster College (Missouri).





## Student Presentation Schedule | Thursday, April 20, 2017

### FORUM #1 – NORRIS 100

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9:00	Michael Augugliaro (Bieler)	Analysis of an Electrochemical Synthesis of Polypyrrole Using a Handmade Four-Point Probe Instrument
9:15	Adleigh Dahl (Streu)	My Semester with Drugs: Investigating Azologues of Anti-Convulsants
9:30	Kylie Heitman (Rabquer)	The Use of Equine Lavender Aromatherapy to Suppress Stress
9:45	Thomas Hall, Lauren Kelsey (Streu)	Synthesis and Characterization of Photoisomerizing Azo-Stilbenes to Inhibit ALK5
10:00	Wendi Wang (Rabquer)	Interactions between MHC Class II Molecules and T-Cells in the Context of Rheumatoid Arthritis
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1:30	Alexandra Rola, Jordan Newson (Streu)	Synthesis and Characterization of an Azo Derivative of Flupoxam
1:45	Chrissy Gauss (Rabquer)	Differential miRNA Expression in Inflammatory Monocytes
2:00	Shannon Murphy (Metz)	Coupling Reactions Catalyzed by Palladium Nanoparticle/Carbon Microsphere Composites
2:15	Chris Armstrong (Streu)	Solving the Arthritis Dilemma with Photoactivatable Molecules
2:30	Lauren Stull (Rabquer)	miR429: Potential Regulator of PAK2 in Inflammatory Monocytes
2:45	Jessica Bush (Rohlman)	Synthesis and Characterization of Nucleic Acid Aptamers Targeted at <i>Aspergillus</i> Cell Surface Carbohydrates
3:00	Marcin Kazmierczak, Rebecca Ryan (Streu)	Synthesis and Characterization of an Azo-Oxytocin Antagonist Azologue
3:15	Nikhil Patel (Rabquer)	Investigation of the Binding Targets of miR9
3:30	Martina Zafferani (Streu)	Quest for Enlightenment: Exploitation of Photoswitchable Molecules as Chemical Weapons in Treatment of Diseases
3:45	Savannah Rana (Rabquer)	Vanadium Complex Induced Cancer Cell Death via RIPK3 Activated Necroptosis

## FORUM #2 – TOWSLEY LECTURE HALL/NORRIS 101

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9:00	Andrew Mattson (Sacks)	'When Shall We Get to the Wilderness?' The Reflection of National Identity in Early American Tourism at Niagara Falls, 1820-1850
9:15	Kathleen Casebeer (MacInnes)	Animal Geography: Contributing to and Coding for the Map of Early Modern London (MoEML)
9:30	Mackie Black (Dick)	The Triangle Fire—'The Fire That Lit the Nation'
9:45	Samuel Raseman (Kirby)	Several Impediments to Truth as Correspondence
10:00	Grace Talaski (Manasreh, Ball)	<i>Première Rhapsodie</i> for Clarinet and Orchestra by Claude Debussy

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1:30	Chelsea Adams (Harnish)	NAGPRA and the Zuni <i>Ahayu:da</i>
1:45	Philip Meyer (Parr)	Hitchhike 1919: Great Lakes Sailing Songs from the Journals of Franz Rickaby
2:00	Kenton McCosh (Valdina)	Buddhist Meditational Practices in a Western Biomedical Context
2:15	Grace Talaski (McIlhagga)	<i>Scientific Inquiry</i> : A Composition for Clarinet and Electronics
2:30	Madeline Beattie (Harnish)	A Dangerous Climate: The Role of Climate Change in Promoting Islamist Extremism Within Bangladesh
2:45	Chris Herweyer (Dick)	The Life and Times of Washington Gardner
3:00	Sarah Kirchner (Yoshii)	The Rise of the German Right Wing Movement and Its Impact on Women
3:15	Virginia Kivel (Henke)	An Analysis of Available Summer Programming in Albion
3:30	Sydney Roeder (Harnish, Grossman, McLean)	Wasta and Water in Jordan: A Study of the Political Ecology of the Red-Dead Sea Project

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## FORUM #3 - NORRIS 102

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9:00	Alexis Ahee (Christopher)	Recognizing the Onset Signs of Domestic Violence Among College Students
9:15	Jessica Shaw (Wieth)	The Impact of Athlete Mindset on Focus
9:30	Tammy Dickens (McCaffrey, Rabquer, Schmitter)	Carpe Momentum: The Role of EMS and Organ Donation for Out-of-Hospital Deaths
9:45	Ashley Tice (Baker)	Investigating Prescriptive Organizational Approaches in Albion College Organizations
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1:30	Jaime Bourgojn (Wieth, Francis)	When Does 'Walking in Their Shoes' Increase Empathy? The Difference Between Empathy for Others in Previously Experienced Social and Physical Situations
1:45	Hanna Atkinson (Christopher)	Personality and Cell Phone Use
2:00	Ian Stewart (E. Hill)	Gender Differences in the Relationship Between Decisiveness and Sexism
2:15	Katie Zinkel (Francis, Wieth)	'She's a Stealer!' Changes in Theory of Mind Impact Young Children's Attributions
2:30	Olivia Alfano (Keyes, Elischberger, Mourad)	Factors Affecting Mock Jurors' Criminal Sentencing Decisions
2:45	Ciara Cannoy (Wieth)	When the Going Gets Tough, the Less Resilient Remember More: The Impact of Trait Resilience and Emotion on Memory
3:00	Dana Demchak (E. Hill)	Walk a Mile: Parasocial Contact, Perspective-Taking and Transphobia
3:15	Kelsey Burns (Christopher)	The Effects of Overt Christian Messaging on Attitudes Toward Christianity



**FORUM #4 – NORRIS 104**

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| 9:00  | Rebecca Barry, Martin Duterte,<br>Julia Fleurence, Thomas Gastineau,<br>Quentin Jourdan, Clotilde Le Bolloch<br>(Baker, Draudt, Towhill, Bruneteaux-Swann)                                 | Business Plan Development: An International Partnership<br>Between the USA and France – Go Global       |
| 9:15  | Samantha Coon, Jacob Neracher,<br>Galien Degueurse, Camille Delande,<br>Lina Frih, Charlie Vannier<br>(Baker, Draudt, Towhill, Bruneteaux-Swann)   | Business Plan Development: An International Partnership<br>Between the USA and France – Open Innovators |
| 9:30  | Megan Britton, Madeleine Rutledge,<br>Spencer Shaheen, Lauren Wiegand,<br>Kevin Barberio, Jeremy Claveau,<br>Julien Guisne, Helene Lorvellec<br>(Baker, Draudt, Towhill, Bruneteaux-Swann) | Business Plan Development: An International Partnership<br>Between the USA and France – Mybriefcase     |
| 9:45  | Arturo Cuellar Ramirez,<br>Christina Minh Vo Phan, Ali Antra,<br>Ricardo Dupot, Nicolas Gaudas,<br>Nicole Getan Metcalf, Azzedine Ouddak<br>(Baker, Draudt, Towhill, Bruneteaux-Swann)     | Business Plan Development: An International<br>Partnership Between the USA and France – New Start       |
| 10:00 | Ben Kolanowski, Taylor Shrader,<br>Anthony Waite, Jacob Winkler<br>(Carlson, Draudt)   | Briton for Life Initiative  |
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| 1:30 | Morgan Garmo (Deutsch)                  | Marketing a Nonprofit   |
| 1:45 | Angela Morrison (Reimann)               | Living on the Edge: Improved Fourier Reconstruction Using<br>Edge Information with Applications to MRI              |
| 2:00 | Julia Armitage<br>(Lyons-Sobaski, Dick) | Vernal Pools Conservation and Its Effects on<br>Amphibian Populations   |
| 2:15 | Michael Dussel (Skean)                  | Revitalization and Mapping of the Ewell A. Stowell Arboretum<br>in an Effort to Increase Its Role at Albion College |
| 2:30 | Erik Davis (Bollman)                    | Continued Fractions: A Brief Study with Applications  |
| 2:45 | Thomas Martin (Franzen, Green)          | Growing Vegetables for a Growing Community: An Update on<br>the Albion College Student Farm                         |
| 3:00 | Roxanne Ford (Metz)                     | Soil Analysis for the Greater Albion Community<br>Garden Network  |
| 3:15 | Liliya Chernysheva (Reimann)            | Sheets, Tubes, and Capsules Constructed from Corner<br>Connected Rectangles   |
| 3:30 | Stephanie Thurner (Reimann)             | How Does Variation in Life History Strategies Affect<br>Long-Term Population Trajectories of Eelgrass?              |

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## POSTER SESSION – SCIENCE COMPLEX ATRIUM, 4-5 P.M.

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Jayden Butler (Zellner, McCaffrey)	Glycoaldehyde and Ethylene Glycol on Nearly Isotropic Comets
Lauren Cook (Betz)	The Association Between Posture and Balance in College Swimmers
Tyler Crespo, Lucas Lusk (Christopher)	Demographic Predictors of Cell Phone Activities
Emily Galka (Lyons-Sobaski)	Identifying Allelic Patterns in Equine Muscle Types Using SNP
Robert Gillham (Menold, Bartels)	Stable Isotope Analyses of Tooth Enamel in Eocene Crocodylians
Molly Hancock, Sarah Kilbride, Kathryn Lasich (Albertson)	<i>Drosophila</i> as a Model Organism for Light-Activated Compounds
Courtney Kondor (Streu)	Synthesis of Photoisomerizable Azo Compounds
Anna Miller (Saville, Cavinder)	The Effect of Hobo Transposon Excision and DNA Repair in <i>Drosophila melanogaster</i>
Zaire Reid (T. Lincoln)	Campus Carbon Audit and Cost-Benefit Analysis of a Carbon-Reduction Project
Megan Reilly (Lyons-Sobaski)	Identifying Allelic Patterns in Equine Muscle Types Using Microsatellite Genetic Markers
Marissa Stegman (Menold)	A Comparison of Surface Water Salt Concentrations from Different Road Salting Methods

## Abstracts of Student Presentations



### **CHELSEA ADAMS, '17** **NAGPRA and the Zuni *Ahayu:da***

Faculty Sponsor: Allison Harnish  
Majors: Anthropology, Religious Studies  
Hometown: Livonia, Mich.

The Zuni *Ahayu:da* are twin War Gods and protectors of the Zuni Pueblo, whose representations in wooden form are sacred to the Zuni people. The spiritual significance of the *Ahayu:da* is tied to their organic nature; they are intended to be eroded by wind, rain, and the passage of time. Prior to the passage of the Native American Graves Protection and Repatriation Act (NAGPRA) in 1990, a common practice among anthropologists, hobbyists, and art dealers was the wholesale looting of Indigenous burial grounds and desecration of sacred sites. Museum collections were regularly stocked with Native American cultural items—including human remains, funerary objects, sacred objects, and items of cultural patrimony. Many had been acquired under dubious circumstances. A result of persistent lobbying on the part of Native American activists and scholars, NAGPRA demands that federally funded institutions return Native American cultural items to their respective tribes. My thesis stems from my work with Dr. Bille Wickre to identify and repatriate the *Ahayu:da* in accordance with NAGPRA regulations. It describes the cultural context and spiritual significance of the *Ahayu:da*, the process of discovering and identifying the *Ahayu:da* at Albion College, the history of NAGPRA, and Albion College's and other institutions' different experiences with NAGPRA compliance and implementation.

Supported by: FURSCA



### **ALEXIS AHEE, '17** **Recognizing the Onset Signs of Domestic Violence Among College Students**

Faculty Sponsor: Andrew Christopher  
Major: Psychological Science  
Hometown: Grosse Pointe, Mich.

This study examined the extent to which college students recognize the potential warning signs of domestic violence. Domestic violence can be defined as "...a pattern of abusive behavior in any relationship that is used by one partner to gain or maintain power and control over another intimate partner" (The United States Department of Justice, 2016). In the United States, one in four women and one in five men will experience domestic violence in their lifetime (National Coalition Against Domestic Violence, 2015). It is commonly perceived that only physical abuse qualifies as domestic violence;

however, this perception exists because it is the most visually apparent form of abuse. Domestic violence includes not only physical abuse, but sexual, emotional, economic, and psychological abuse as well. Emotional and physical abuse are the most common forms of abuse displayed in long-term relationships regarding college students (Sigelman, Jordan-Berry, & Wiles, 1984).

In this study, college students ( $N = 116$ ) from a small liberal arts school were prompted to reflect on their own experiences with romantic relationships through a writing prompt labeled as positive, negative, or neutral to prime participants into the respective mindset. Adjectives such as *admire* and *emulate* were used in the positive prompt. Phrases such as *wouldn't consider healthy* and *dysfunctional behavior* were used in the negative prompt. Participants then read a hypothetical scenario about a college couple, after which they completed a survey about the scenario that measured the quality of the relationship in that scenario, followed by a measure of attitudes toward domestic violence.

Analyses of variance suggested that individuals who were prompted to write about an unhealthy relationship were more likely to rate the relationship in the hypothetical scenario as being unhealthy compared to individuals who were prompted to write about positive or neutral relationships. Additionally, scenarios with gender pronouns resulted in participants perceiving the hypothetical relationship as being unhealthier than when the scenarios contained gender-neutral language.

This research could be used to educate young adults about the quality of relationships in hopes of raising awareness of domestic violence warning signs. Additionally, college counseling centers may use this information to establish training programs for college students.



### **OLIVIA ALFANO, '17** **Factors Affecting Mock Jurors' Criminal Sentencing Decisions**

Faculty Sponsors: Barbara Keyes, Holger B. Elischberger, Ronney Mourad  
Major: Psychological Science  
Hometown: Clinton Township, Mich.

This study was designed to examine the effect of a defendant's race, gender, and history of childhood physical abuse on mock jurors' decisions about criminal sentencing. Participants ( $N = 400$ ) from across the U.S. were asked to read one of eight mock incident reports of a domestic altercation that resulted in the death of the victim. They were then instructed to choose one of four sentences for



the defendant: Not Guilty, Guilty of Involuntary Manslaughter, Guilty of Voluntary Manslaughter, and Guilty of Second-Degree Murder. In addition to demographic questions, participants were asked if they or someone close to them had ever been a victim of childhood physical abuse. Participants also completed a Right-Wing Authoritarianism and an Emotional Empathy scale. The results showed that female participants imposed harsher sentences on male than on female perpetrators [ $r = .217, p = .002$ ], whereas male participants did not consider perpetrator gender in their sentencing decision [ $r = -.008, n.s.; z = 2.290, p = .022$ ]. There were no effects involving participant race or perpetrator race [ $(|r| \leq .058, p \geq .238)$ ], or defendant's or participant's history of childhood physical abuse [ $|r| \leq .036, p \geq .474$ ]; future research should explore the possibility that a more detailed account of a defendant's past than what was used in the current study might make a difference. Finally, older participants ( $r = -.110, p = .026$ ) and those with less-pronounced right-wing authoritarian views ( $r = .099, p = .047$ ) tended to impose more lenient sentences; both of these characteristics were, in turn, related to increased empathy ( $|r| \geq .157, p \leq .002$ ).

*Supported by: FURSCA*

literature, and population viability analysis software to explore the importance and conservation status of amphibians within these small local wetlands.



### **CHRIS ARMSTRONG, '17** **Solving the Arthritis Dilemma with Photoactivatable Molecules**

Faculty Sponsor: Craig Streu  
Major: Biology  
Hometown: Commerce Township, Mich.

Non-steroidal inflammatory drugs, NSAIDs, have become critical tools to help combat the symptoms of rheumatoid arthritis and other inflammatory diseases. One category of these drugs, the cyclooxygenase 2 (COX-2) inhibitors, were very effective at reducing inflammation, but had serious side effects including an increased risk of myocardial infarction. To date, it has been difficult to design molecules that inhibit COX-2 without increasing the risk of myocardial infarction given the role of COX-2 in prostaglandin and thromboxane synthesis. However, it may be possible to exploit the tissue-specific roles of COX-2 using targeted therapies. The goal of this project is to design a light responsive drug that can bind and inhibit COX-2 in a targeted fashion without increased risk of myocardial infarction. Synthesis, photophysical behavior, and bioactivity of the lead compounds will be disclosed.

*Supported by: FURSCA*



### **JULIA ARMITAGE, '17** **Vernal Pools Conservation and Its Effects on Amphibian Populations**

Faculty Sponsors: Sheila Lyons-Sobaski, Wesley Dick  
Major: Biology  
Hometown: Canton, Mich.

Vernal pools are an essential, but often overlooked, ecosystem. Although this type of wetland has many names, e.g., vernal pool, vernal pond, and ephemeral pool, it is always a shallow pool that fills and dries cyclically. They are common all over North America, especially in the Midwest. Often developing in fields, woodlands, and other lowland areas, these pools are located all around Michigan, including Albion's Whitehouse Nature Center. It is also common for vernal pools to develop near urban areas, which can leave them vulnerable to human pollutants, invasive species, and habitat loss. Obligate species, or species that can only live or breed in these pools, are threatened when these ecosystems are no longer available to them. Many obligate species are amphibians, a group that has been in rapid decline over the last few decades. Similar negative factors are thought to be affecting both amphibians and vernal pools alike. By strengthening protections for vernal pools on a local and national level, we may be able to decrease the rate of amphibian loss. Inspired by my internship with the Natural Area Preservation division of the Ann Arbor Parks Department last summer, my thesis uses personal experience, primary research



### **HANNA ATKINSON, '17** **Personality and Cell Phone Use**

Faculty Sponsor: Andrew Christopher  
Major: Psychological Science  
Hometown: Waterford, Mich.

Research on individual differences in cell phone usage thus far has been scarce. To better conceptualize the motives for certain types of cell phone activity, the present study investigated how different personality factors predicted different reasons for using cell phones.

As part of a larger project on cell phone usage, we recruited 301 American participants through an online survey service called Amazon MTurk. Participants completed survey measures on neuroticism, extraversion, openness, agreeableness, conscientiousness, cell phone activity, and cell phone attachment. The cell phone activities were factor analyzed into five categories: leisure (e.g., play games), utilities (e.g., take pictures), business (e.g., respond to e-mail), entertainment (e.g., watch movies), and traditional communication (e.g., answer calls).



We ran six simultaneous multiple regressions on the five categories of cell phone use and cell phone attachment. We found that, in general, extraversion and neuroticism were the most consistent predictors of cell phone use. Specifically, extraverted people tended to use their phones for leisure, utilities, business, and traditional communication, and indicated strong attachments to their cell phone. In addition, neurotic people tended to use their phones for leisure and utilities, and also had high attachments to their cell phone.

Future research could follow up by examining the interpersonal functions that a cell phone serves for both neurotic and extraverted people. Furthermore, research could assess the interpersonal consequences that may result from being either separated or overly immersed in their phone.

*Supported by: Faculty Development Committee*

## REBECCA BARRY, '18

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



## MADELINE BEATTIE, '17

### A Dangerous Climate: The Role of Climate Change in Promoting Islamist Extremism Within Bangladesh

Faculty Sponsor: Allison Harnish  
Majors: Environmental Science, Political Science  
Hometown: Mt. Prospect, Ill.

Bangladesh is highly vulnerable to the effects of climate change. Located in the Bay of Bengal, the effects of climate change experienced by this South Asian country will include sea-level rise, increased flooding, drought, and natural disasters. There is little doubt that climate change will have large social, economic, and political impacts within Bangladesh, a society which already struggles with poverty and corruption. However, questions remain as to what these impacts will mean for the Islamic extremist movement taking root within the country's borders. Bangladesh has a long history of moderate Islam, which indicates that under ideal circumstances the mass facilitation of terror groups would be unlikely. But, in the face of a changing environment and a worsening political climate, circumstances may be right for a rise of violent Islam.

The Islamic State has already expressed its interest in an entry into Bangladesh—the second-largest Muslim nation in the world—following its losses of territory in the Middle East. With the frequency of terror attacks in Bangladesh increasing and climate change worsening, it is time to seriously consider the possibility of militarized Islam in Bangladesh. Will climate change provide a large enough disruption to the social and political fabric of Bangladesh to allow for an Islamic State to rise to prominence?



## MICHAEL AUGUGLIARO, '17

### Analysis of an Electrochemical Synthesis of Polypyrrole using a Hand-Made Four-Point Probe Instrument

Faculty Sponsor: Craig Bieler  
Majors: Chemistry, Physics  
Hometown: Washington Township, Mich.

The unique properties of conductive polymers have been extensively studied since they were first synthesized in the 1970s. Since then, there have been many practical uses found for conductive polymers both in industrial applications and in research. Polypyrrole, a common conductive polymer, has been used in instrumentation and consumer electronics as a semiconductor. Polypyrrole can be synthesized chemically and photochemically, but an electrochemical synthesis provides the opportunity to synthesize conductive polypyrrole as a thin film on electrodes, opening the possibility to numerous other applications. One of the most important physical properties of these films is their conductivity. The four-point probe technique is typically used for determining the conductivity of conductive or semi-conductive materials, but available commercial instruments are usually expensive. The goal of this project is to not only explore the conditions under which the electrochemical synthesis will produce a highly conductive polypyrrole but to also test the reliability of an inexpensive simple four-point probe device made out of common materials. This instrument was fabricated during the spring 2016 semester based on Seng and coworker's design and has since been used in analyzing conductive polypyrrole.

*Supported by: FURSCA*



## MACKIE BLACK, '19

### The Triangle Fire—The Fire That Lit the Nation'

Faculty Sponsor: Wesley Dick  
Majors: Anthropology, English  
Hometown: The Woodlands, Texas

On March 25, 1911, at 4:45 in the afternoon, the young-women factory workers at the Triangle Waist Company, located on the eighth, ninth, and tenth floors of the Asch Building, had just finished their shift of making shirtwaists or blouses and were eagerly anticipating the weekend. At that very instant,



their joy turned to fear and panic when a fire broke out on the eighth floor and soon spread to the top floors. The fire claimed 146 lives, 123 of whom were women, mostly young Jewish and Italian immigrants. The Triangle Fire remains the second most deadly New York City workplace tragedy, second only to the attack on the World Trade Center on September 11, 2001. By illuminating broader American social, economic, and political issues, the fire spurred action that led to the reform and regulation of business and labor. This presentation explores the conditions at the Triangle Factory and the union efforts and strikes of women garment workers before March 25, 1911. The dramatic fire will be described as well as the public and legislative response. How did the nation respond to this tragedy in 1911? How did Michigan and Albion react? National, and especially Michigan, newspaper coverage will be illustrated. Today, more than 100 years later, how have the fire and its victims been remembered? Does the Triangle Fire have lessons for today? This presentation will conclude by examining the Fire's relevance in 2017.

breaking off a relationship, been in both situations, or never experienced a break-up. Conversely, participants who experienced a concussion were less empathetic than participants who had never experienced a concussion. Results suggest that past experience is a detriment in feeling empathy for physical situations but may be an empathy aid for social situations.

*Supported by: FURSCA—K.D. Metalonis, 1999 Memorial Endowed Student Research Fellowship*

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## MEGAN BRITTON, '17

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

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**JAIME BOURGOIN, '17**  
**When Does 'Walking in Their Shoes' Increase Empathy? The Difference Between Empathy for Others in Previously Experienced Social and Physical Situations**  
 Faculty Sponsors: Mareike Wieth, Andrea Francis  
 Major: Psychological Science  
 Hometown: Midland, Mich.

Previous research has shown that individuals can relive and re-experience social pain more easily and more intensely than physical pain (Chen, Williams, Fitness & Newton, 2008). This ability to re-experience pain or hurt has been shown to be a key to the experience of empathy. Rutan, McDonnell, & Nordgren (2015) showed that participants who had previously experienced and overcome a distressing event were less likely to show compassion towards people currently experiencing a similar situation. The current study was designed to investigate how past experience with specific social and physical situations impacts empathy for another person currently going through a similar situation. It was predicted that for a physical situation (i.e. concussion), which is less likely to be relived as intensely or as often, participants with previous experience would show less empathy than they would for a social situation (i.e. breakup), which is relived more intensely and more often.

Analyses showed that participants had more empathy for an individual experiencing physical pain (concussion) than an individual experiencing social pain (i.e. getting broken up with). In addition, participants who had been broken up with felt more empathy than participants who had only experienced



**KELSEY BURNS, '17**  
**The Effects of Overt Christian Messaging on Attitudes Toward Christianity**  
 Faculty Sponsor: Andrew Christopher  
 Majors: Psychology, Spanish  
 Hometown: Clarkston, Mich.

More than other generations, Millennials are skeptical of and disengaged with religion (Barna Group, 2015). If churches want to engage Millennials, they need to understand this phenomenon. Across two experiments, I investigated how priming overt Christian concepts affects attitudes toward Christianity. The first was a field experiment examining willingness to help with a simple survey in the presence of either an overt or casual Christian messenger. With a sample of 243 students, it was found that people were not more likely to agree to participate with casual Christian messaging, but were more likely to decline participation when presented with overt Christian messaging.

The second experiment tested for the effect of overt or casual Christian messaging on personal religious beliefs and attitudes toward the church. A sample of 60 students of various religious identities and degrees of religious attendance watched a video (with either overt or casual Christian messages) and then reported their own personal religious beliefs and their attitude toward the Church. Results indicated that in the presence of overt messaging, rather than casual messaging, those who attend church infrequently or not at all had lower religious beliefs and a more negative attitude toward the Church.

The results of these two studies suggest that, relative to casual Christian messaging, in the presence of overt Christian messaging, Millennials were less likely to want to be involved in a seemingly religious undertaking and expressed weaker religious beliefs. This has important implications for the Church in that



to best engage Millennials, it is advantageous not to use in-your-face Christian messaging but to instead using a more subtle, inclusive approach.



**JESSICA BUSH, '18**  
**Synthesis and Characterization of Nucleic Acid Aptamers Targeted at *Aspergillus* Cell Surface Carbohydrates**

Faculty Sponsor: Christopher Rohlman  
 Majors: Biology, Chemistry  
 Hometown: Marshall, Mich.

*Aspergillus* is a common fungus that is found naturally throughout the world. These spores are inhaled on a daily basis and processed within the body without any negative consequences, however prolonged exposure to high quantities of *Aspergillus* can cause allergic or toxic symptoms, and infection in immuno-suppressed individuals (Hummel *et al.*, 2006). Traditional detection methods for *Aspergillus* are difficult and invasive, including biopsies of cerebral lesions and extraction of cerebrospinal fluid, and frequently yield negative results (Hummel *et al.*, 2006). These detection methods are often not feasible for immunocompromised patients. Aptamers present a new potential detection method for Aspergillosis. Aptamers are single-stranded DNA or RNA sequences, which bind to a target molecule with high affinity and specificity (Navani *et al.*, 2009). These sequences can be selected to bind to ligands associated with Aspergillosis. Due to the high specificity and affinity binding capabilities of aptamers, they have become an emerging diagnostic and therapeutic tool. With research applications including artificial gene synthesis, DNA sequencing, library construction, molecular probes, and polymerase chain reaction, aptamers can be selected to target and identify a wide variety of infectious diseases (McKeague and DeRose, 2012). Such application allows us to target and identify a wide variety of infectious diseases including fungal infections caused by the mold *Aspergillus*. By selecting for specific nucleic acid aptamers and fluorescently labeling these molecules, we can develop a new detection method for Aspergillosis that is more sensitive and less invasive.

Once selected, fluorescent tagging can be used to observe their interaction with the target molecule. As a means for developing and evaluating the selection process, several carbohydrate targets were studied. DNA aptamers were synthesized by binding a randomized N15 DNA sequence to cassettes to a target carbohydrate found on the *Aspergillus* surface. Once bound, washing processes eliminated nonbinding DNA segments followed by an elution process and asymmetric PCR to produce a single stranded pool of aptamer candidates for the next round of selection. Mobility shift assays have also been used to further refine the aptamer pool. The potential of mobility shift

assays opens the possibility to expand our aptamer research to investigate a new variety of ligands for future study as well as optimize the selection process. In parallel, RNA aptamers targeted at the *Aspergillus* cell surface carbohydrate beta-D-glucan were selected from an N40 randomized template pool. PCR amplification was then used to generate the initial DNA template pool. RNA aptamers were generated via *in vitro* transcription of the template pool utilizing modified NTPs. Successful aptamers were selected through nine successive rounds of binding to beta-D-glucan, reverse transcription, and cDNA template pool amplification. This work will describe binding characteristics as well as the RNA aptamer pool sequence diversity.

Supported by: FURSCA



**JAYDEN BUTLER, '17**  
**Glycoaldehyde and Ethylene Glycol on Nearly Isotropic Comets**

Faculty Sponsors: Nicolle Zellner, Vanessa McCaffrey  
 Major: Physics  
 Hometown: Detroit, Mich.

The delivery of glycolaldehyde (GLA) and ethylene glycol (EG) could be important for understanding the origin of life. GLA, the simplest sugar, is a building block for ribose, the backbone of RNA; EG is a reduced alcohol variant of GLA, found to be created by the impact of GLA under simulated cometary impact conditions (McCaffrey *et al.* 2014). GLA and EG have been found in regions of the interstellar medium and recently on nearly isotropic comets (NICs), which originate in the Oort Cloud, a spherical shell of material that resides at the outskirts of the Solar System. NICs are long period comets ( $P > 200$  years) and have orbits that are nearly randomly inclined to the plane of the ecliptic (Mumma & Charnley *et al.* 2011). Based on impact experiments that assess survivability of these molecules (McCaffrey *et al.* 2014), we aim to determine the mass of GLA and EG that could have been delivered on comets since the formation of the Solar System 4.5 billion years ago. The focus of the current study is to determine the abundances of GLA and EG on C/1995 O1 (Hale-Bopp), C/2012 F6 (Lemmon), C/2013 R1 (Lovejoy 2013), and C/2014 Q2 (Lovejoy 2014), all of which have been found to possess at least one of these molecules. Using published values of observed production rates of water, GLA, and EG (e.g., Biver *et al.* 2015), we have estimated a range of masses of these molecules of interest on their host comets. Even with a high degree of uncertainty in comet diameters and volumes, we have determined that large amounts of these molecules could have survived the impact via delivery by a single comet.

Supported by: NASA Exobiology and Evolutionary Biology Grant Program



**CIARA CANNOY, '17**  
**When the Going Gets Tough, the Less Resilient Remember More: The Impact of Trait Resilience and Emotion on Memory**

Faculty Sponsor: Mareike Wieth  
Major: Psychological Science  
Hometown: West Branch, Mich.

Trait resilience involves the ability to bounce back from negative life events (Connor & Davidson, 2003). Previous research shows that lower levels of trait resilience are associated with an increased risk of developing certain mental disorders, such as Post Traumatic Stress Disorder (PTSD; Lee et al., 2014). Research on PTSD and memory suggests individuals with PTSD are more likely to remember general information for non-traumatic events than individuals without PTSD (Brown et al., 2013). However, McKinnon, et al. (2014) found that individuals with PTSD remembered more specific details for a traumatic event than individuals who did not develop PTSD. Whereas there is clearly a link between PTSD and memory, little research has investigated the connection between trait resilience and memory. This study was designed to investigate the relationship between trait resilience, emotionality of an event, and memory for the event.

In order to test this relationship, participants were asked to watch a series of potentially emotional photos depicting drug use. Participants rated how emotional they found the series of photos. Later they were asked to remember as much as they could about the photos. Finally, participants completed the Brief Resilience Coping Scale (Smith et al., 2008). Analyses indicated that low resilient individuals produced more generalized memory for less emotional information but more detailed memory for emotional information. The opposite pattern of results was seen for high resilient individuals. These findings mimic the relationships found between PTSD and memory, further lending support to the connection between trait resilience and PTSD.

*Supported by: FURSCA—Richard L. and Barbara J. Meyer Student Research Endowment*



**KATHLEEN CASEBEER, '17**  
**Animal Geography: Contributing to and Coding for the Map of Early Modern London (MoEML)**

Faculty Sponsor: Ian MacInnes  
Majors: Chemistry, English  
Hometown: Pleasant Lake, Mich.

For the past two summers I had the opportunity to work as a contributor to the Map of Early Modern London (MoEML), an interactive online map of Elizabethan London based on a digitized version of a woodcut map from 1561. I researched assigned sites on the map using digitized original documents and papers to compose articles for each site. I was fortunate enough to receive FURSCA funding to travel to the Folger Shakespeare Library in Washington, D.C., for a week last summer to use the library's documents in person. MoEML also offers a virtual workshop to train contributors to encode in TEI (Text Encoding Initiative). Through this training I was able to encode articles I wrote, as well as other documents. In my presentation I will discuss the research process, some of the difficulties that have arisen in it, and the process of composing and encoding an article for MoEML. I'll also discuss how this research has shaped a piece of fiction I am writing.

*Supported by: FURSCA—Hyde Fellows in Student/Faculty Research*



**LILIYA CHERNYSHEVA, '19**  
**Sheets, Tubes, and Capsules Constructed from Corner Connected Rectangles**

Faculty Sponsor: David Reimann  
Majors: Chemistry, Mathematics  
Hometown: Moscow, Russia

During the summer of 2016, I conducted research on geometric forms related to polyhedra and planar tessellations. I was involved in the geometric construction process resulting from substituting plates for edges in a base polyhedron, which has been shown to result in a surprising variety of geometric forms. The plates are connected at corners resulting in an open lattice structure where vertices and faces are transformed into open space and edges are rectangular plates. I explored different materials for the plates and fasteners that have been used in these constructions. I will show constructions based on uniform tessellations of the plane and prove that exactly four will remain planar after this edge expansion procedure. These sheets can be rolled into cylindrical tubes of arbitrary length along either of

the two primary symmetry axes of the corresponding tessellation. Capsules can be constructed by capping the tubes with sections of regular polyhedra, specifically pyramids, cupolas, and rotundas. Example constructions will be shown.

*Supported by: FURSCA*



**LAUREN COOK, '17**  
**The Association Between Posture and Balance in College Swimmers**

Faculty Sponsor: Heather Betz  
 Major: Athletic Training  
 Hometown: Milan, Mich.

Athletes have been shown to develop postural strategies that help them maintain balance during activity (Paillard & Noe, 2006). Without strong postural stability control (PSC), athletes would not be able to maintain their posture and this may compromise athletic performance (Blaszczyk, Beck, & Sadowska, 2014). Research has been mixed as to the association between balance and muscular strength. It has been documented that strength deficits and a decreased PSC are associated with higher risk of sport-related injury (Granacher, Golhofer, & Kriemier, 2010). Performing balance assessments on athletes periodically may be an effective way to reduce the amount of athletic injuries that jeopardize performance (Biec, Giemza, & Kuczynski, 2015). Having athletes with identified postural and muscular imbalances participate in balance training could improve postural control and thus reduce risk of injury (Granacher, Golhofer, & Kriemier, 2010). The purpose of this investigation was to study the relationship between posture, muscular strength, and balance. Participants were asked to complete a series of tests including a posture test, a balance test, and muscular strength and endurance tests. Our hypothesis was that there would be a positive association between posture and balance, lower body muscular strength, and core muscular endurance.

**SAMANTHA COON, '18**

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



*Crespo*

**TYLER CRESPO, '19**

Major: Biochemistry  
 Hometown: San Diego, Calif.

**LUCAS LUSK, '19**

Majors: Psychological Science,  
 Communication Studies  
 Hometown: Naperville, Ill.



*Lusk*

**Demographic Predictors of Cell Phone Activities**

Faculty Sponsor: Andrew Christopher

As cell phone technology continues to redefine cultural norms and practices, it becomes increasingly important to understand why people use them and how such uses might be a function of individual differences, such as demographic background. Our research examined three demographic predictors (i.e., gender, age, and socioeconomic status [SES]) of cell phone activities. As part of a larger project on cell phone usage, we recruited 301 American respondents via Amazon's Mechanical Turk to complete a battery of measures that included demographic information, cell phone attachment, and 19 different potential uses for a cell phone (e.g., watching TV, social networking, making calls).

We first used principal components analysis with an orthogonal varimax rotation on the 19 potential uses for a cell phone. This analysis condensed cell phone activities into five dimensions: leisure (e.g., pass the time), utilities (e.g., navigation), business (e.g., perform work/school-related tasks), entertainment (e.g., listen to music), and traditional communication (e.g., make calls). These five dimensions of cell phone use, as well as cell phone attachment, served as our outcome variables in six simultaneous-entry regressions, with participant gender, age, and SES serving as our predictor variables.

Across six simultaneous-entry regressions, it was found that younger participants tended to use their cell phone for leisure and entertainment purposes more than older participants. SES was positively related to using a cell phone for utility and business purposes. Women were more likely than men to use their cell phones for utility purposes. There were no demographic predictors of traditional communication with cell phones. Finally, regarding cell phone attachment, younger and higher SES respondents indicated stronger attachment to their cell phones.

These results begin to form a taxonomy of reasons why people use cell phones and potential demographic differences in usage. Future work can expand this taxonomy to include people in other nations, with a focus on a wider range of demographic and other individual difference predictors of cell phone use.

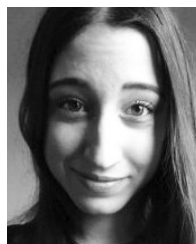
*Supported by: Faculty Development Committee*





## ARTURO CUELLAR RAMIREZ, '19

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



## DANA DEMCHAK, '17

### Walk a Mile: Parasocial Contact, Perspective-Taking, and Transphobia

Faculty Sponsor: Eric Hill  
Majors: Psychological Science, English (Creative Writing)  
Hometown: Rochester Hills, Mich.

Research suggests that personal contact with transgender individuals reduces transprejudice (Walch et al., 2012; Broockman & Kalla, 2016). Parasocial contact (e.g., through popular media) can also reduce prejudice (Schiappa et al., 2005) as can perspective-taking activities (Batson et al., 2007). The present study combines these two lines of research, examining the extent to which parasocial contact and perspective-taking reduce transprejudice.

Eighty-two adults (47 female,  $M_{age} = 18.61$ ,  $SD_{age} = .75$ ) were recruited from among introductory psychology students at a small college, and 238 adults (114 female,  $M_{age} = 35.64$ ,  $SD_{age} = 11.85$ ) were recruited via Amazon's Mechanical Turk. In the context of a study on 'social attitudes and advertising effectiveness,' participants watched one of three short political ads, one of which included a transgender man (parasocial-contact condition). They then completed one of two writing tasks, one of which was designed to encourage perspective-taking. Participants then completed measures of transprejudice.

In the college sample only, men had more transphobia than women. Conservatism and religious-service attendance predicted greater transprejudice in both samples. There were no significant effects of either manipulation on transprejudice in the college sample. In the online sample, which had significantly higher transphobia, the perspective-taking manipulation significantly reduced social distance compared to control. However, this effect was only significant after removing participants who wrote fewer than 50 words and/or completed the study in less than half the average time, suggesting that effects of this brief intervention are modest at best and only for those open to the process.

*Supported by: FURSCA*



## ADLEIGH DAHL, '17

### My Semester with Drugs: Investigating Azologues of Anticonvulsants

Faculty Sponsor: Craig Streu  
Major: Biochemistry  
Hometown: Williamston, Mich.

Epilepsy is a complex disease affecting approximately 50 million people worldwide. Many causes of the disease are not yet known and are still of great interest to scientists and clinicians. The creation of azologues of compounds with anticonvulsant activity is a meaningful step in discovering how the disease functions within the brain and neurological system. Azologue anticonvulsants can be reversibly activated through the use of UV light. Targeting light to different areas of the epileptic brain can spatially control the photochemical switching of the azo compounds. This technology has significant implications for researchers who could benefit from the ability to reversibly activate epileptic pathways, leading to a better understanding of the disease. My project outlines the synthesis and photoisomerizability of azologues of anticonvulsants.



## ERIK DAVIS, '17

### Continued Fractions: A Brief Study with Applications

Faculty Sponsor: Mark Bollman  
Major: Mathematics  
Hometown: Ortonville, Mich.

There are a few sources for finding information on continued fractions, though many of those sources are not very readable for undergraduates. And if they are, then it will not likely be the case that they dive into the more beautiful aspects of the topic. This paper provides a brief look into the theory and applications of continued fractions and is partitioned by three different types of continued fractions: finite; infinite and periodic; and infinite and non-periodic.



**TAMMY DICKENS, '17**  
**Carpe Momentum: The Role of EMS and Organ Donation for Out-of-Hospital Deaths**

Faculty Sponsors: Vanessa McCaffrey, Brad Rabquer, Ruth Schmitter  
 Major: Biology  
 Hometown: Battle Creek, Mich.

Too often, little thought goes into the impact that checking the small red box on your driver's license can have. That little box has the ability to change many lives. As of this writing, there are 118,576 individuals on the organ donor waiting list in the United States. Of those, 3,527 reside in Michigan. Over the years, there have been many myths associated with organ donation and medical care that have led to confusion and uncertainty among American citizens. A worldwide organ shortage has caused many countries to reevaluate practices and take a variety of measures to increase organ donation. Currently, a significant portion of individuals who have become organ donors are from a "controlled death," meaning that their death, or organ recovery, can be predictably controlled following the withdrawal of life support within the confines of a hospital. The American Heart Association reported that in 2014, 326,200 people died from out-of-hospital cardiac arrest. Unwitnessed cardiac arrest carries a 10.6% survival rate and only 8.3% survive with good neurologic function. These patients were not considered for organ donation, not because of criteria that made them unfit for organ procurement, but because there were no guiding protocols for pre-hospital emergency medical responders. It is time to review, reorganize, and rewrite the procedures for the emergency medical first responders and their vital role in the organ donation process.

developed an arboretum website. The plant inventory includes 71 total species of trees and shrubs in 26 families. Fifty-seven species (80%) are native to Michigan. Non-native Asian honeysuckles (*Lonicera morrowii*, *L. tatarica*, and their hybrid *L. X bella*), oriental bittersweet (*Celastrus orbiculatus*), and white mulberry (*Morus alba*) are the three most problematic invasives. The GPS data were used to expand the existing GIS geodatabase infrastructure that exists for the WNC. In addition, QR code signage was installed to allow visitors to access the arboretum's interactive website using smartphones. It is hoped that my project will increase awareness and use of the arboretum by classes and the greater Albion community.

*Supported by: FURSCA—Julia Robinson Burd, '31 Memorial Fellowship*



**ROXANNE FORD, '17**  
**Soil Analysis for the Greater Albion Community Garden Network**

Faculty Sponsor: Kevin Metz  
 Major: Biochemistry  
 Hometown: Eaton Rapids, Mich.

The water crisis in Flint, Mich., highlighted two concerns for low-income communities living in post-industrial towns: aging infrastructure and access to nutritious food. Albion, Mich., is also a post-industrial town with a large low-income population. Luckily, the water infrastructure in Albion appears to be well maintained. However, access to nutritious food remains a concern for many of the citizens of Albion. As a result, a local nonprofit organization has been created in hopes of developing a city-wide community garden. Property has been donated for this cause, and other land plots are available for purchase. But, before land preparation and planting can begin, the soil quality needed to be assessed, given the industrial history of the town. Soil analysis in support of the Albion Community Garden Network was conducted. Investigation of the general soil quality was led using parameters set forth by the U.S. Department of Agriculture. Special examinations of lead and arsenic concentrations were carried out to check compatibility to EPA recommendations. Our approach and results will be presented.

*Supported by: FURSCA—Anna and Carl Weiskittel Endowed Chemistry Fellowship*



**MICHAEL DUSSEL, '17**  
**Revitalization and Mapping of the Ewell A. Stowell Arboretum in an Effort to Increase Its Role at Albion College**

Faculty Sponsor: Dan Skean  
 Major: Environmental Science  
 Hometown: Cassopolis, Mich.

The Stowell Arboretum was established in April 1973 in honor of Dr. Ewell A. "Doc" Stowell (1922-2009), a biology professor at Albion College. It is located in a relatively remote location on the east side of the Whitehouse Nature Center (WNC). Since the late 1990s, the arboretum has mostly sat idle, with occasional use by biology classes and plantings made to honor people or commemorate events. From May 16-July 18, 2016, I conducted an inventory of its woody species, mapped 185 individuals using GPS and GIS, installed modern signage, removed invasive species strategically, rerouted trails, and (with assistance)



**EMILY GALKA, '17**  
**Identifying Allelic Patterns in Equine Muscle Types Using SNP**

Faculty Sponsor: Sheila Lyons-Sobaski  
Major: Biology  
Hometown: Cadillac, Mich.

Different breeds of horses (*Equus caballus*) have been developed via artificial selection for different types of work. Large, stocky horse breeds, referred to as draft horses or heavy breeds, have been bred to pull carriages, while horses that are relatively lean and lanky are known as saddle horses or light breeds. During the past three summers, I worked at Cindy's Riding Stable on Mackinac Island, handling both draft and saddle horses. Some of the horses at the stables are mixed breeds of smaller saddle horses and larger draft horses, including my horse, Lisa. Because of this, I wanted to look into the genetic differences between the two types of horses and what that means for mixes of the two. The myostatin gene determines muscle growth in horses. I am investigating how the frequency of the myostatin gene is related to the horses' builds. This past year I have worked in the lab with DNA extracted from Mackinac Island horsehair samples and used restriction fragment analysis to determine the frequency of the myostatin gene in multiple types of horse breeds.

*Supported by: FURSCA, Biology Department*



**CHRISSE GAUSS, '17**  
**Differential miRNA Expression in Inflammatory Monocytes**

Faculty Sponsor: Brad Rabquer  
Major: Biology  
Hometown: St. Clair, Mich.

MicroRNAs (miRNA) have been recently identified as regulator molecules in the inflammation process of the immune system. miRNA are small, single-stranded non-coding RNAs of 21 nucleotides in length that regulate gene expression post transcriptionally by binding to the 3' untranslated regions of specific target mRNA. The bound miRNA can either stimulate or repress translation of the mRNA that code for cytokine-producing cells which induce inflammation. A key part of understanding chronic inflammatory diseases such as rheumatoid arthritis (RA) is to determine how different inflammatory mediators regulate miRNA expression. Here we will test the hypothesis that the cytokine TNA-a induces different miRNA expression compared to the pro-inflammatory bacterial product lipopolysaccharide (LPS).

*Supported by: FURSCA*



**MORGAN GARMO, '19**  
**Marketing a Nonprofit**

Faculty Sponsor: Glenn Deutsch  
Majors: Finance, English  
(Professional Writing)  
Hometown: West Bloomfield, Mich.

In this project-based directed study, the student has enhanced her professional writing skills by formulating and implementing marketing strategies for Fleece & Thank You, a nonprofit she previously cofounded. Fleece & Thank You provides hospitalized children in select cities with tangible comfort, connection, and support through a video message of hope and a fleece blanket. The directed study has involved student creation of templates and content for a range of marketing materials including monthly emails; quarterly awareness campaigns; advertising through Google; personalizing the organization's existing website; and creating an awareness blog with multimedia components. We anticipate these elements will help support the growth of Fleece & Thank You in this modern era of nonprofit marketing.



**ROBERT GILLHAM, '17**  
**Stable Isotope Analyses of Tooth Enamel in Eocene Crocodylians**

Faculty Sponsors: Carrie Menold, William Bartels  
Major: Geology  
Hometown: Homer, Mich.

Carbon and oxygen isotope analyses from tooth enamel carbonates were conducted on a variety of Paleogene (53-48 million years ago) crocodylian taxa in order to help test hypotheses regarding their diets as well as regional and local paleoclimates. Additionally, the results will increase our understanding of isotopic variation across complex ancient landscapes and ecosystems. This study utilizes a vast collection from the Green River Basin of Wyoming where a diverse assemblage of crocodylians is preserved in the latest Wasatchian (Wa7) through middle Bridgerian (Br2) Wasatch, Green River, and Bridger Formations. These deposits represent Basin-Margin (upland) alluvial fan and braided stream to Basin-Center (lowland) meandering stream, lake-margin, and lake environments. The crocodylians occupying the basin at the time were distributed across this landscape with some taxa restricted to lake and lake-margin, or upland regions, while most occupied the river systems in between. The niches of these forms were further partitioned by body size and dietary preferences presumably



as reflected in their varying snout width and dentitions. Sampled taxa included *Boverisuchus vorax*, *Procaimanoidea*, "*Crocodylus*" *affinis*, and Cf. "*C.*" *acer*. The samples were chosen based on condition and their representation of different taxa, depositional environments, individual body size (age), and horizon. These teeth were prepared at Albion College and analyzed at the University of Michigan Stable Isotope Laboratory. Our results indicate different intra- and interspecific isotope ranges with relation to area, horizon, and in Cf. "*C.*" *acer*, body size (age). Only minor interspecific isotope differences related to diet preference were noted.

*Supported by: FURSCA, Lawrence D. Taylor Fund for Undergraduate Research in Geology, Albion College Geology Department Alumni Fund*



Hancock

**MOLLY HANCOCK, '18**

Major: Biology  
Hometown: Midland, Mich.

**SARAH KILBRIDE, '18**

Major: Biology  
Hometown: Bloomfield Hills, Mich.

**KATHRYN LASICH, '18**

Major: Biology  
Hometown: Trenton, Mich.

***Drosophila* as a Model Organism for Light-Activated Compounds**

Faculty Sponsor: Roger Albertson

Azo-stilbenes compounds have cis/trans forms that are photoisomerizable between 400-600nm. This photoisomerizing property allows selective activation or deactivation of the azo-stilbene, which has highly useful research and therapeutic applications. The purpose of our work is to develop a method to deliver photoisomerizable compounds into living *Drosophila melanogaster* fruit flies. Subsequently, we aim to activate the compounds and assay for potential effects on fly neurophysiology. *Drosophila* is a good model organism, since humans and *D. melanogaster* are functionally homologous for 75% of disease-causing genes.



Kilbride



Lasich

Second instar larvae were starved and fed. Control larvae were fed a 5% sucrose/yeast mixture; experimental larval food was supplemented with photoisomerizable compounds. Larval motility was video-recorded and walking distance, speed, and number of turns were quantified using ImageJ software. Control groups demonstrate we have developed a reliable quantitative method to screen drug-fed larvae for neuromuscular defects and we have begun our analysis of larvae fed with photoisomerizable compounds.

*Supported by: FURSCA—Bruce A., '53 and Peggy Kresge, '53 Endowed Science Fellows (Hancock); Kenneth Ballou, '47 Research Endowment for Biology (Kilbride)*



Hall

**THOMAS HALL, '17**

Major: Biochemistry  
Hometown: Midland, Mich.

**LAUREN KELSEY, '18**

Major: Biochemistry  
Hometown: Sanford, Mich.

**Synthesis and Characterization of Photoisomerizing Azo-Stilbenes to Inhibit ALK5**

Faculty Sponsor: Craig Streu



Kelsey

Current cancer treatments, while successful, are not without their shortcomings. Many lack the ability to be selective for specific targets or only rapidly dividing cells. The subsequent off-target interactions can result in undesired side effects. This project focused on the synthesis of a light-responsive ALK5 inhibitor, based upon known inhibitors. The target is designed so that the introduction of specific wavelengths of light can activate the molecule by changing its conformation. Specifically, three azo-stilbene molecules based off of known ALK5 inhibitors were targeted. The synthesis of these molecules and investigations of their photodynamic properties are discussed.

*Supported by: FURSCA—Lawrence B., '72 and Frances Schook Research Fund (Kelsey)*



**KYLIE HEITMAN, '17**  
**The Use of Equine Lavender Aromatherapy to Suppress Stress**

Faculty Sponsor: Brad Rabquer  
 Major: Biology  
 Hometown: West Olive, Mich.

Interrupting horses from their typical day-to-day routine has the potential to cause horses to develop unnecessary stress. Competition horses encounter a wide variety of unnatural and stressful stimuli through hauling to new venues, loud noises, and limited turnout. Unfortunately, many drug regulations are in place for sedatives, tranquilizers, herbs, and other therapeutic tools for those competition horses, creating a challenging decision when it comes to finding useful stress-reducing tools. Lavender has the potential to be used as a therapy in equines to reduce stress levels. When used as an aromatherapy in competition horses, it is a potential alternative that is not illegal.

The objective of this study was to determine whether lavender, when diffused into the air, could be used to decrease heart rate and blood cortisol levels in horses encountering stressful situations like hauling horses in a horse trailer. The specific aim of this study was to determine if cortisol levels and heart rate (HR) levels were suppressed when essential lavender oil is administered through the air during a stressful stimulation. While other studies have explored the benefits of essential oils in human and dog models, it is a relatively unexplored area in equine physiology and veterinary medicine.

A total of 14 horses were individually hauled in a trailer for 15 minutes. Seven of the horses served as the treatment, receiving the lavender aromatherapy treatment; and seven horses served as the control, receiving distilled water aromatherapy. At baseline in the control group, we measured, in beats per minute (bpm), an average HR of 34.3 bpm (+/- 3.5 S.D), which was elevated to 42.4 bpm (+/-3.3 S.D) immediately after stimuli. At baseline in the treatment group, we measured an average HR of 33 bpm (+/-3.2 S.D), which was elevated to 37.8 bpm (+/- 4.9 S.D) immediately after stimuli. Despite the increase, there was no significant difference in HR between the control and treatment groups after stimuli (p-value 0.0714). In addition to HR, we also assessed blood cortisol levels. The baseline cortisol in the control group was 2,166 pg/ul (+/- 1,964 S.D), which was elevated to 11,528 pg/ul (+/- 3,535 S.D) after stimuli. At baseline in the treatment group, the cortisol levels were 340 pg/ul (+/- 218 S.D), which was elevated to 6,815 pg/ul (+/- 4,118 S.D) after stimuli. There was a significant difference between the control and treatment groups at the baseline (p-value 0.0453) and after stimuli (p-value 0.0481) cortisol measurement.

Stimulation by hauling the animals resulted in an increase in HR. Treatment with lavender aromatherapy resulted in a nonsignificant decrease in HR. However, the cortisol data was unreliable due to the significant difference in the baseline cortisol levels between the control and treatment groups.

*Supported by: FURSCA*



**CHRIS HERWEYER, '17**  
**The Life and Times of Washington Gardner**

Faculty Sponsor: Wesley Dick  
 Majors: History, Political Science  
 Hometown: Wyoming, Mich.

If you take a stroll down Albion's Michigan Avenue in 2017, walking west from the Wesley Dorm, you soon arrive at a classic school building with the name "Washington Gardner High School." Who is Washington Gardner, whose name so prominently graces the Albion landscape?

Born on an Ohio farm on February 16, 1845, Washington Gardner was one of nine children. His mother died when he was only four and, in his early teen years, Gardner worked as a farm laborer for six dollars a month and board. Washington's rise from this humble beginning is truly an "American Dream" story. He enlisted in the Union Army at age 16, participating in key Civil War battles until he was severely wounded in 1864. Following the war, Gardner earned a college degree and pursued advanced studies in theology and law. He practiced law and became a Methodist minister, which brought him to Albion in 1887 as pastor of the Albion First Methodist Church. Gardner became a professor at Albion College, but soon public service called. He served as Michigan Secretary of State and, beginning in 1898, Gardner was elected to the first of six terms as a U.S. Congressman—the only U.S. Congressman from Albion. Later, Gardner was honored as the national commander of the Grand Army of the Republic, and President Warren Harding appointed him Commissioner of Pensions in 1921. Washington Gardner died on March 31, 1928.

Washington Gardner's journey from the Civil War to the 1920s illuminates American history and Albion's history. This presentation, based on archival research, is intended to introduce Washington Gardner to today's audience.

*Supported by: FURSCA—Harriet E. Elgin, '36 Endowed Fellowship*



Kazmierczak

**MARCIN KAZMIERCZAK, '18**

Major: Chemistry  
Hometown: Clinton Township, Mich.

**REBECCA RYAN, '18**

Majors: Biochemistry, Spanish  
Hometown: Ann Arbor, Mich.

**Synthesis and Characterization of an Azo-Oxytocin Antagonist Azologue**

Faculty Sponsor: Craig Streu

Azo-stilbene compounds have long been used as dyes, but their popularity has recently surged as their photodynamic properties have shown promise in medical applications. More specifically, having the ability to change conformation, or shape, in response to a specific wavelength of light is advantageous in the spatial and temporal selectivity of the compound. Oxytocin in particular shows disparate behavior depending on the location of its administration and a host of other incompletely understood factors. As such, a spatially and temporally controllable tool for reversible inactivation of the oxytocin receptor would be a valuable research tool. To this end, a novel azo-oxytocin receptor antagonist has been synthesized, its photodynamic properties characterized, and its biological activity evaluated. Further research is ongoing to increase the solubility of the compound in addition to increasing competitive binding to the receptor.

Supported by: FURSCA

**LAUREN KELSEY, '18**

(See Thomas Hall, '17; Lauren Kelsey, '18)

**SARAH KILBRIDE, '18**

(See Molly Hancock, '18; Sarah Kilbride, '18; Kathryn Lasich, '18)

**SARAH KIRCHNER, '17****The Rise of the German Right Wing Movement and Its Impact on Women**

Faculty Sponsor: Midori Yoshii  
Majors: German, International Studies  
Hometown: Whitmore Lake, Mich.

Right wing political extremism has been on the rise in the West—from Donald Trump in the U.S. to Marine le Pen in France, Nigel Farage in U.K., and Viktor Orban of Hungary. The conservative movement has been gaining popularity in Germany as well, despite the post-World War II generation-Germans' pride in their liberal education, with much emphasis on learning the negative legacy of National Socialism so that they would not allow another Nazi-like movement. The rise of the German right wing movement, therefore, alarms us more, and thus deserves our special attention.

My research examines the rise of the German right wing extremist party, *Alternative für Deutschland* (Alternative for Germany, *AfD*), and their policies' impact on women. Germany will vote in its next federal elections on September 24, 2017, and some predict *AfD* to become the third-largest party. If this were to occur, there will be significant setbacks in German women's status in health, politics, and socioeconomic conditions. Nevertheless, public discussions by German media and academics are limited to their impact on racial and ethnic issues only, mostly on their immigration policy, and never about women. Relying on interviews and analysis of German media, literature, and popular culture, this research sheds new light on the reasons why German discourse has neglected women's issues in their discussions over the rise of *AfD*.

**VIRGINIA KIVEL, '18****An Analysis of Available Summer Programming in Albion**

Faculty Sponsor: Suellyn Henke  
Majors: Integrated Science, Elementary Education  
Hometown: Dexter, Mich.

Since the summer of 2016, I have conducted an ongoing research project in which I gathered information from a variety of sources about the summer program network currently in place in Albion. I became interested in this topic given my concentration in elementary education and the changes surrounding the annexation of Albion Public Schools, which was occurring at that time. To begin my research, I surveyed fourth- and fifth-graders at the Albion Community School about their experiences and interests in summer programming. The survey results indicated that students primarily had an interest in three programming areas: just for fun, sports, and science/STEM. For the duration of the summer, I





spent my weekdays interviewing program directors and stakeholders in the community about their experiences as well as their views regarding current strengths and needs for improvement. I also observed and participated in these programs. After 11 interviews and more than 130 hours of observations, I began to categorize my data and identify repeated trends. For example, many program directors expressed the need for a master calendar that would help them coordinate to spread out program offerings and avoid competition for the same participants. As a culmination of this process, I worked with Dr. Sheryl Mitchell, Albion's city manager, and Dr. Harry Bonner, director of Kids at Hope, to schedule a meeting of key stakeholders in the community to share the results of my research and discuss coordination of summer programs.

*Supported by: FURSCA*



**COURTNEY KONDOR, '17**  
**Synthesis of Photoisomerizable Azo Compounds**

Faculty Sponsor: Craig Streu  
 Major: Chemistry  
 Hometown: Kalamazoo, Mich.

The synthesis of photoisomerizable azo-compounds has important applications to the medical field. These compounds, when used as drugs, can be "switched" on and off by changing the molecular conformation around a nitrogen-nitrogen double bond. This "switch" is light-activated and is referred to as photoisomerization. When a specific wavelength of light is emitted onto the compound, it will switch from its cis conformation to its trans conformation. We have designed the compound so that when it is in the cis conformation it is able to fit into the enzymes better and act as an inhibitor, whereas when it is in the trans conformation, it can be quite useless as a drug. This research aims to develop a photoisomerizable COX-2 inhibitor to treat arthritis. The successful synthesis of a COX-2 inhibitor would provide a better alternative to regular NSAIDs for those who suffer from arthritis. Regular NSAIDs inhibit both the COX-1 and COX-2 isozymes when in the body and even specialized COX-2 specific inhibitors are not tissue-selective. Since many side effects appear when the COX-1 isozyme is inhibited, or when the COX-2 isozyme is inhibited in areas not impacted by arthritis, such as the heart, the need for a targetable COX-2 inhibitor has risen. To that end, this presentation will discuss our success synthesizing and photochemically characterizing photoisomerizable versions of highly COX-2 selective inhibitors.

*Supported by: FURSCA*

**KATHRYN LASICH, '18**

(See Molly Hancock, '18; Sarah Kilbride, '18; Kathryn Lasich, '18)

**LUCAS LUSK, '19**

(See Tyler Crespo, '19; Lucas Lusk, '19)



*Kolanowski*

**BEN KOLANOWSKI, '17**

Majors: Finance, Business and Organizations  
 Hometown: Hastings, Mich.

**TAYLOR SHRADER, '17**

Majors: Communication Studies, Business and Organizations  
 Hometown: Novi, Mich.



*Shrader*

**ANTHONY WAITE, '17**

Major: Business and Organizations  
 Hometown: White Lake, Mich.

**JACOB WINKLER, '17**

Major: Business and Organizations  
 Hometown: Mattawan, Mich.

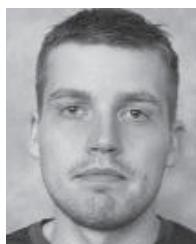


*Waite*

**Briton for Life Initiative**

Faculty Sponsors: John Carlson, Laurel Draudt

The Briton for Life Initiative is a fundraising and outreach campaign that specifically targets Albion College graduates within the last five years, as well as current students who are committed to lifelong service and interest for the betterment of the institution. Through analysis of future data provided by the Office of Institutional Advancement, as well as surveying of recent graduates, we have created a comprehensive method of communication to promote philanthropic involvement from our current and former student body.



*Winkler*



**THOMAS MARTIN, '17**  
**Growing Vegetables for a Growing Community: An Update on the Albion College Student Farm**

Faculty Sponsors: Trisha Franzen, David Green

Major: Biology

Hometown: Wyandotte, Mich.

Since 2010, Albion College has offered students the opportunity to get involved with sustainable gardening in their own backyard. With its founding, the Student Farm has represented not only a custodial duty to our environment, but also a will to support the Albion community. With the addition of a hoop house in 2011, the farm has utilized four growing seasons and continues to expand the range of crops it can sustain. Many students who have never made it to the Albion Farmers' Market may have tried some of the Student Farm produce without realizing it, as the fruits and vegetables are also served at the cafeteria on campus. As the years have passed and student interest has increased, sales have increased. Although great strides have been made in the last few years, much can still be improved. Here, the practices of larger, more successful student farms are examined to create a plan for the future. In order to continue to improve the Student Farm and its produce, year-round staffing must be hired and, more importantly, increased student involvement is required.

Through its characterizations within national conversations about identity, the tourism industry gave Niagara a greater commercial interest and a larger national significance, not only as an awesome and inspiring physical phenomenon, but as an example of the glorious natural potential of America's land and the ingenuity of its people.

Niagara was soon studded with more than the limited hotels and transportation options present in 1825; the additions of museums, curio shops, parks, omnibus companies, ferries, tour guides, and fireworks made Niagara America's premier travel destination. However, the narrative of unspoiled wilderness remained in sensational local guidebooks, along with a growing emphasis on the landscape's improvement and domestication—both aspects equally valued and praised as good and American.

*Supported by: FURSCA—Bethune Fellows Student Research Endowment*



**KENTON MCCOSH, '17**  
**Buddhist Meditational Practices in a Western Biomedical Context**

Faculty Sponsor: Peter Valdina

Majors: Biology, Religious Studies

Hometown: Hillsdale, Mich.

Discoveries in regard to the evaluation of Buddhist medicine and Western Biomedicine are being discussed by many scholars within the field. Some, namely those who attended a conference in 2003 at MIT titled "Investigating the Mind," state there are grounds for comparison. Others, such as Donald Lopez, scrutinize these comparisons and indicate limitations within the compatibility of the two practices. Recent scholarship including Janet Gyatso and C. Pierce Salguero has displayed similarities and analogies regarding the different medicinal practices of Western allopathic medicine and indigenous Indian medicine. Analysis of historical presentations of Buddhist medicine points toward possible similarities between Western Biomedicine and Ancient Indian medicine. More recent experiments suggest that there is a correlation between the performance of yoga-based practices and meditation, and an increase in the parasympathetic portion of the autonomic nervous system. In addition, these similarities have been recognized and acknowledged by the 14th Dalai Lama, who argues that meditation is what truly contributes to a real understanding of the mind, beyond the limitations of science. My research explores this particular field of study. I argue that the idea behind meditational and yogic practices in the Buddhist context is the development of a healthy central nervous system. As such, there are future horizons for contact between Ancient Indian practices, such as meditation and yoga, and Western Biomedicine.



**ANDREW MATTSON, '17**  
**'When Shall We Get to the Wilderness?'**  
**The Reflection of National Identity in Early American Tourism at Niagara Falls, 1820-1850**

Faculty Sponsor: Marcy Sacks

Major: History

Hometown: Davisburg, Mich.

Travelers had long sought the glorious views of Niagara Falls, but by 1825, as the Erie Canal began dropping tourists on Niagara's doorstep, the Falls' dramatic landscape had become a prominent part of American national iconography. Its proliferation in literature and visual art dominated the cultural output of the United States and inspired the treks of many visitors. Cultural narratives repurposed from characters and stories like that of James Fennimore Cooper's *Leather-Stocking Tales* were utilized to portray the Falls as an eternally unconquered wilderness, while structural additions like mills and bridges were conversely emphasized as examples of how American ingenuity could domesticate any landscape. The tourism industry and guidebook writers at Niagara Falls successfully appraised the local landscape and stories through both lenses, depending on which approach best suited their interests.



**PHILIP MEYER, '19**  
**Hitchhike 1919: Great Lakes Sailing Songs from the Journals of Franz Rickaby**

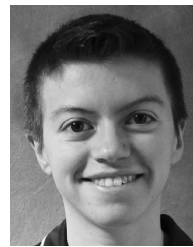
Faculty Sponsor: Clayton Parr  
 Majors: Music, Business and Organizations  
 Hometown: Troy, Mich.

Franz Rickaby (1886-1925) was a professor of English at the University of North Dakota and Pomona College. A noted playwright and poet, Rickaby set out on a hitchhiking trip in 1919, starting in Charlevoix, Mich., and traveling through Wisconsin and Minnesota, ending in North Dakota. He took no money with him on the trip, convinced he could “earn his keep” by singing and fiddling along the way. He collected songs from local singers all along the trip—most of them were lumbering songs, but some sailing songs were included. Many of these songs were published posthumously by Harvard University Press in 1925. Reviews noted that Rickaby had documented enough songs to fill a second book. The presentation will include all the songs having to do with sailing in both journals, with background information about other sources and versions of those songs as well. A few of the sailing songs referenced in the text will be sung along with the presentation. Rickaby’s versions of these songs will be compared with those from other Great Lakes song sources.

*Supported by: FURSCA*

female flies that have an inducible source of hobo transposase were crossed with HOP8 male flies and heat-shocked to trigger transposition, leaving a double-strand DNA break requiring repair behind. The resulting mosaic-eyed male flies were then crossed with wild-type female flies because mosaic eyes mark meiotic recombination in the P element. Female flies with white eyes, indicating that hobo transposition occurred, were collected and stored in a freezer. Experiments are under way to determine the original location of hobo in the HOP8 flies and the new insertion sites in the collected progeny.

*Supported by: FURSCA*



**ANGELA MORRISON, '17**  
**Living on the Edge: Improved Fourier Reconstruction Using Edge Information with Applications to MRI**

Faculty Sponsor: David Reimann  
 Major: Mathematics  
 Hometown: Westland, Mich.

Magnetic resonance imaging (MRI) is a critical non-invasive tool used by medical professionals to take images of the human body. MRI machines work by returning the Fourier Coefficients corresponding to the patient being imaged, which are then used to reconstruct a picture of the patient. The imaging process is error prone due to instrumentation limitations as well as motion by the patient during the scanning process. Additionally, due to the presence of multiple tissues and organs in patients’ bodies, the images tend to have a piecewise-smooth structure, resulting in image reconstruction errors that distort the boundaries between tissues due to the Gibbs Phenomenon. I propose a highly effective method of detecting edges from Fourier data in order to produce more accurate reconstructions by mitigating Gibbs artifacts. I describe several advanced sampling and reconstruction methods supported by numerical results that produce quicker and more accurate reconstructions relative to the modern standard.

*Supported by: National Science Foundation, National Security Agency*



**ANNA MILLER, '18**  
**The Effect of Hobo Transposon Excision and DNA Repair in *Drosophila melanogaster***

Faculty Sponsors: Ken Saville, Brad Cavinder  
 Majors: Biology, Music  
 Hometown: Livonia, Mich.

As the repository of genetic information, it is critical to organisms that DNA damage is repaired quickly and with high fidelity. When DNA damage is improperly repaired, it may cause diseases such as cancer, Cockayne syndrome, and severe combined immunodeficiency. DNA can be mutated by numerous agents both external and internal. One internal source of DNA damage is from the transposition of transposable elements, including the P and hobo elements. Transposable elements “jump” out from one section of the DNA and reinsert into another, leaving double-strand DNA breaks at the excision site. Hobo excisions are preferentially repaired by nonhomologous end-joining (NHEJ). DNA repair and transposable elements themselves can be studied in *Drosophila melanogaster*. This study looked at the hobo on P, or HOP, element. The hobo element is located inside of the P element; HOP8 is nonautonomous and needs hobo transposase to be supplied in trans. Curly winged, glazed-eye





**SHANNON MURPHY, '17**  
**Coupling Reactions Catalyzed by Palladium Nanoparticle/Carbon Microsphere Composites**

Faculty Sponsor: Kevin Metz  
 Majors: Chemistry, Mathematics  
 Hometown: Hope, Mich.

This project studies the effect of palladium nanoparticle/carbon microsphere composites as catalysts in the Suzuki reaction. Carbon microspheres were made by ultrasonic spray pyrolysis and then palladium nanoparticles were placed on top of these microparticles through a reaction with  $\text{Sn}^{2+}$ . The resulting composites were then used to carry out Suzuki coupling reactions. Suzuki reactions can be used to synthesize compounds such as agrochemicals, pharmaceuticals, polymers, and compounds which are used in industry. These coupling reactions form C-C bonds by reacting an aryl halide and a boronic acid with the use of a palladium catalyst. Studies have shown that yields depend on the aryl halide used with  $\text{I} > \text{Br} > \text{Cl}$ . In this project 4-bromotoluene, 4-iodotoluene, or 4-chlorotoluene were used as starting materials to test the activity of our composites in Suzuki reactions. The product, 1,1 biphenyl 4-methyl, was analyzed via gas chromatography/mass spectrometry to determine percent yield. 10 wt % palladium on carbon as the catalyst was used as a control, and produced lower yields for the Suzuki reactions. The latest results will be presented.

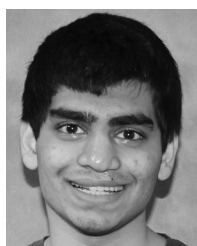
Supported by: FURSCA

**JACOB NERACHER, '17**

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

**JORDAN NEWSON, '17**

(See Alexandra Rola, '17; Jordan Newson, '17)



**NIKHIL PATEL, '18**  
**Investigation of the Binding Targets of miR9**

Faculty Sponsor: Brad Rabquer  
 Majors: Biology, Economics and Management  
 Hometown: Grosse Pointe Woods, Mich.

Rheumatoid arthritis (RA), a chronic, auto-immune, inflammatory disorder characterized by progressive joint destruction, affects 0.3-1% of people worldwide and is a major cause of

disabilities. Monocyte (MN) trafficking into inflamed joints is critical to the pathogenesis of RA. Micro RNAs (miRNAs) are approximately 22-nucleotide-long, single-stranded, noncoding RNA which bind to mRNA, thus making them act as gene expression regulators. miRNAs bind to complementary sites on the 3'-end of target mRNAs and either block their translation or enhance their degradation, resulting in downregulation of certain genes. Using transformed MNs (U937 cell lines specifically), the expression of the miRNA miR9 can be modulated using specific miRNA mimics and inhibitors. My gene of interest is CTNNA1, which prior research in Dr. Rabquer's lab has predicted miR9 to be a suitable binding match. If miR9 binds to CTNNA1, then miR9 will mediate its degradation, which would potentially result in muscle contraction failure.

Supported by: FURSCA—Jane Seymour Kilian, '39  
 Endowed Fellowship

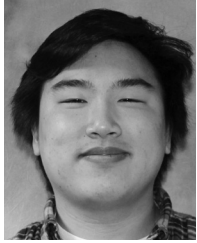


**SAVANNAH RANA, '17**  
**Vanadium Complex Induced Cancer Cell Death via RIPK3 Activated Necroptosis**

Faculty Sponsor: Brad Rabquer  
 Major: Biology  
 Hometown: Grosse Pointe, Mich.

Cancer, at the cellular level, is characterized by uncontrolled cell proliferation caused by a loss of control of the cell's normal cycle of growth and division. This loss of control could result in programmed cell death, or apoptosis. Previous studies in our lab have shown the efficacy of using vanadium complexes to inhibit cancer cell growth, yet not the activation of the caspase 3/7 apoptosis pathway. The necroptosis pathway is a mode of inflammatory programmed cell death characterized by the phosphorylation of the proteins receptor interacting protein kinase 3 (RIPK3) and multi-lineage kinase like (MLKL). We hypothesized that the vanadium-complex-treated HT-29 cells are being terminated by means of the necroptosis pathway. In this study, HT-29 cells were used as a model for colon cancer. Vanadium complexes (VCs) with 5-Br and 3-Br functional groups were used as treatments *in vitro*. Immunofluorescence assays were performed on cells treated with 5-Br control, 3-Br (0.5mM), and 5-Br (0.5mM) VCs for incubation periods of 24 hours and three hours. An increase in phosphorylated RIPK3 was evident after both three- and 24-hour incubation periods, indicating activation of the necroptosis pathways. Identical treatments were used on cells from which protein lysates were then collected and run in western blots to detect the presence of total and phosphorylated (RIPK3); however, activation of the RIPK3 necroptosis pathway was not confirmed.

Supported by: FURSCA



**SAMUEL RASEMAN, '19**  
**Several Impediments to Truth as Correspondence**

Faculty Sponsor: Jeremy Kirby  
Major: Philosophy  
Hometown: Kalamazoo, Mich.

Herein I consider the view that a causal correspondence theory of truth is needed to explain the link between belief and successful action (Kitcher 2002).

**ZAIRE REID, '19**  
**Campus Carbon Audit and Cost-Benefit Analysis of a Carbon-Reduction Project**

Faculty Sponsor: Tim Lincoln  
Major: Business and Organizations  
Hometown: Detroit, Mich.

A carbon audit shows the total amount of greenhouse gas emissions, calculated as CO<sub>2</sub> equivalents, emitted by an organization. Albion students have completed audits for the college as far back as 2000 and have completed audits for 10 additional years since then. These show trends that can be related to (1) the building space served and technology deployed, and (2) the enrollment of students. The present study includes an audit for 2016 to see how trends have changed and how that has affected the emission of carbon.

All audits show that up to 90% of the emitted CO<sub>2</sub> comes from natural gas burning and purchased electricity, and we know generally that heating-ventilation-air-conditioning (HVAC) systems of buildings contribute heavily to these. Data from the audit and the Albion Environmental Dashboard will be combined to better estimate the HVAC contribution to CO<sub>2</sub> emissions. In order to seriously address the College's emissions we need to implement projects that lower HVAC and other major uses of electricity and natural gas on campus. This project reports the dollar costs and carbon benefits of a potential pilot project of installing a geothermal HVAC system in the renovated Whitehouse Nature Center. Geothermal technology claims up to a 70% reduction in HVAC energy use. The results of this study will allow the College to see clearly the up-front cost, operational dollar and emissions savings, and educational benefits of this option as renovations proceed.



**MEGAN REILLY, '18**  
**Identifying Allelic Patterns in Equine Muscle Types Using Microsatellite Genetic Markers**

Faculty Sponsor: Sheila Lyons-Sobaski  
Major: Biology  
Hometown: Brighton, Mich.

Horses are bred for different characteristics depending on the work humans need them to do. For riding purposes, horses are bred to have lighter muscle and be more mobile, while for carriage-pulling and farm work, they are bred to have bigger, stronger muscles. This research aims to discover genetic differences that are associated with distinct muscular types in a variety of horse breeds (*Equus caballus*). Microsatellite genetic markers were used to determine allelic patterns among horse breeds and pinpoint alleles that may be associated with different muscular types.

*Supported by: FURSCA*



**SYDNEY ROEDER, '17**  
**Wasta and Water in Jordan: A Study of the Political Ecology of the Red-Dead Sea Project**

Faculty Sponsors: Allison Harnish, Andrew Grossman, Patrick McLean  
Majors: Anthropology, International Studies  
Hometown: Midland, Mich.

The Hashemite Kingdom of Jordan has been deemed time and time again to be “water scarce,” with an annual per capita availability well below United Nations standards. The drying up of the Jordan River has not only caused problems for those that depend on it, but also the Dead Sea, which has been receding at an alarming rate. In response to this, the international community has implemented the Red-Dead Sea Pipeline Project, which will pump water from the Red Sea to the Dead Sea. In addition to “refilling” the Dead Sea, this project will provide desalinated water to citizens in Israel and Jordan. However, this water will be privatized which has been proven by anthropologists to be both successful and unsuccessful in the past. This thesis attempts to bring into conversation the political ecology of water scarcity, conflict, and water privatization with the most significant societal factor in Jordan—the tribal system. It is critical in laying the groundwork for further study on what the Red-Dead Sea Pipeline will mean for the citizens of Jordan.

*Supported by: FURSCA—Robert M. Teeter Research Fellowship Endowment, Kim Tunnick Endowment*



Rola

**ALEXANDRA ROLA, '17**

Major: Biochemistry  
Hometown: Gaylord, Mich.

**JORDAN NEWSON, '17**

Major: Biology  
Hometown: Chicago, Ill.



Newson

**Synthesis and Characterization of an Azo Derivative of Flupoxam®**

Faculty Sponsor: Craig Streu

Most herbicides today are produced through random screening, rather than targeting a known pathway. This practice and improper use of known herbicides has resulted in an outbreak of resistance to commercial herbicides in use today. One branch of herbicides that has little resistance are cellulose biosynthesis inhibitors (CBIs). However, the mechanism

of action for these compounds and the mechanism of cellulose biosynthesis is still poorly understood. This paper focuses on the synthesis of a photoisomerizable azo derivative of the commercial CBI Flupoxam® as a tool to study the cellulose biosynthesis pathway of the primary cell wall. The azo compound would allow for high specificity and control of the tool in its active form due to the reversible isomerization of azo compounds, allowing the compounds to act as a switch to monitor the effect of the herbicide at different stages of cellulose and microtubule formation. Knowledge of this pathway would allow the development of targeted herbicides with new modes of action as well as expand the current understanding of plant growth and morphology.

*Supported by: FURSCA*

**MADELEINE RUTLEDGE, '19**

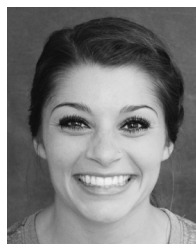
(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership Between the USA and France – Mybriefcase)

**REBECCA RYAN, '18**

(See Marcin Kazmierczak, '18; Rebecca Ryan, '18)

**SPENCER SHAHEEN, '19**

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

**JESSICA SHAW, '17****The Impact of Athlete Mindset on Focus**

Faculty Sponsor: Mareike Wieth  
Major: Psychological Science  
Hometown: Allegan, Mich.

Previous research has found conflicting results when investigating the relationship between competitive athletes and cognitive processes. Vestaburg et al. (2012) found that soccer players had significantly better measures of executive functions compared to a non-soccer playing norm group. Contrary, Memmert et al. (2009) found that athletes in team sports did not perform better in a series of attention tasks compared to non-team athletes. This study was designed to investigate this potential difference by looking at the importance of instructions on performance. Research has shown advantages of using instructions that direct the athlete's attention toward overall outcomes of their actions compared to the specific execution of their actions (Ehrlenspiel, 2001 Peh et al., 2011). While the importance of instructions on athletic skill execution are well established, little research has investigated the impact of instructions on the cognitive processes of team and non-team athletes. This study was therefore designed to investigate the role of instructions and athlete type on attentional processes.

Athletes from a variety of sports were asked to complete a pattern visualization task. Half of the athletes were instructed to focus on one aspect of the pattern while the other half were instructed to focus on the whole pattern. In addition, athletes were asked background information about their sport and the position they play. Results showed that athletes who are required to engage with teammates performed better on the pattern visualization task when instructed to focus on the whole pattern than when instructed to focus on one aspect of the pattern.

**TAYLOR SHRADER, '17**

(See Ben Kolanowski, '17; Taylor Shrader, '17; Anthony Waite, '17; Jacob Winkler, '17)

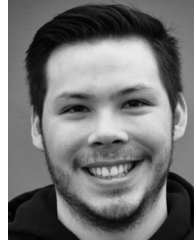




**MARISSA STEGMAN, '17**  
**A Comparison of Surface Water Salt Concentrations from Different Road Salting Methods**

Faculty Sponsor: Carrie Menold  
Major: Biology  
Hometown: Algonac, Mich.

Road salt applications have been prevalent since the 1960s, resulting in notable increases in concentrations of chloride in surface and ground waters since that time. Today, rock salt (NaCl) as well as other types of salts (ex. MgCl, KCl, K-acetate) and salt alternatives (ex. beet juice, cheese brine) continue to be heavily used on roads and sidewalks in snowy months due to their chemical composition which can substantially lower the melting point of water thus breaking the bondage of ice from pavement. Because of the widespread use, and often high application concentrations, these salts have become a source of significant environmental concern. As such, there is growing interest in adjusting salt types and concentrations as well as application methods. Therefore, this research sought to compare saline surface water concentrations from two areas using different salting applications: the city of Albion, MI and the adjacent campus of Albion College. Samples were collected from puddles created by meltwater on sidewalks, in roads, and parking lots, as well as two sample locations (upstream and downstream) in the Kalamazoo River, which runs through both the city of Albion and the college. Samples were analyzed for conductivity, pH, and in some cases major anions. By sampling these sites consistently throughout the winter season and monitoring the additions of road salts, we gained an understanding of when and where higher concentrations of salts were present in the city and on campus. ArcGIS and ArcGIS Collector were also used in the salt-concentration analysis by calculating and presenting correlations between the different methods and salts used by Albion College and the city of Albion and how these differences related to varying degrees of salt concentrations found between the two areas. In general, it was found that higher salinity concentrations were found in all areas during warmer days since the evaporation of melt water occurred, thus increasing the ratio of salt to H<sub>2</sub>O. Because of the substantial ecological consequences of having high salt concentrations in the environment, the results of this study are an important first step in identifying differences in salt application methods. These observations can be used to help develop best practices in salt application methods that will aid in minimizing harm to the environment.



**IAN STEWART, '19**  
**Gender Differences in the Relationship Between Decisiveness and Sexism**

Faculty Sponsor: Eric Hill  
Major: Psychological Science  
Hometown: Laingsburg, Mich.

The present study examined decisiveness as a predictor of sexism. Research suggests there is a positive relationship between decisiveness and self-esteem (Onwumere et al., 2010), and defensive high self-esteem, particularly as it trends toward narcissism, is related to prejudice (Schnieders & Gore, 2011; Jordan et al., 2003). Moreover, decisiveness has been directly linked to racism in previous research (Roets & Alain, 2006). The present study looked at the relationship between decisiveness and both benevolent and hostile sexism. Given well-established gender differences in narcissism (see Grijalva et al., 2015 for a review) and potentially in decisiveness by proxy, this study also examined gender as a potential moderator of the decisiveness-sexism relationship.

In this study, 332 adults (201 females,  $M_{age} = 18.97$ ,  $SD_{age} = 2.365$ ) were recruited from the introductory psychology participant pool at a large university in the southwestern United States. In an online administration, participants completed survey measures of decisiveness and sexism as well as other measures of social attitudes and beliefs not included in the present analyses.

On average, men were significantly higher in hostile sexism than were women. Men and women did not significantly differ in levels of benevolent sexism, although there was a trend toward higher levels among men. Men were significantly higher in decisiveness than were women. Regression analyses revealed a significant interaction between participant gender and decisiveness on hostile sexism. Among women, decisiveness was unrelated to hostile sexism. Among men, however, greater decisiveness was associated with greater hostile sexism, on average.



**LAUREN STULL, '19**  
**miR429: Potential Regulator of PAK2 in Inflammatory Monocytes**

Faculty Sponsor: Brad Rabquer

Major: Biology

Hometown: Commerce Township, Mich.

Rheumatoid arthritis is an inflammatory disease that leads to the eventual deterioration of joints. Monocytes receive signals that cause them to travel to the site of the inflammation due to the involvement of target genes. miRNAs regulate mRNAs and protein synthesis in these monocytes and have the ability to silence mRNAs by preventing translation or aiding degradation. Previous results from our lab have evidenced that certain microRNAs were elevated in rheumatoid arthritis monocytes and had possible gene targets. miR429, which has PAK2 as a theoretical gene target, has been shown to inhibit migration of certain cancer cells, along with reducing protein expression of its target genes. PAK2 regulates inflammation through activating downstream targets. We hypothesized that miR429 binds PAK2 and mediates its degradation. The addition of target gene PAK2 to the plasmid pmirGLO vector was necessary to perform the luciferase assay to test this hypothesis. First, the vector was transformed into *E. coli* and the plasmid was isolated. After amplification of the plasmid, restriction enzymes SacI and SacII were used to perform a double digest on the pmirGLO vector, prepping it for the insertion of the PAK2 gene. THP-1 monocytes were used as a source of mRNA. cDNA was prepared and primers specific to the 3' UTR of PAK2 were used to produce a PCR product of 238 base pairs. Ligation of the plasmid and PAK2 was then performed. We concluded that the 3' UTR of PAK2 was cloned into the pmirGLO vector for the assessment of miR429 binding.

*Supported by: FURSCA*

*Scientific Inquiry* combines my major musical medium, the clarinet, with electronically manipulated and combined chemistry laboratory sounds. Specifically, the electronic half of the work belongs to a subgenre of electronic music called musique concrète, which is created by recording and manipulating ambient or environmentally found noises. *Scientific Inquiry* has seven movements, which I call “experiments,” that represent both principles of chemistry and my own experiences in the laboratory. The entire process of creating this work was an experiment for me since I have never composed electronic music or composed something that I intended to perform publicly before. In addition, the clarinet part often utilizes experimental performance techniques that are not common in traditional clarinet repertoire as well as unusual scales and sonorities. In my presentation I will discuss the creative process and musical outcomes behind *Scientific Inquiry* as well as perform excerpts of my work.

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

**GRACE TALASKI, '17**  
**Première Rhapsodie for Clarinet and Orchestra by Claude Debussy**

Faculty Sponsors: Sarah Manasreh,  
James Ball

Majors: Music Performance, Chemistry

Hometown: Caro, Mich.

*Première Rhapsodie* is one of two pieces that Claude Debussy composed for solo clarinet. Debussy composed this piece in 1909-1910. When Debussy was added to the Board of Directors of the Paris Conservatory, he was obligated to compose two works for the next year's clarinet examinations. This is one of those pieces. Debussy originally composed *Première Rhapsodie* for clarinet and piano, and he orchestrated it in 1911. This piece is the most famous clarinet composition of the symbolist/impressionist movement. Nearly everything about performing this piece is difficult: finding the right places to breathe, mastering the phrasing, controlling the intonation, playing smoothly enough, keeping up with the key changes, and succeeding with the demanding level of technical difficulty. Despite the many challenges it presents, *Première Rhapsodie* is one of the most popular pieces in the clarinet repertoire and is extremely beautiful when performed well. With a dream-like character and a sense of timelessness, *Première Rhapsodie* possesses the qualities that are most admired in Debussy's music.



**GRACE TALASKI, '17**  
**Scientific Inquiry: A Composition for Clarinet and Electronics**

Faculty Sponsor: Samuel McIlhagga

Majors: Music Performance, Chemistry

Hometown: Caro, Mich.

Chemistry and music seem to have nothing to do with each other besides their shared dependence on physics and the fact that both use things called instruments. As a student who studies in both of these fields, I have often found the disparity between chemistry and music frustrating. Seeking a way to combine my two major interests, I realized that the rich variety of sounds produced by chemistry laboratory tools and machines has great musical potential. My composition, *Scientific Inquiry*, is my attempt to find commonality between chemistry and music.



**STEPHANIE THURNER, '17**  
**How Does Variation in Life History Strategies Affect Long-Term Population Trajectories of Eelgrass?**

Faculty Sponsor: David Reimann  
 Majors: Mathematics, Biology  
 Hometown: Caledonia, Mich.

Contemporary declines in seagrass habitats worldwide warrant understanding factors that may allow managers to predict change and recovery in these habitats. In the Pacific Northwest, eelgrass (*Zostera marina*) forms these critically productive meadows and has experienced instances of localized population decline. Eelgrass reproduces using two different life history strategies, asexual and sexual reproduction, with varying life history strategies between populations. It is unknown how variation in life history strategy affects the long-term population trajectories of eelgrass. In this study we develop a stage-based matrix population model and analyze populations with variations in sexual and asexual reproduction. We saw that the model is a highly conservative estimate for solely sexually reproducing populations, and an overestimate for populations with asexual reproduction. We also see that recovery of a population back to initial population levels after a disturbance is different when density is determined spatially rather than by looking at the entire area. Further data collection and refinement of vital rates as well as the addition of other environmental conditions will increase the accuracy of the model and help inform management and conservation strategies.

*Supported by: National Science Foundation Research Experiences for Undergraduates*

social support. The results of the study showed that there is not a significant correlation between the organizational communication style of a group and the perceived level of social support of participants.

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**CHRISTINA MINH VO PHAN, '19**

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

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**ANTHONY WAITE, '17**

(See Ben Kolanowski, '17; Taylor Shrader, '17; Anthony Waite, '17; Jacob Winkler, '17)



**WENDI WANG, '18**  
**Interactions Between MHC Class II Molecules and T-Cells in the Context of Rheumatoid Arthritis**

Faculty Sponsor: Brad Rabquer  
 Major: Biochemistry  
 Hometown: Midland, Mich.

Rheumatoid arthritis (RA) is an autoimmune disease that attacks the lining of the joints leading to an inflammatory response causing severe pain. RA is associated with HLA-DR Class II genes, which are responsible for the immune response. The specific genes involved are DR1 and DR4. Despite their association with RA, the two DR genes differ by polymorphisms and have different functions. The focus of the research is to determine how the polymorphisms control the differential function in the stimulation of T-cells between the two genes. The HLA-DR genes were mutated through site-directed mutagenesis and then the antigen presenting cells were transfected. Antigen presentation assays were done as a means of assessing the effect of each polymorphism on the function of the DR molecule. Flow cytometry was used to screen for the DR expression by immunofluorescence. The result was that polymorphism in amino acid residue (AA) 71 played a major role in the recognition of the peptide by DR1 and DR4 to restrict the T-hybridomas. By changing the arginine in DR1 to lysine in DR4, this greatly reduced the T-cell recognition of the DR1 peptide but did not reduce the binding. A similar response ensued with AA340. It is unlikely that one residue controls the function of the T-cell recognition. The data suggest that the polymorphisms cause a rotation of the backbone of the peptide in the way that is bound to both DR1 and 4 to provide specific sites of interaction for the T-cells.



**ASHLEY TICE, '17**  
**Investigating Prescriptive Organizational Approaches in Albion College Organizations**

Faculty Sponsor: Vicki Baker  
 Major: Business and Organizations  
 Hometown: Clarkston, Mich.

This study investigated the relationship between organizational communication approaches in collegiate organizations and perceived social support level of participants. Fifty students (25 women, 25 men) attending Albion College, a small liberal arts college in the rural Midwest, were approached in various on-campus locations to complete a paper-and-pencil study at their convenience. Participants completed one survey including two scales. The first scale was used to classify the organizational communication style of the on-campus organization the participant is most prominently involved in, and the second was used to find the participant's overall perceived level of



**LAUREN WIEGAND, '18**

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

**JACOB WINKLER, '17**

(See Ben Kolanowski, '17; Taylor Shrader, '17; Anthony Waite, '17; Jacob Winkler, '17)

**KATIE ZINKEL, '17****Do Changes in Children's Attributions Depend on Changes in Theory of Mind?**

Faculty Sponsors: Andrea Francis, Mareike Wieth

Major: Psychological Science

Hometown: Birmingham, Mich.

When trying to explain the behaviors of others, adults commonly attribute actions to either the person's disposition (their personality) or the person's situation (outside factors) (Heider, 1958). Children also have the ability to explain the behavior of others, but do so differently depending upon their age. Rholes and Ruble (1984) found that 5- and 6-year-olds were less likely to explain others' behaviors based on dispositional factors than were 9- and 10-year-olds. Therefore, children may be more likely to make each type of attribution depending on their age. One possible reason for the age differences in children's attributions is the development of Theory of Mind. Theory of Mind is the understanding that people's behaviors are related to internal mental states. The current study was designed to examine the role of Theory of Mind in children's use of dispositional attributions.

Children ages 4-10 completed an attribution task, in which they were asked why a doll would hypothetically take a cookie from them. Participants then completed a Theory of Mind task where children watched a doll, Anne, hide a marble from another doll, Sally, and then answered a variety of perspective-taking questions (e.g., Where will Sally look for the marble?). Results showed that the presence of Theory of Mind was only associated with a greater proportion of dispositional attributions for younger children (4-6 years) but not for older children (7-10 years). This suggests that Theory of Mind only plays a significant role in children's attributions early in development but does not later.

*Supported by: FURSCA*

**MARTINA ZAFFERANI, '17****Quest for Enlightenment: Exploitation of Photoswitchable Molecules as Chemical Weapons in Treatment of Diseases**

Faculty Sponsor: Craig Streu

Major: Biochemistry

Hometown: San Marino

Research and design of increasingly selective chemotherapeutics remains an area of intense research and interest in the pharmaceutical industry. Tubulin inhibitors play a vital role in the functioning of alpha and beta tubulin, and are central agents in the control of cell division. Despite being effective in causing cellular apoptosis, they lack selectivity and capacity to distinguish between cancer cells or healthy cells with highly proliferative properties. Therefore, we concentrated our efforts in designing a molecule that would retain the efficacy of a normal tubulin inhibitor, along with new features that would allow for greater species and tissue selectivity. We synthesized a photoisomerizable compound, which is activated only at specific wavelengths of light, consequently broadening the concept of tubulin inhibitors and creating solid ground for further investigation for efficacy and toxicity.

*Supported by: FURSCA, American Chemical Society Petroleum Research Fund*



## Albion/L'École Supérieure de Vente (SDV) Entrepreneurial Exchange

Faculty Sponsors: Vicki Baker (Economics and Management), Laurel Draudt (Gerstacker), Catherine Bruneteaux-Swann (SDV), Annie Towhill (SDV)

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

Albion students, along with their advisor, spent the week of fall break in France. During this time French and American students, working in teams, developed market surveys and started to lay the groundwork for the development of a new business venture. They

created a market research plan and marketing strategy for their chosen business. Student teams were coached by French and American experts on their specific endeavor and marketing strategy. At the end of the week, students presented their preliminary business plans. With relationships solidified and plans in place, the teams continued to work together from afar—utilizing virtual meeting rooms and other technology to stay in touch and move the plans forward. The French students spent the week leading up to the Isaac Student Research Symposium in Albion, visiting their American teammates and putting the final touches on their plan, culminating in presentations at the symposium. The French team(s) with the best business ideas will have the opportunity to present in front of French bankers and venture capitalists in the near future.

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



*Student and staff participants in the 2017 International Entrepreneurial Exchange.*

**Business Plan Development: An International Partnership Between the USA and France – Go Global**

**REBECCA BARRY, '18**

Majors: Business and Organizations, Communication Studies  
Hometown: Manistee, Mich.

**MARTIN DUTERTE**

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

**JULIA FLEURENCE**

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

**THOMAS GASTINEAU**

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

**QUENTIN JOURDAN**

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

**CLOTILDE LE BOLLOCH**

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

Go Global is a travel application with the ability to provide medical, travel, and insurance information. Many international travelers are confused or unaware about healthcare policies and what to do if they become ill while traveling abroad. Go Global is a trip advisor for medical care with country-specific regulations, language translation, business protocol, and access to insurance coverage information to help manage any minor or major health complication.

**Business Plan Development: An International Partnership between the USA and France – Open Innovators**

**SAMANTHA COON, '18**

Major: Business and Organizations  
Hometown: Ypsilanti, Mich.

**JACOB NERACHER, '17**

Major: Communication Studies  
Hometown: Wixom, Mich.

**GALIEN DEGUEURSE**

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

**CAMILLE DELANDE**

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

**LINA FRIH**

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

**CHARLIE VANNIER**

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

Open Innovators is an online platform that allows colleges, students, and businesses to work together in an innovative consulting way. Businesses are looking for new and innovative solutions to company problems, and colleges are looking to form new relationships for their students to network and gain real-world experience. Students brainstorm, test products, and innovatively consult for companies, while gaining experience and improving their network.



## **Business Plan Development: An International Partnership Between the USA and France – Mybriefcase**

### **MEGAN BRITTON, '17**

Major: French  
Hometown: Frankenmuth, Mich.

### **MADELEINE RUTLEDGE, '19**

Majors: Business and Organizations, Finance  
Hometown: Sault Ste. Marie, Mich.

### **SPENCER SHAHEEN, '19**

Major: Entrepreneurship  
Hometown: Rochester, Mich.

### **LAUREN WIEGAND, '18**

Major: Business and Organizations  
Hometown: Brighton, Mich.

### **KEVIN BARBERIO**

Major: Business Engineering  
Hometown: Sartrouville, France

### **JEREMY CLAVEAU**

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

### **JULIEN GUIISNE**

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

### **HELENE LORVELLEC**

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

Mybriefcase is an application that helps match college students to potential employers. Our app creates a more convenient system for college students to use. It provides a space where the students can get advice and help with the application process. Also, it connects students and recent graduates to an entry-level job or internship. On the business side, Mybriefcase helps recruiters find the most qualified college students in a more efficient way. This process is more cost-efficient and allows for a shorter recruiting process for the business.

## **Business Plan Development: An International Partnership Between the USA and France – New Start**

### **ARTURO CUELLAR RAMIREZ, '19**

Majors: Business and Organizations, French  
Hometown: Midland, Mich.

### **CHRISTINA MINH VO PHAN, '19**

Major: Actuarial and Financial Mathematics  
Hometown: Ho Chi Minh City, Vietnam

### **ALI ANTRA**

Major: Business Engineering  
Hometown: Casablanca, Morocco

### **RICARDO DUPOT**

Major: Business Engineering  
Hometown: Fort-de-France, Martinique

### **NICOLAS GAUDAS**

Major: Business Engineering  
Hometown: Ruell-Malmaison, France

### **NICOLE GETAN METCALF**

Major: Business Engineering  
Hometown: Paris, France

### **AZZEDINE OUDDAK**

Major: Business Engineering  
Hometown: Paris, France

New Start is a new online consulting company. The basis of our company is to connect startups or small companies with retired professionals to aid the business. We act as a middle man connecting these two parties based on the company's needs. If a startup needs an accountant, then we get in contact with a retired CPA who fits their needs. Our selection process to match retired professionals to a company goes further than just selecting someone to do the job based on their career. We have a vetting process to ensure the professionals we hire are leaders and they focus on really developing the business. That being said, our services range from full business plan overhauls down to an one-hour consulting session. We are distinct from the rest of the market because of this selection process. We find tailored professionals for any type of small business or start-up.



## About the Symposium

Albion College's Student Research Symposium is now in its 28th year. The first symposium, held on April 20, 1990, involved seven students making presentations describing their research projects in the sciences. Three years later, a poster session was added. The program has been offered annually since its founding and now features the work of more than 100 students recommended by their faculty mentors. Representing a broad array of disciplines, the symposium has become the College's principal showcase for outstanding student research, scholarship, and creative activity.

## The Elkin R. Isaac Endowment

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

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

### The Isaac Endowment Committee

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

## The Joseph S. Calvaruso Keynote Address Endowment

Joseph S. Calvaruso, '78, and his wife, Donna, established an endowment fund in 2005 to support the annual Elkin R. Isaac Symposium keynote address. The keynote address now bears Calvaruso's name. An Albion native, he currently serves as executive director of the Gerald R. Ford Presidential Foundation in Grand Rapids. Before joining the foundation, he was senior vice president and director of risk management for Mercantile Bank in Grand Rapids. Active in the Republican Party on the state and national levels, Calvaruso is a member of the Albion College Board of Trustees.

In keeping with Calvaruso's personal goal to "try different things in life," the keynote endowment ensures the symposium will continue to provide an exceptional variety of presenters from the arts, sciences, social sciences, and humanities.

## Past Isaac Symposium Speakers

### Elkin R. Isaac Alumni Lecture

Emilio DeGrazia, '63 (1999)  
James Misner, '66 (2000)  
John Vournakis, '61 (2001)  
Joseph Serra, '56 (2002)  
Denise Cortis Park, '73 (2003)  
John Porter, '53 (2004)  
Elkin Isaac, '48 (2005)  
Joseph Calvaruso, '78 (2006)  
Eileen Hebets, '94 (2007)  
James Beck, '97 (2008)  
James Gignac, '01 (2009)  
Kristen Neller Verderame, '90 (2010)  
John Ferris, '89 (2011)  
Lawrence Schook, '72 (2012)  
Michael Harrington, '85 (2013)  
Hugh McDiarmid, '84 (2014)  
Samata Singhi, '05 (2015)  
Mallory Brown, '08 (2016)

### Joseph S. Calvaruso Keynote Address

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

## The 2017 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)  
Andrew Christopher (Psychological Science)  
Allison Harnish (Anthropology/Sociology)  
E. Dale Kennedy (Biology/Brown Honors Program)  
Lisa Lewis (Chemistry)  
Anne McCauley (Art and Art History)  
Ashley Miller (English)  
John Perney (Marketing and Communications)  
Michael Van Houten, Chair (Stockwell-Mudd Libraries)  
John Woell (Academic Affairs)



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

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

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

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

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

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







**Albion College**

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