

Elkin R. Isaac
Student Research Symposium
Albion College



2019



Albion College

2019 Elkin R. Isaac Student Research Symposium

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The Thirtieth Annual Elkin R. Isaac Student Research Symposium

Albion College | April 17-18, 2019

SCHEDULE OF EVENTS

Wednesday, April 17, 2019

7:30 p.m. Elkin R. Isaac Alumni Lecture: Natalie Dubois, '97
"Boundary Spanners: Navigating the Space Between
Research and Conservation"

*Towsley Lecture Hall/Norris Center 101
Reception immediately following the program
Mitchell Museum, Norris Center*

Thursday, April 18, 2019

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

1:15-4:30 p.m. Student Research Platform Presentations
See locations above.

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

7 p.m. Keynote Address: Jennine Capó Crucet
"Make Your Home Among Strangers: A Presentation
with Jennine Capó Crucet"

*Goodrich Chapel
Reception and book signing immediately following the program
Bobbitt Visual Arts Center Lobby*

Elkin R. Isaac Alumni Lecture



NATALIE DUBOIS, '97

Natalie Dubois is a senior research specialist with the Washington, D.C.-based Environmental Incentives, providing technical support to international conservation programs on the use of evidence-based approaches. In support of the United States Agency for International Development (USAID)'s Measuring Impact

project, she co-authored the Agency's first guidance supporting the use and generation of evidence in biodiversity programming and continues to support evidence-based design, implementation, and adaptive management across USAID's biodiversity portfolio. Previously, Dubois worked as a staff scientist at Defenders of Wildlife, providing technical and scientific guidance to the organization's renewable-energy and climate-adaptation programs.

Dubois traces her passion for research to a National Science Foundation Research Experiences for Undergraduates grant at Konza Prairie in Kansas, where she conducted research with Albion biologist and professor Dale Kennedy on interspecific competition between house wrens and Bewick's wrens. This work became part of her Albion College honors thesis, "Territorial Responses to House Wrens by Bewick's Wrens and Eastern Bluebirds: A Song Playback Experiment," presented at the 1997 Isaac Research Symposium.

Dubois continued research on house wrens at Michigan State University, where she received a doctorate in zoology and ecology, evolutionary biology and behavior. She completed a postdoctoral fellowship at Ohio University, examining mate choice and communication systems in swordtail fishes, before becoming a "boundary spanner" strengthening the use of science in natural resource management and conservation decisions.

Symposium Keynote Address



JENNINE CAPÓ CRUCET

Novelist and essayist Jennine Capó Crucet is the author of *Make Your Home Among Strangers*, winner of the International Latino Book Award for Best Latino-themed Fiction and a *New York Times Book Review* Editor's Choice Award. The 2015 novel was chosen as the 2018 Richard M. Smith Common Reading Experience, a

component of the William Atwell Brown, Jr., and Mary Brown Vacin First-Year Experience at Albion College.

Crucet's story collection *How to Leave Hiialeah* won the Iowa Short Fiction Prize, the John Gardner Book Award and the Devil's Kitchen Reading Award, and was named a Best Book of the Year by the *Miami Herald*, the *Miami New Times*, and the Latinidad List.

One of *The New York Times'* current contributing opinion writers, Crucet has also had essays and opinion pieces featured by PBS NewsHour and the *Los Angeles Review*, among others. She is an associate professor in the University of Nebraska-Lincoln's Department of English and Institute for Ethnic Studies.

Crucet has received an O. Henry Prize, the Picador Fellowship, and the Hillsdale Award for the Short Story, awarded by the Fellowship of Southern Writers. Her work has appeared in *Guernica*, *Ploughshares*, *Epoch*, *The Rumpus*, *Prairie Schooner*, and other print and digital magazines.

Crucet's third book, a collection of essays titled *My Time Among the Whites*, investigates concepts of race, gender, immigration, and the "American dream" since the 2016 election. It is scheduled for release later this year from Picador.



Student Presentation Schedule | Thursday, April 18, 2019

FORUM #1 – NORRIS 100

MORNING SESSION

- 9:00 Emilee Weiblen, Marah Ranger (Streu) Synthesis and Evaluation of Photoswitchable c-Raf Inhibitor
- 9:15 Jessica Allison (Streu) Design and Synthesis of a Photoisomerizable Second Generation Kinase Inhibitor
- 9:30 Rebecca Enerson (Cervantes) Determining if Mating Type Proteins Play a Role in Immaturity in the Ciliate *Tetrahymena thermophila*
- 9:45 Matthew Anderson (Saville) Quantitative Methods to Reconstruct Length and Weight of Great Lakes Prey Fish using Bony Structures
- 10:00 Chris Breen (Cahill) Ecological Investigation of Salt Marsh Invertebrates using Metabarcoding

AFTERNOON SESSION

- 1:15 Jenna Beer, Jordan Church (Betz) Effects of Great Toe Extension on Balance and Vertical Jump in Collegiate Volleyball Players
- 1:30 Noah Robertson (Streu) Checkmate, Cancer! The Synthesis of a Light-Activated Immunotherapy
- 1:45 Madeline Denison (Streu) Syntheses of Photoswitchable Cyclooxygenase-2 Inhibitors
- 2:00 Nichole Brown (Jordon) Skolem Sequences and their Generalizations
- 2:15 Katie Ferrero (Cahill) Investigating Aphid “Superclone” Status
- 2:30 Taylor Karns, Shelby Stajdl (Streu) Synthesis and Biological Evaluation of a Photoswitchable Quorum Sensing Molecule
- 2:45 Zerick Dill (McCaffrey) Unraveling the Biosynthesis of the Essential Lipoyl Cofactor in *Staphylococcus aureus*
- 3:00 Cesar Cortes, Rachel Stander (Cahill) Salinity’s Effects on Species Diversity in Maple River State Game Area
- 3:15 Hannah Schoon (Rabquer) Cancer: Going Viral
- 3:30 Annika Markovich (McCaffrey) Microwave Assisted Duff Formylation Reactions
- 3:45 Paige Mellema, Mackenzie Moore (Albertson) Delivery of Photoisomerizable Molecules into *Drosophila melanogaster*
- 4:00 Angela Panzica (Shanton) Improving Curriculum and Teaching Requirements for English Education in Japan
- 4:15 Jared Karsama (Henke) Researching and Applying Culturally Proficient Instruction in Outdoor Programming

FORUM #2 – TOWSLEY LECTURE HALL/NORRIS 101

MORNING SESSION

- 9:00 Michael Martinez, Tiffany Newman, Kayla Sharp, Lauren Solano, Jessica Courtial, Bambi Diawara, Anne-Julie Francois, Quentin Jurvillier (Baker, Bruneteaux-Swann) Business Plan Development: An International Partnership between the USA and France – Campus Management App
- 9:15 Sydney Cohn, Sierra Hazard, Angela Panzica, James Tonge, Coraline Braun, Anne Giraud, Mathieu Le Breton, Hugo Moulin, Sydney Ninino (Baker, Bruneteaux-Swann) Business Plan Development: An International Partnership between the USA and France – OPTEE
- 9:30 Alondra Alcazar, Dillon Dejong, Justin Green, Megan Gutherie, Kevin Barret, Mathis Michel d’Annoville, Adrien Uridat (Baker, Bruneteaux-Swann) Business Plan Development: An International Partnership between the USA and France – SPORTWORK
- 9:45 Chelsei Carpenter, Madison Kroetsch, Sophia Sanfilippo, Evan Seuryneck, Marion Allair, Amir Aoues, Amine Darih, Cyrielle Rafle (Baker, Bruneteaux-Swann) Business Plan Development: An International Partnership between the USA and France – STAR
- 10:00 Eleanor Hill, Andrew Klinger, Philip Meyer, Spencer Shaheen, Kiana Thomas, Cole Thune (Draudt, Carlson) Gerstacker Senior Capstone: Equestrian Center Market Analysis

AFTERNOON SESSION

- 1:15 Evan Rieth (Christensen) Let Us Yeet: The Diversified Joy of a Millennial Farmer
- 1:30 Philip Meyer (Balke) Cloudy Skies: Songs Composed to the Poetry of Shel Silverstein
- 1:45 Taylor Anhalt (Brown) *Possessed*: The Process of Writing a Novel
- 2:00 Ikpemesi Ogundare (Balke) The Performance of the Countess’s Arias, *Porgi Amor* and *Dove Sono*
- 2:15 Zoe Wilson (Chytilo) The Exploration of Energy, Growth and Movement
- 2:30 Batoul Ballout (Dixon) Exploring Identity and Belonging through Painting
- 2:45 Kyle Cater (Ball) Édouard Lalo’s *Cello Concerto in D Minor*
- 3:00 Emilee Kinney (Wilson) Here, the Trees Hold Our Tongues More than We Do: Poems
- 3:15 Savannah Manning (Henderson) From the Page to the Stage: The Costuming Process from Conceptualization to Construction

(continued on next page)



(afternoon session continued)

- 3:30 Sean Barlett (Wickre) *Die Brücke*, the Leaders of German Expressionism
- 3:45 Philip Meyer (Balke, Ball) Three Solo Selections from the Operetta *Candide* by Leonard Bernstein
- 4:00 Sarah Finn (Collar) Ardency and Agency: Romantic Love in Paired American Novels from 1899, 1957, and 2015

FORUM #3 – NORRIS 102

MORNING SESSION

- 9:00 Ian Stewart (Christopher) Sexism and Recipient Gender as Predictors of Resource Allocation
- 9:15 Tessa Triest (Wieth) Creativity and Disordered Eating
- 9:30 Sydney Graham (Schoene) Institutional Distrust as Observed at Albion College
- 9:45 Rachel Appel (Wieth) Save Yourself: The Impact of Scenario Type and Gender on Moral Judgements for Autonomous Vehicle Programming
- 10:00 Lucas Lusk (Christopher) Out of Control: Social Attitudes Toward Alcohol

AFTERNOON SESSION

- 1:15 Elizabeth Glenn (Henke) Therapy Dogs in Classrooms
- 1:30 Taylor Antal (Francis) Beliefs about Government and Industry Responsibility Affect the Relationship between Environmental Locus of Control and Pro-Environmental Behaviors
- 1:45 Jacquelyn Harbin (Betz) Goal Setting: The Relationship between Grit, GPA, and the Ability to Cope Throughout the College Years
- 2:00 Marianne Krause (Francis) Skeptical Preschoolers: Role of Theory of Mind in Young Children's Skepticism of Reliable Adults
- 2:15 Anna Watson (Price) The Relationship between Music Preference and Identity
- 2:30 Emily Mudd (Elischberger, E. Hill) Equality under the Law? Effects of Gender, Gender Role Conformity, and Traditional Gender Role Beliefs on Sentencing Outcomes
- 2:45 Laurel McGerty (Jechura, Elischberger, Price) The Effect of Health Message-Framing and Healthcare Practitioner Gender on Opinions and Intentions to Vaccinate
- 3:00 Maggie Fowler (Carlson) The Effect of Pop Culture's Stereotypes on America's Bean Counters
- 3:15 Briana Flanagan (Guenin-Lelle) "Those French People, They're So Rude!" – Personal Journey of Demystifying French Stereotypes
- 3:30 Amanda Baumgart (Henke) Students' Perceptions of the Impact of Gay-Straight Alliances
- 3:45 Katherine Maher (Melzer) Resources for Intimate Partner Violence Between Queer Women

4:00	Alex Keck (Baker)	Burnout: A Meta-Analysis on Causes and Intervention Methods
4:15	Irene Corona Avila, Olivia Hancock (Wang)	Content Analysis of Dietary Behavior Messages on Twitter

FORUM #4 – NORRIS 104

MORNING SESSION

9:00	Phillip Voglewede (Ho)	Visualizing the American Midwest: Photographic Interpretations of Rural Identity, Leisure Culture, and Socioeconomic Change, 1933-1953
9:15	Isaac Verhelst (Kanter)	Strangers to the European Family: How Finnish-Americans Became White in the Upper Midwest
9:30	Tyler Eyster (McWhirter)	Religion, Immigration and Industry: The Role of Christian Communities in Shaping 20th Century Albion
9:45	Megan Bricely (Harnish)	Sickness, Stories, and a Cemetery: An Analysis of the Spanish Flu in Albion 100 Years Later
10:00	Maggie Belcher (Schoene)	An Analysis of Refugee Integration in a Michigan City

AFTERNOON SESSION

1:15	Sadie Wayman (Carlson)	No Way-Man Equestrian Facility
1:30	Kendra Cook (Okwako-Riekkola)	Determining Instructional Efficacy When Using Technology: A Case Study of Elementary School Teachers
1:45	Cecilia Wang (Mittag)	An Ontological Analysis of Human Beings from a Buddhist “Non-Self” Perspective
2:00	Isabel Allaway (Schoene)	Income Inequality and Protest Activity in Three European Countries
2:15	Alina Holmstrom (Yoshii)	The Impacts of Women’s Cooperatives and Associations on the Economic, Social, and Cultural Aspects of Moroccan Society
2:30	Nicole McCann (Schoene)	Euroscepticism on the Rise? The Impact of Euroscepticism Through Economic, Political and Cultural Aspects
2:45	Troy Trombley (McWhirter)	Messianic Exegesis in the Letter to the Hebrews
3:00	Anthony Avouris (Riedel)	Links to the Past: Ancient Greece from a Medieval Greek Perspective
3:15	Zachary Serzo (Walling)	Reforming United Nations Peace Operations: A Proposal for a Permanent UN Peace Force
3:30	Maryam Syed (Harnish)	Conservation Violence: Where is the Development?
3:45	Leaha Sinnaeve (Valdina)	The Greek Orthodox and Hindu Diasporas in the United States
4:00	Cameron Voss (McWhirter)	Post-Genocide Understanding within Rwandan Families



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

Margaret Alway (Harnish)	Social Change and Headstone Iconography: Material Culture in Albion's Riverside Cemetery
Matthew Anderson, Hannah Schoon (Saville)	The Development of a Bioinformatics Tool to Compare Two Prokaryotic Gene Predictors, Genemark and Glimmer, Using the Python Computer Language
Matthew Anderson, Chris Breen, Anh Dinh, Hannah Erickson, Megan Harvey, Sydney Rudowski (Saville)	Gene Annotation of <i>Drosophila takahashii</i> Contig18
Andrew Baker, Maxim Rosenburg (T. Lincoln)	Evaluating the Contributions of Sediment and Adjacent Wetland Pore Waters to the Dissolved Orthophosphate Load of the Kalamazoo River
Mary Beall, Slone Schultz (Metz)	Catalytic Reduction of Oxyanions Using Bimetallic Nanoparticle Carbon Microsphere Composites
Mackie Black (Chase, MacInnes)	City of Bones: Synthesizing and Mapping the Zooarchaeology of Early Modern London
Matthew Chen, Lauren Young (Francis)	The Relationship Between Grit, Stress, and Parenting Style in Physician Assistant Graduate Students
Cesar Cortes, Rosemary Hernandez, Saige Jost, Rachel Stander (Cahill)	Invertebrate Community Composition in an Inland Salt Marsh
Darian Elson (Shanton, Owakko-Reikkola, Lewis)	Teacher Research - Journal Inquiry of a Spiraling Science Curriculum Across Grades K-8
Khulan Enkhbaatar, Maxwell King (Rohlman)	A Study of RNA Polymerase-Template Interaction utilizing CRISPR/dCas9 Protein
Brandon Gary, Brigitte Kobs, William Michels, Mackenzie Moore, Sydney Rudowski (Saville)	Gene Annotation of <i>Drosophila takahashii</i> Contig7
Alex Hoinville (McRivette)	Assessing Pressure-Temperature Conditions of the Seve Nappe, Scandinavian Caledonides, Sweden
Shakara Jordon (Lewis)	The Isolation and Characterization of Lemongrass Components Using Various Extract Techniques
Meghan Krawczyk (Francis, Wieth)	Using Concept Maps to Understand Psychology Topic Difficulty
Jonas LaMont (Bieler)	An Exploration of the Effectiveness of Different Methods of Conductive Polypyrrole Synthesis
Anna Moore, Taylor Antal (Francis)	Student Interest in Human Services at Albion College
Natalie Nichols (Betz)	Performance, Coping Skills, and Stress in College Cross Country Athletes
Zachary Plummer (Streu)	Examining Methods for the Synthesis of Azo-Indole Compounds
Taylor Rosenthal (Cervantes)	The Influence of Mating Type Proteins on Mating Type Recognition in <i>Tetrahymena thermophila</i>
Bram Siemers (Streu)	Biomaterials With Functionally Graded Stiffness

ALONDRA ALCAZAR, '20

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

been associated with acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML). Drugs to target this disease have been known to have off-target interactions, which cause side effects. CML has developed several resistances to the first-generation drug imatinib, developed for treatment.

The purpose of this research is to test the photo-induced bioactivity of azologues of a second-generation BCR/ABL inhibitor. Azologues are light-activated versions of known biologically active molecules, whose photoisomerizable properties are imparted by the presence of an azo-stilbene group. Compounds that can be selectively spatially and temporally activated by light could circumvent these off-target interactions. Given the spatial and temporal control that photoisomerization allows, azologues may be utilized as powerful chemical tools for the study of time- and location-dependent cellular processes. The design and synthesis of the target molecule will be outlined as well as the unique synthetic challenges associated with this class of biomolecule.

Supported by: FURSCA—Orpha Leiter Irwin Fellowship

**ISABEL ALLAWAY, '20**
Income Inequality and Protest Activity in Three European Countries

Faculty Sponsor: Matthew Schoene
Major: Sociology
Hometown: Des Moines, Iowa

Forum #4, Norris 104 - 2:00 p.m.

Europe has recently experienced a wave of anti-austerity protest movements. Protest results from factors like the public's grievances, material and cultural resources, political opportunities, and the receptiveness of their culture to protest (Kriesi, 2012). While much relevant literature agrees inequality has potential to influence protest (Quaranta, 2016), it is largely unclear what its effects are, or if the effect differs when measured at the national or local level. Therefore, we ask whether national or regional inequality influences European participation in protest. To answer this question, we use data from the seventh wave of the European Social Survey for France, Spain, and the Czech Republic and analyze it with a three-level, mixed-effects logistic regression model. We find only a small positive effect of national-level inequality on participation in a demonstration, and a small negative effect of local inequality on signing petitions. We conclude with the implications for European protest activity.

**MARGARET ALWAY, '19**
Social Change and Headstone Iconography: Material Culture in Albion's Riverside Cemetery

Faculty Sponsor: Allison Harnish
Major: Anthropology
Hometown: Ludington, Mich.

Poster Session, Science Complex Atrium - 4:00 p.m. - 5:00 p.m.

Cemeteries serve as material artifacts of communities, reflecting a culture's history and showing its changing memorial practices and attitudes toward death. Just as cultures change over time, so do cemetery styles, and four prominent eras of style have emerged in the United States: the Rural Cemetery (1830-1855), the Landscaped Lawn (1856-1917), the Isolation of Death (1918-1949), and the Modern Period (1950-today). This study asks the question: In addition to representing changing cemetery styles, do the grave markers in Albion's Riverside Cemetery also reflect social changes that the city experienced over time? I have hypothesized that epitaphs, through the changes in phrases, will showcase the changing positions and roles of women and children in American history. Using the Albion Riverside Cemetery (est. 1837) as a sampling frame, I look for evidence of these social movements in images and epitaphs adorning 100 headstones, 50 belonging to women and 50 belonging to children. I further divided these samples into sections of 25, divided by what I have identified to possibly be key moments in history that changed the position of women and children. For children, it was the enactment of the Fair Labor Standards Act in

**JESSICA ALLISON, '19**
Design and Synthesis of a Photoisomerizable Second-Generation Kinase Inhibitor

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

Forum #1, Norris 100 - 9:15 a.m.

BCR/ABL is a chimeric oncogene made up of breakpoint cluster region protein (BCR) from chromosome 22 and Abelson murine leukemia (ABL) from chromosome 9. This genetic recombination results in a shortened chromosome 22, which is also known as the Philadelphia Chromosome. The BCR/ABL fusion protein produced as a result of this translocation mutation causes the resulting tyrosine kinase enzyme to become constitutively active. Given the critical regulatory role of ABL in cell division, its constitutive activation results in uncontrollable cell division, which in this case, most often leads to chronic myeloid leukemia (CML). BCR/ABL has also



1938, which prohibited most employment for minors (under the age of 16) in dangerous occupations, such as mining or manufacturing, or during school hours. And for women, I chose the arrival of the second wave of feminism, which began to appear around 1965, broadening the discussion of gender equality to more issues, such as domestic violence, sexuality, reproductive rights, family structure, and workplace rights.

Supported by: FURSCA—Bethune Fellows Student Research Endowment

MATTHEW ANDERSON, '19
Quantitative Methods to Reconstruct Length and Weight of Great Lakes Prey Fish Using Bony Structures

Faculty Sponsor: Ken Saville
 Major: Biology
 Hometown: Southgate, Mich.

Forum #1, Norris 100 - 9:45 a.m.

When analyzing the stomach contents of fish, bony structures persist longer than soft tissue. The utility of bony structures such as vertebrae and cleithra were evaluated for their capability of reconstituting the length and weight of 13 prey fish commonly found in the diets of Great Lakes piscivorous fish. Full vertebrae measurements were the most accurate for estimating total length of fish. Cleithra were the second most accurate when estimating total length with the exception of some species whose cleithra were more difficult to extract without structural damage. Partial vertebrae measurements were also a good method to estimate total length, primarily when looking at species with lower vertebral counts. When a larger proportion of the vertebrae were measured, more accurate estimations were the result. The use of bony structures to reconstitute the length and weight of prey fish found in the stomach contents of piscivorous fish can allow for more efficient processing methods when evaluating stomach contents.

MATTHEW ANDERSON, '19

Major: Biology
 Hometown: Southgate, Mich.



HANNAH SCHOON, '19

Major: Biochemistry
 Hometown: Canton, Ill.

The Development of a Bioinformatics Tool to Compare Two Prokaryotic Gene Predictors, Genemark and Glimmer, Using the Python Computer Language

Faculty Sponsor: Ken Saville

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

Bioinformatics is the science of finding biological meaning in DNA sequences. One aspect of bioinformatics is gene annotation—finding genes in genomes. A first step in genome annotation is predicting the location of genes using gene-prediction computer programs. However, different gene-prediction programs will give different results depending on the criteria used to identify genes. An important step in genome annotation is deciding which predicted genes are correct. In this project, we wrote a Python script to run and compare the results of two prokaryotic gene predictors: Genemark and Glimmer. We applied our script to several genomes, two bacteriophage genomes of less than 100,000 nucleotides each, and one bacterial genome consisting of about five million base pairs. We were able to reliably identify genes predicted by only Genemark, only Glimmer, or both. This tool could be a useful addition to tools used to annotate new bacterial genomes.

MATTHEW ANDERSON, '19

Major: Biology
 Hometown: Southgate, Mich.

CHRIS BREEN, '20

Major: Biology
 Hometown: Royal Oak, Mich.



Dinh

ANH DINH, '22

Major: Biology
 Hometown: Hanoi, Vietnam

HANNAH ERICKSON, '21

Major: Biology
 Hometown: Birmingham, Mich.



Erickson

MEGAN HARVEY, '20

Major: Biology
 Hometown: Milan, Mich.

SYDNEY RUDOWSKI, '20

Major: Biology
 Hometown: St. Clair, Mich.

Gene Annotation of *Drosophila takahashii* Contig18

Faculty Sponsor: Ken Saville



Harvey

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

We annotated contig18 of *Drosophila takahashii*. We were assigned this project by our professor, Dr. Saville. Our project



Rudowski

is part of a nationwide study, hosted by Washington University in St. Louis, called the Genomics Education Partnership (GEP). The GEP allows undergraduates to participate in genetic sequencing and annotation. Our role in this project was to annotate a small portion of the dot chromosome in *D. takahashii*, specifically contig18. Two genes were annotated, CG1674 and dpr7, both of which had more than one isoform. We used the GEP UCSC

genome browser to look at and annotate the genes. The browser included RNA seq data, splice sites, and other gene-prediction programs that helped us determine the boundaries of each exon to form the full gene. Other resources provided by the GEP were Gene Record Finder, Small Exon Finder, and Gene Model Checker. BLAST was also used to check the *D. takahashii* alignment with the *D. melanogaster* sequence. *D. melanogaster* was used for its close ancestry with *D. takahashii*. The annotation process required many checkpoints using the Gene Model Checker. Once the gene model was approved by the Gene Model Checker, it was sent back to the GEP project for final approval.



TAYLOR ANHALT, '19

Possessed: The Process of Writing a Novel

Faculty Sponsor: Danit Brown
Major: English (Creative Writing)
Hometown: Oswego, Ill.

Forum #2, Towsley Lecture Hall/
Norris 101 - 1:45 p.m.

Possessed is a novel set in a post-apocalyptic world. It challenges our conceptions of strength and weakness and focuses on overcoming physical and mental obstacles. I have always been interested in the prospect of different worlds and myths. Books that submerge the reader in another world are a passion that has extended into my writing. The capability of transporting readers into another dimension and presenting a new perspective is something I wanted to do myself. In *Possessed*, I present the same world that we know, but deeply transformed.

Possessed is my first completed novel, and the steps I have taken to create it involve outlining, creating plot points and new ideas, and several rewrites before the final proofreading. Writing a novel is its own journey, one filled with its ups and downs and overcoming obstacles along the way, but once it's all done, the sense of accomplishment mirrors the end of an epic adventure.



TAYLOR ANTAL, '19

Beliefs About Government and Industry Responsibility Affect the Relationship Between Environmental Locus of Control and Pro-Environmental Behaviors

Faculty Sponsor: Andrea Francis
Majors: Psychological Science, Sociology
Hometown: Manistee, Mich.

Forum #3, Norris 102 - 1:30 p.m.

When it comes to reversing the negative effects of climate change, both macro- and micro-level factors affect individuals' pro-environmental behaviors (PEBs). PEBs are intentional acts that "minimize the negative impact of one's actions on the natural and built world" (Kollmuss & Agyeman, 2002, p. 240). Pro-environmental individuals value nature (De Boer et al., 2007), understand climate change (Gifford & Nilsson, 2014), and have an internal locus of control, or believe they control their own fate (Pavalache-Ilie & Unianu, 2012). However, an individual may have a global internal locus of control, but believe outside forces play a bigger role in the destiny of the environment than oneself. Therefore, Cleveland and Kalamas (2005) suggested that environmental locus of control (ELOC) captures the extent to which individuals feel personal accountability for the environment (Internal-ELOC) or feel environmental outcomes are driven by extraneous forces (External-ELOC). The current study assesses whether beliefs about how much the government and industry are responsible for the environment impact the relationship between ELOC and PEBs.

Analyses showed that valuing nature, understanding climate change, and having a global internal locus of control are not enough to predict PEBs. However, having an internal ELOC did predict increased PEBs. A significant interaction indicated that individuals with high internal ELOC and low government/industry responsibility report more PEBs than individuals with high internal ELOC and high government/industry responsibility. Results suggest environmental change programs should focus on individual lifestyle changes rather than macro-level factors such as the government and industry.

TAYLOR ANTAL, '19

(See Anna Moore, '19; Taylor Antal, '19)



RACHEL APPEL, '19
Save Yourself: The Impact of Scenario Type and Gender on Moral Judgements for Autonomous Vehicle Programming

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

Forum #3, Norris 102 - 9:45 a.m.

Should autonomous vehicles (AVs) be programmed to save its passengers at all cost or sacrifice its passengers for the greater good? Previous research has found that participants rate self-sacrificing programming as more moral than self-preserving programming when asked to evaluate a hypothetical scenario depicting an AV-pedestrian accident (Bonneton, Shariff, & Rahwan, 2016). This type of scenario can be seen as a more personal moral dilemma than a scenario where an AV hits another car and kills its passengers (e.g., Greene et al., 2001). Previous research has shown that participants rate pragmatic responses (i.e., save the most lives regardless of putting others at risk) as less moral in more personal moral dilemmas than in less personal moral dilemmas (Cushman et al., 2006). Furthermore, women and men have been shown to differ when making decisions about more or less personal moral dilemmas (Buckwalter & Stich, 2014; Fumagalli et al., 2009). The current study examined gender differences in moral judgments about AV programming when provided with a more personal AV crash scenario compared to a less personal AV crash scenario. Analyses showed that for participants in the less personal scenario condition, men rated self-preserving AV programming as more moral than women. However, men and women gave similar moral ratings for self-preserving AV programming in the more personal scenario condition. Moral ratings for self-sacrificing AV programming did not differ based on gender or scenario type. These findings suggest gender and scenario type influence moral judgements for AV programming.

Supported by: FURSCA—K.D. Metalonis, 1999 Memorial Endowed Student Research Fellowship; Orpha Leiter Irwin Fellowship



ANTHONY AVOURIS, '21
Links to the Past: Ancient Greece from a Medieval Greek Perspective

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

Forum #4, Norris 104 - 3:00 p.m.

Greece in the Middle Ages was dominated by the Byzantine Empire, a continuation of imperial Rome

that nevertheless treasured its classical Hellenic heritage. This paper will examine several aspects of ancient Greece that the medieval Greeks preserved and adapted, such as music, aesthetic design, and methods of warfare. These demonstrate that the Byzantines continued to acknowledge and revere their ancient Greek heritage, despite their conversion from polytheism to Christianity and numerous other changes over the millennium that separated them.

ANDREW BAKER, '20

Major: Geology
 Hometown: Downers Grove, Ill.

MAXIM ROSENBERG, '19

Major: Geology
 Hometown: St. Joseph, Mich.

Evaluating the Contributions of Sediment and Adjacent Wetland Pore Waters to the Dissolved Orthophosphate Load of the Kalamazoo River

Faculty Sponsor: Tim Lincoln

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

Our goal was to quantify the contributions of water traveling through either riverbed sediment or adjacent wetlands to the PO₄-3 load of the North Branch of the Kalamazoo River. The 10-km study reach is a meandering and predominantly gaining stream with abundant springs and adjacent wetlands and is upstream from any continuously discharging wastewater treatment plants. Gradient ranges from 1 to 6 ft/mile; most reaches are close to the average of 2.5 ft/mile.

Seepage rates (cm/sec) assessed at six locations range from 0.79E-5 to 7.7 E-5 and average 3.2E-5. Average PO₄-3 concentrations (mg/l) range from 0.11 to 0.5 and average 0.3 (n=20). This is significantly higher than the river concentration of .038 (n=66). There is a positive correlation between PO₄-3 and dissolved iron in seeped water, suggesting reductive dissolution of iron hydroxide contributes to the elevated PO₄-3. Previous work has shown springs carry high NO₃ and SO₄-2. A best-fit mass balance mixing model between spring and seep water predicts river water with similar PO₄-3, SO₄-2 and seep:spring ratio, but grossly over predicts the NO₃-.

We sampled 10 wetland wells with depths from 1m to 1.5m. Reasoning that during the falling limb of the storm hydrograph we would see water draining wetlands, we measured the concentration of ions and monitored stage during storm events. Following storms, load of all ions increased. Because of uncertainty due to low overall PO₄-3 concentrations

and calculating discharge from stage, we feel this needs more work.

The most significant contributor to PO4-3 in the river is seepage from the riverbed sediment, evidenced by the high concentration of PO4-3 in the water collected by seepage meters. The wetlands contribution is difficult to quantify, but presently appears less significant.

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



BATOUL BALLOUT, '20
Exploring Identity and Belonging Through Painting

Faculty Sponsor: Michael Dixon
Major: Art
Hometown: Dearborn, Mich.

Forum #2, Towsley Lecture Hall/
Norris 101 - 2:30 p.m.

When I was 7 years old, my parents applied for immigration to the United States. After 13 years, our application was approved and we were granted our visa. It has been about five years since I left my home country of Lebanon and became a permanent resident of the United States of America. As a Muslim female immigrant, it is a constant battle between place and identity. Muslims, often seen as terrorists in the media, have been marginalized since 9/11. The rise of white nationalism within our current political climate has made it more difficult to identify as a Muslim and to come from a new immigrant family. Through painting, I am able to share my experiences and to spark a conversation regarding my reality. During the summer of 2018, my mornings consisted of reading books and journaling in order to document my ideas and thought process. Then, I went to the studio and painted. My aim was to experiment with ideas of visual representation as well as improving my painting skills. I painted more than 10 self-portraits revolving around ideas of identity, belonging, and self-exploration. When FURSCA came to an end, I had developed a strong skill set and a meaningful body of work.

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

SEAN BARLETT, '19
***Die Brücke*, the Leaders of German Expressionism**

Faculty Sponsor: Bille Wickre
Major: Art History
Hometown: Dexter, Mich.

Forum #2, Towsley Lecture Hall/
Norris 101 - 3:30 p.m.

Expressionism was a pan-European art movement that challenged turn-of-the-20th-century academic art traditions that failed to meet expressive needs of the artists. Throughout Europe, revolutionary art groups succeeded from art academies declaring they would destroy the old order to initiate a new art. Artists of *die Brücke*, led by Ernst Kirchner, fled the strictures of modern middle-class life, protesting the corrupt political and social climate of contemporary Germany. They were the first and the most effective artist group to chart a clear course away from European tradition and toward a fresh, raw, and truthful new art. In their art, members of *die Brücke* addressed common feelings of alienation resulting from discordant relationships with religion, loss of connection with nature, and anxiety occasioned by rapid changes in technology. The introduction of automobiles, trains, and electricity at the end of the 19th century left people feeling that the world was changing at a pace too rapid to comprehend.

Kirchner led *die Brücke* in its embrace of radical forms, bold colors, and compositions that mirrored the discomfort of the society around them. Kirchner and other members of *die Brücke* found woodcut prints, with their jagged lines, flattened forms, and stark tonal contrasts an unparalleled medium for some of their most dramatic work. The Albion College Print Collection holds a selection of *die Brücke* woodcuts that are important to my study of the movement. Through study of the Albion prints and prints from the University of Michigan Museum of Art, I have been able to better understand *die Brücke's* context in Germany of the 1910s, to formulate theories about the intentions and interactions within the group, and I have been able to suggest some new dating where dates have been uncertain.

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



AMANDA BAUMGART, '19
Students' Perceptions of the Impact of Gay-Straight Alliances

Faculty Sponsor: Suellyn Henke
Major: English
Hometown: Lake Orion, Mich.

Forum #3, Norris 102 - 3:30 p.m.

Gay-straight alliances (GSAs) have been implemented in middle and high schools since 1988. These organizations provide a space for LGBT students and their allies to discuss issues without negative remarks or actions toward them. Previous studies have shown that students attending schools with a GSA are less likely to hear homophobic bullying, and LGBT students are more likely to feel safe, have high self-esteem and sense of belonging, have higher grades and lower dropout rates, and lower substance abuse rates. Students involved in GSAs have been



shown to be more “empowered” and go on to use those leadership skills later in life. This study utilizes a focus group methodology in order to interview high school and college students about their current or previous experience with a GSA, and how they perceive its effectiveness in their own life. Participants spoke of their own struggles with their sexuality and how they think a GSA helped or might have helped them.



Beer

JENNA BEER, '19

Major: Athletic Training
Hometown: Leo, Ind.



Church

JORDAN CHURCH, '19

Major: Athletic Training
Hometown: Canton, Mich.

Effects of Great Toe Extension on Balance and Vertical Jump in Collegiate Volleyball Players

Faculty Sponsors: Heather Betz, Carol Moss

Forum #1, Norris 100 - 1:15 p.m.

The foot is a very complex part of the human body that consists of many different components. Overall, there are 26 bones in the foot, which make up many different joints. The hallux, also known as the great toe, makes up a small portion of the foot but has a large impact on the function. The hallux is the first of the five phalanges of the foot and is made up of the 1st metatarsophalangeal (MTP) joint and 1st interphalangeal (IP) joint. The muscles that act upon the hallux can be involved in flexion, extension, adduction, and abduction of the hallux. Any impairment to the hallux, specifically at the 1st MTP joint, can greatly affect different weight-bearing movements. This can potentially have an impact on how well an athlete can perform, as many sports include a variety of weight-bearing movements. One example of such a sport is volleyball, which includes a mixture of upper and lower extremity movements. The lower extremity involvement and weight-bearing movements include short bursts of sprints, change of direction, as well as jumping (Milic et al., 2017). The purpose of this study was to determine the effect that great toe extension and ankle range of motion play in both vertical jump and balance of female volleyball players. It was hypothesized that great toe extension would have a positive effect on vertical jump height and the ability to balance and that those with greater ankle dorsiflexion would also have great toe extension.



MAGGIE BELCHER, '18

An Analysis of Refugee Integration in a Michigan City

Faculty Sponsor: Matthew Schoene
Major: Anthropology and Sociology
Hometown: Parma, Mich.

Forum #4, Norris 104 - 10:00 a.m.

The United Nations High Commissioner for Refugees made an estimate that by the end of 2018 there will be 1.2 million people who have sought asylum in foreign countries (“UNHCR”). Refugeeism and



Beall

MARY BEALL, '21

Major: Chemistry
Hometown: Midland, Mich.



Schultz

SLONE SCHULTZ, '21

Major: Chemistry
Hometown: Battle Creek, Mich.

Catalytic Reduction of Oxyanions Using Bimetallic Nanoparticle Carbon Microsphere Composites

Faculty Sponsor: Kevin Metz

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

Oxyanions are emerging contaminants because of their increasing concentration in the environment and known health impacts. One method explored for the removal of oxyanions is hydrogenation, but it is hindered by catalyst (Pt/C, Pd/C) costs. This research focuses on the development of inexpensive bimetallic catalysts for the hydrogenation of oxyanions. The catalysts are made using ultrasonic spray pyrolysis (USP), producing highly porous carbon microspheres (CM) with bimetallic nanoparticles embedded in them. To date Ni/Fe, Ni/Cu, Ni/Co, Fe/Cu, Fe/Co, and Cu/Co CMs have been made. Ni/Fe CMs show promise in the reduction of bromate. Our latest results from optimizing these systems as well as the synthesis and testing of Ag/Ni as a catalyst will be presented.

Supported by: FURSCA—Robson Family Fellows Endowment (Beall); Richard K. Vitek, '56 FURSCA Endowment (Schultz)

migration is an increasing global phenomenon that will change the dynamics of countries nationally and internationally. For this transition to be successful, it is critical that efforts are made toward establishing systems for integration. Integration is a process supported by both the host society and refugees to embrace a new multicultural environment that naturally has changed at the arrival of the new social group (Strang and Ager, 2010). Through a synthesis of previous research, I have indicated that the four fundamental aspects of successful integration are providing language and cultural knowledge support (Strang and Ager, 2010), combating poverty by helping with housing and employment (Strang and Ager, 2010; Valenta and Bunar, 2010), creating social ties (Lamba and Krahn, 2003), and participation in institutions and organizations (Valenta and Bunar, 2010). I have used these markers to evaluate how well integrated a group of Michigan refugees are in their community. I discovered there is a lack of language and cultural knowledge support offered by the city studied and this is what has significantly hindered progress towards integration. This research contributes insight into processes that both help and inhibit group integration, but further research is necessary.

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



MACKIE BLACK, '19
City of Bones: Synthesizing and Mapping the Zooarchaeology of Early Modern London

Faculty Sponsors: Brad Chase, Ian MacInnes

Majors: Anthropology, English

Hometown: The Woodlands, Texas

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

London, England, is one of Europe's oldest cities and has been continually occupied at least since the Roman invasion of the British Isles, making it a city that is ideal for archaeological excavations. Utilizing two doctoral theses, the online interactive Map of Early Modern London, and many other zooarchaeological excavation reports and historical documents, I have begun synthesizing and mapping the early modern (mid-1400s to mid-1700s) archaeological work done in London in order for it to be accessible to a non-specialized audience. Focusing on excavations of animal-based industries such as the making of leather and the utilization of animal horn for items such as plastic panes on lanterns, I have begun to analyze the spatial relationships between these craftsmen in early modern London. I have also utilized excavation reports for York, England, in an attempt to compare these two similarly sized cities in

the way that their societies were spatially organized during this period. Through this work and the utilization of mapping techniques and software such as ArcGIS, I have not only been able to confidently place streets in their historically correct locations that were previously mislocated, such as Petticoat Lane on the Agas Woodcut Map, but I have also been able to produce articles and maps to help humanities scholars better understand the spatial nature of London during this period, paving the way for the utilization of zooarchaeological and spatial data by all humanities disciplines.

Supported by: FURSCA—Bethune Fellows Student Research Endowment

CHRIS BREEN, '20
Ecological Investigation of Salt Marsh Invertebrates Using Metabarcoding

Faculty Sponsor: Abigail Cahill

Major: Biology

Hometown: Royal Oak, Mich.

Forum #1, Norris 100 - 10:00 a.m.

Inland salt marshes are an extremely rare ecosystem found right here in Michigan, and very little is known about the invertebrates that live there. What we wanted to know is if there are different communities and diversities at the salt marsh as compared to the Whitehouse Nature Center. We also wanted to know if the diversity and population of these invertebrates changed as we got farther away from the salt seep. To figure this out we took samples every 10 meters out from the salt seep. We also measured the salinities at each data-collecting point to see if the salinity affected it. I then took the sediment samples we collected from the Maple River salt marsh and extracted DNA from the samples using a kit provided. After the DNA was extracted from the sediment samples, I had to make a test to make sure the DNA was extracted. Using Polymerase Chain Reaction (PCR) we amplified our DNA and used metabarcoding techniques to analyze it. We then received our data back and, using bioinformatics pipelines, we were able to see what kind of life the salt marsh ecosystem supports. This study will give us a "catalogue" of the animals that live there.

Supported by: Faculty Development Committee (Cahill)

CHRIS BREEN, '20

(See Matthew Anderson, '19; Chris Breen, '20; Anh Dinh, '22; Hannah Erickson, '21; Megan Harvey, '20; Sydney Rudowski, '20)



MEGAN BRICELY, '19
Sickness, Stories, and a Cemetery: An Analysis of the Spanish Flu in Albion 100 Years Later

Faculty Sponsor: Allison Harnish
 Major: Biology
 Hometown: Troy, Mich.

Forum #4, Norris 104 - 9:45 a.m.

The 1918 Spanish influenza pandemic was the most catastrophic event in modern history with an estimated death toll of 50 million people worldwide. Numerous scholars have studied the effect of the outbreak in major cities as well as the efficacy of city health measures in stopping the spread of influenza. Such analysis rarely includes small, rural towns such as Albion, Michigan. Therefore, records were collected from Riverside Cemetery of Albion, Michigan. Based on these records, the author calculated a mortality rate of 9.34 (deaths per 1,000 people) for the city. An increased number of Albion deaths attributed to stroke and hemorrhage was noted during the outbreak, so more records were utilized to gather a percentage of deaths by stroke or hemorrhage for the pandemic years as well as the two years prior and the two years after the pandemic. 9.55% of deaths in 1918, 1919, and early 1920 were by stroke or hemorrhage. This was an increase from the 6.92% in 1916 and 1917. This decreased back down to 6.48% in the years 1921 and 1922. This relationship was found to be statistically insignificant but may imply a more complicated relationship between influenza deaths and aspirin. Albion's mortality rate is higher than the country's average. Albion employed many measures such as school closure and sanitation regulations, but efforts may have been implemented too late. Future pandemic planning efforts should be focused on timely implementation and those most vulnerable to health inequalities.

Supported by: FURSCA—Orpha Leiter Irwin Fellowship



NICHOLE BROWN, '19
Skolem Sequences and Their Generalizations

Faculty Sponsor: Heather Jordon
 Major: Mathematics
 Hometown: Williamston, Mich.

Forum #1, Norris 100 - 2:00 p.m.

A Skolem sequence of order t is a sequence $S = (s_1, s_2, \dots, s_{2t})$ of $2t$ integers satisfying the condition that for every $k \in \{1, 2, \dots, t\}$ there exists exactly two elements $s_i, s_j \in S$ such that $s_i = s_j = k$, and if $s_i = s_j = k$ with $i < j$, then $j - i = k$. For example, a Skolem sequence of order 5 is (1, 1, 3, 4, 5, 3, 2, 4, 2, 5). In this talk, we will discuss necessary and sufficient conditions for the existence of these sequences and their many generalizations.

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

CHELSEI CARPENTER, '20

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



KYLE CATER, '21
Édouard Lalo's Cello Concerto in D Minor

Faculty Sponsor: James Ball
 Majors: Music, English
 Hometown: Ada, Mich.

Forum #2, Towsley Lecture Hall/
 Norris 101 - 2:45 p.m.

Less well-known than some of the more popular cello concertos often performed, the first movement of Lalo's Cello Concerto in D Minor captures the romantic style at its best. Cadenzas divide the piece to show off the cello's ability for rich, tragic emotion while other themes capture its passionate intensity or bright beauty. Édouard Lalo was a French composer who made music the center of his life, despite his father's expectation to join the military. Heavily influenced by the Romantic composers of the time, Lalo's concerto is a difficult one to put together because of the wide range of interpretations the musicians have; remaining consistent in tempo changes and style is difficult when the piece wants to take on a life of its own. This freedom of interpretation and the broad range of strengths that the cello gets to implement makes Lalo's concerto one of his most famous works.



MATTHEW CHEN, '19

Major: Biology
 Hometown: Portage, Mich.

Chen

LAUREN YOUNG, '19

Major: Psychological Science
 Hometown: Lake Orion, Mich.



Young

The Relationship Between Grit, Stress, and Parenting Style in Physician Assistant Graduate Students

Faculty Sponsor: Andrea Francis

Poster Session, Science Complex
 Atrium - 4:00 p.m.-5:00 p.m.

How is the increased level of helicopter parenting affecting student performance and life satisfaction in high-pressure physician assistant (PA) graduate programs? Helicopter parenting, which is a term used to describe highly involved parents of young adult children, is increasingly seen among incoming medical school students. Segrin, Woszidlo, Givertz, and Montgomery

(2013) found that overparenting was associated with higher levels of narcissism and more ineffective coping skills. Coping skills can be seen as a form of grit. Grit is a measure of how much perseverance a person has for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Miller-Mateo, Martinez, Yarechuk, and Ko (2018) found that medical students with higher grit scores were more likely to graduate in less time and be ranked higher in their class than students with lower grit scores. Grit has also been linked to higher life satisfaction (McCann & Roberts, 2010). Kaplan Thaler and Koval (2015) suggested that the hyper-involvement in children's lives that is part of helicopter parenting leads to reduced grit as an adult. Therefore, we hypothesized that as helicopter parenting increased, grit and PA student well-being would decrease.

To assess the relationship between helicopter parenting, grit, and PA student well-being, PA students at Wingate University were asked to complete a series of questionnaires. Based on this research, we suggest that students who are considering applying for PA school may benefit from practicing and improving their grit and resilience skills during their time as an undergraduate student, regardless of parenting style.

JORDAN CHURCH, '19

(See Jenna Beer, '19; Jordan Church, '19)

SYDNEY COHN, '21

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



KENDRA COOK, '19

Determining Instructional Efficacy When Using Technology: A Case Study of Elementary School Teachers

Faculty Sponsor: Betty Okwako-Riekkola
Majors: Mathematics, Elementary Education
Hometown: Woodhaven, Mich.

Forum #4, Norris 104 - 1:30 p.m.

Do in-service teachers consider technology an integral component of instruction? If so, how do they frame the impact technology has on their instructional practices? How do their attitudes towards technology influence how and when they use technology? This study sought to answer the above questions. Specifically, the study examined the impact of technology on instruction. Grounded in qualitative research traditions, data collection

entailed a case study in which I interviewed and observed three teachers at a K-8 school in a small rural town in Michigan. Additionally, I analyzed relevant policy documents to determine how these teachers were using technology to meet state requirements and standards for educational technology. The study also sought to find out what types of resources are provided for teachers to meet these expectations and if teachers found these resources useful. Given that the school recently adopted the ambitious one-to-one policy, in which all students are provided with a computer during instruction, I was interested to find out if the teachers felt prepared for this transition. I framed my analysis around the Technological Pedagogical Content Knowledge (TPACK) framework and the ISTE technology standards. My findings indicated that teachers who felt comfortable using technology were more innovative in their instructional practices. Additionally, lessons where technology was integrated seemed to be more learner-centered. The three teachers concurred that if used effectively, technology can improve instruction and increase student engagement. Finally, they agreed that more resources and support was needed to achieve the one-to-one goals.



IRENE CORONA AVILA, '22

Major: Biochemistry
Hometown: Lawrenceville, Ga.

Corona Avila

OLIVIA HANCOCK, '22

Majors: Business, Communication Studies
Hometown: Albion, Mich.



Hancock

Content Analysis of Dietary Behavior Messages on Twitter

Faculty Sponsor: Fang Wang

Forum #3, Norris 102 - 4:15 p.m.

Obesity is a serious public health issue worldwide (World Health Organization, 2018). Dietary behavior, as one of the major drivers of obesity, has drawn researcher attention in the media and communication field. The research primarily focuses on the dissemination of accurate information and health campaigns to educate the public, expecting to change the public's attitude toward unhealthy diet habits and ultimately the unhealthy dietary behavior. Given the heavy usage of social media, messages on social media platforms have been exerting a tremendous influence on individuals' knowledge, awareness, and even practice of health behavior. Twitter, as the most popular microblogging platform, has evolved into an important source of information so that each user is able to voice themselves, start a discussion, or participate in an ongoing conversation (Joel, 2010). This study investigates the content on Twitter about dietary behavior, including the original tweets, replies



to the tweets, retweets, and likes. Thematic analysis is taken to code the raw data on Twitter. The data for the analysis are selected from November 1, 2018 through January 1, 2019. This time period holds highly celebrated holidays in the United States, which makes eating an unavoidable topic of online conversation. To ensure acceptable intercoding reliability, two coders had one coding training to meet at least 70% similar coding results. The number of tweets, attributes and themes of the tweets, and replies to the influential tweets are analyzed and reported. In addition, the Twitter users' perception on dietary behavior and obesity is reported. Limitation of the study is discussed.

Supported by: Student Research Partners

CESAR CORTES, '21

Majors: Anthropology, Biology
Hometown: Chicago, Ill.



Hernandez

ROSEMARY HERNANDEZ, '22

Majors: Anthropology, Biology
Hometown: Chicago, Ill.

SAIGE JOST, '22

Major: Biology
Hometown: Dallas, Texas



Jost

RACHEL STANDER, '21

Majors: Biology, Secondary Education
Hometown: Grosse Pointe, Mich.



Stander

Invertebrate Community Composition in an Inland Salt Marsh

Faculty Sponsor: Abigail Cahill

**Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.**

We are studying the biodiversity of macroinvertebrates at the Maple River inland salt marsh (Maple River State Game Area). Due to the salinity found in the habitat, the macroinvertebrate biodiversity may be unique and has scarcely been studied before. Inland salt marshes are considered an endangered habitat and exhibit extreme saline conditions. In 2018-2019 we collected sediment from a transect of various salinity measurements in the marsh and morphologically and genetically distinguished freshwater inhabitants in the ecosystem. We examined abundance and diversity of freshwater species by using an aquatic invertebrates dichotomous key. We also used PCR and gel electrophoresis to observe the DNA sequences among the individuals. These identified species ranged from snails (i.e., gilled snail) to insects (i.e., water beetle). We found that community composition and diversity changed along the salinity gradient and throughout the year. In spring and fall the marsh was wetter and dominated by different animals than July, when the area was dry and dominated by terrestrial animals.

Supported by: Student Research Partners

DILLON DEJONG, '21

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

RACHEL STANDER, '21

Majors: Biology, Secondary Education
Hometown: Grosse Pointe, Mich.

Salinity's Effects on Species Diversity in Maple River State Game Area

Faculty Sponsor: Abigail Cahill

Forum #1, Norris 100 - 3:00 p.m.



Stander

As the Great Lakes State, Michigan is home to many massive freshwater systems, but it's also home to a wetland that most people are unfamiliar with—millions of years ago an ocean existed where Michigan is today, which left salt deposits in the water and soil. Today, Michigan is home to a number of inland salt marshes. In order to explore these salty environments, we collected samples from 2018-2019 in different seasons from the Maple River State Game Area in Michigan, where the salt marsh is located. We examined water and mud samples of varying salinities and collected data on the invertebrates and other organisms that inhabit the salt marsh. We found a variety of different organisms, including snails, ostracods, copepods, and nematodes. The section of the salt marsh with the highest salinity values differed in species diversity and richness compared to sections with lower salt concentrations. Even at the lowest salinity recordings, the salt marsh still experienced lower species diversity than freshwater habitats, such as the Kalamazoo River at the Whitehouse Nature Center (WNC) in Michigan. We collected and examined samples from both habitats and found that Maple River communities had lower taxon diversity than the WNC freshwater areas.

Supported by: Student Research Partners

MADLINE DENISON, '19
Syntheses of Photoswitchable
Cyclooxygenase-2 Inhibitors

Faculty Sponsor: Craig Streu
 Majors: Chemistry, Spanish
 Hometown: Grosse Pointe Woods, Mich.

Forum #1, Norris 100 - 1:45 p.m.

Cyclooxygenase-2 (COX-2) is an enzyme primarily responsible for synthesizing prostaglandin in response to infection or injury. Overproduction of prostaglandin can lead to painful inflammation like rheumatoid arthritis and osteoarthritis. Non-steroidal anti-inflammatory drugs (NSAIDs) have long been used to reduce this inflammation. However, NSAIDs are not as selective and inhibit both cyclooxygenase-1 (COX-1) and COX-2. The unintended inhibition of COX-1 results in unwanted side effects like stomach ulcers and gastrointestinal toxicity. To solve this issue, "coxib" drugs were created, and were designed to selectively inhibit COX-2. The first selective COX-2 inhibitor was rofecoxib. Rofecoxib worked well in reducing inflammation, however, it was found that it also produced adverse vascular side effects like heart attacks, which resulted in its withdrawal from the market. Upon further research, it was discovered that COX-2 is also expressed in, and is important for, the maintenance of the vascular system. As a result, inhibition of COX-2 in the vascular system leads to the observed side effects. The research being presented aims to eliminate this side effect by making a selective COX-2 inhibitor that can be targeted to specific areas of inflammation without impacting the vascular system.

The targeted molecule is an azologue of an established COX-2 selective inhibitor. The azo group is a nitrogen-nitrogen double bond that can change its conformation from the initial *trans* state to *cis* or *cis* to *trans* in response to given wavelengths of light. Our modeling suggests that the *cis* conformation is likely to be the active form of the drug. Therefore, light can "turn on" the drug. This light-switching capability helps with drug selectivity because the drug can be systemically administered and then activated in a specific area of inflammation with light, preventing the synthesis of prostaglandin, all without harming the vascular system.

Supported by: FURSCA

ZERICK DILL, '20
Unraveling the Biosynthesis of the Essential Lipoyl
Cofactor in *Staphylococcus aureus*

Faculty Sponsor: Vanessa McCaffrey
 Major: Biochemistry
 Hometown: Columbus, Ohio

Forum #1, Norris 100 - 2:45 p.m.

In recent years, the rise and spread of methicillin-resistant *S. aureus* (MRSA) that has evolved resistance to antibiotics previously successful at eradicating the infection has become a global health concern. Thus, the search for novel antibiotic targets has been the focus of many research efforts. One potential new target is the biosynthesis of the lipoyl cofactor, which plays an essential role in the oxidative decarboxylation of various α -keto acids and the breakdown of glycine. The second step of the *de novo* pathway for the biosynthesis of the lipoyl cofactor, the attachment of two sulfur atoms to C6 and C8 of an n-octanoyl chain connected to a target lysyl residue on a lipoyl carrier protein, is catalyzed by lipoyl synthase (LipA), a member of the radical S-adenosylmethionine (SAM) superfamily. In addition to its [4Fe-4S] radical SAM cluster, LipA contains a second [4Fe-4S] "auxiliary cluster" which is sacrificed during catalysis to supply the requisite sulfur atoms. The destruction of its auxiliary cluster renders LipA inactive in the absence of a system to restore it. Further studies have identified that *Escherichia coli* (*E. coli*) has an additional protein, NfuA, an iron-sulfur cluster carrier protein, that can target LipA and regenerate its auxiliary cluster to reactivate it for catalysis.² However, while *E. coli* LipA has been extensively studied, the *S. aureus* LipA homolog has not been fully characterized. My research project uses a combination of genetic, biochemical, and spectroscopic approaches to functionally characterize *S. aureus* LipA and understand the potential roles of *S. aureus* iron-sulfur carrier proteins in the regeneration of LipA's auxiliary cluster. Ultimately, this information could be used to design antibiotics that target this biosynthetic pathway and obstruct the biosynthesis of lipoic acid, inducing death to pathogenic bacteria.

ANH DINH, '22

(See Matthew Anderson, '19; Chris Breen, '20; Anh Dinh, '22; Hannah Erickson, '21; Megan Harvey, '20; Sydney Rudowski, '20)



DARIAN ELSON, '19
Teacher Research – Journal Inquiry of a Spiraling Science Curriculum Across Grades K-8

Faculty Sponsors: Kyle Shanton, Betty Okwako-Riekkola, Lisa Lewis
 Major: Integrated Science
 Hometown: Macomb, Mich.

Poster Session, Science Complex
 Atrium - 4:00 p.m.-5:00 p.m.

After having several field placements in varying grade levels, the interest of creating a spiral curriculum with ecosystems seemed interesting to look deeper into. Placed in a fifth-grade and a kindergarten classroom, this was journal inquiry-based research. Forty lessons were created that spanned across kindergarten, third grade, and fifth grade; through those lessons there was data collected. The data were obtained when 12 lessons (six from kindergarten and six from fifth grade) were taught and reflected upon. The reflection and analysis of the lessons showed three specific findings from the data. These findings were specific to student oral explanation, importance of teaching routine, and my individual practice as a teacher. While the broadness of the findings spans both kindergarten and fifth grade, the importance of reflection in the teaching profession is important because it is a helpful tool to improve your own pedagogical skills as well as the learning environment for your students.



REBECCA ENERSON, '19
Determining if Mating Type Proteins Play a Role in Immaturity in the Ciliate *Tetrahymena thermophila*

Faculty Sponsor: Marcella Cervantes
 Major: Biology
 Hometown: Huntington Woods, Mich.

Forum #1, Norris 100 - 9:30 a.m.

Tetrahymena thermophila is a free-living ciliate, commonly found in freshwater ponds, and is often used as a model research organism. *T. thermophila* exhibit nuclear dimorphism through a somatic nucleus and a smaller germline nucleus that exist simultaneously. They also exhibit seven distinct mating types. Mature cells will only mate after they have been starved and put in the presence of cells of a different mating type. Since they do not mate, it is currently unknown if mating type genes are induced by starvation in immature progeny. This study mated CU427 and S1969, mating type VI and II, respectively, of *T. thermophila* and isolated the progeny based on antibiotic sensitivity of parental strains. The goal of this study was to determine if mating type genes were induced under a variety of conditions, and it was

hypothesized that mating type genes would not be induced in immature progeny following the mating of parental strains because they will not mate. The mating type gene expression for the parental strain, utilizing S1969, was tested at logarithmic growth phase, 30 minutes of starvation, and two hours of starvation. The mating type gene expression for the progeny was tested at the same three conditions. These samples will be analyzed using quantitative reverse transcription polymerase chain reaction and semi-quantitative PCR to determine the relative induction of the mating type genes between the six samples. Alternate triplicate samples of progeny and mature parental cells were starved for 24 hours and analyzed using RNA sequencing. The data from qRT-PCR and RNA Seq will be cross-referenced to support the induction of the mating type gene in immature *T. thermophila*.

KHULAN ENKHBAATAR, '21

Majors: Biochemistry, Mathematics/Physics
 Hometown: Darkhan, Mongolia

MAXWELL KING, '21

Major: Biochemistry
 Hometown: Birmingham, Mich.

A Study of RNA Polymerase-Template Interaction Utilizing CRISPR/dCas9 Protein

Faculty Sponsor: Christopher Rohlman

Poster Session, Science Complex
 Atrium - 4:00 p.m.-5:00 p.m.

We are exploring the RNA transcription process, and attempting to bring the process to a halt, using the CRISPR/dCas9 protein as a blockade. RNA transcription is a fundamental process that is required for gene expression in all cells. A multitude of proteins interact with the molecular machine that transcribes genes, RNA polymerase, activating, or sometimes pausing, transcription in order to control gene expression. We are using the CRISPR/dCas9 protein system to artificially induce transcription pausing and termination. We will study the process using two different gene copying machines, *E. coli* and T7 RNA polymerases. The dCas9 protein will be used as the mechanism for stopping the transcription process, serving as an RNA-guided DNA binding platform. The goal of this project is to study the behavior of the RNA polymerases following a brief pause in the transcription process. As part of this study we hope to chemically cross-link the RNA polymerases to the nucleic acid at the pause site. This will allow us to verify the presence of the RNA polymerase protein on the nucleic acid template, and examine its interactions with the dCas9 protein. Essentially, we will be investigating the dCas9 protein's pausing ability as well as its structural and chemical interaction with

the two different RNA polymerases and the template DNA. Ultimately this could allow us to develop a method for targeted modification of RNA sequences.

Supported by: FURSCA

HANNAH ERICKSON, '21

(See Matthew Anderson, '19; Chris Breen, '20; Anh Dinh, '22; Hannah Erickson, '21; Megan Harvey, '20; Sydney Rudowski, '20)

TYLER EYSTER, '20

Religion, Immigration, and Industry: The Role of Christian Communities in Shaping 20th-Century Albion

Faculty Sponsor: Jocelyn McWhirter

Majors: Religious Studies, English

Hometown: Canton, Mich.

Forum #4, Norris 104 - 9:30 a.m.

This research analyzes the impact of Christian communities located within the City of Albion during the 20th century. Six churches have been surveyed which represent the following denominations: Mainline, Evangelical and Black Protestantism, Russian Orthodoxy, and Catholicism. Each can be directly connected to the many ethnic identities which were present within Albion during the last century. Recorded interviews and historical sources have been collected in hopes of better understanding the ways in which the aforementioned communities maintained their religious identities while living in 20th-century Albion. Attention has also been paid to the ways in which Christian churches and communities shaped civic life and industry throughout Albion's history. Outcomes of this research include a thesis, and oral history interviews with prominent church leaders and members.

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



KATIE FERRERO, '19

Investigating Aphid 'Superclone' Status

Faculty Sponsor: Abigail Cahill

Major: Biology

Hometown: Royal Oak, Mich.

Forum #1, Norris 100 - 2:15 p.m.

It has been proposed that individuals of *Aphis nerii*, commonly known as the oleander aphid, are genetic clones. Generally found feeding on several types of milkweed, this species of aphid is invasive to the United States. Previously, it has been suggested

that oleander aphids have low genetic diversity, despite a large geographic range. Genetic diversity is important in that it allows natural selection to take place, which overall lessens the chance of a population's extinction due to lack of evolution. In this study, genetic diversity was determined by isolating the cytochrome c oxidase (COI) gene, which is a marker commonly used for bio-identification and genetic characterization. It was hypothesized that the oleander aphids in this study would consist of low genetic diversity, supporting previous findings which suggested clonal ecology. Data taken from the aphids and milkweed were collected and recorded locally on Albion College's campus. The COI gene amplified from aphid DNA was sequenced at the Michigan State Genomic Core. This data was then analyzed using software such as R, BioEdit, genepop, and FSTAT to determine the amount of genetic diversity. Ecological factors relating to milkweed frequency, physical features, and presence of predators were also taken into account. Results from this study were compared to samples taken in Pennsylvania.

Supported by: FURSCA



SARAH FINN, '19

Ardency and Agency: Romantic Love in Paired American Novels from 1899, 1957, and 2015

Faculty Sponsor: Mary Collar

Major: English

Hometown: Shelby Township, Mich.

**Forum #2, Towsley Lecture Hall/
Norris 101 - 4:00 p.m.**

1899, 1957, and 2015—these are the years that my great-grandmother, my grandmother, and I each turned 18. My project examines two American novels from each of these years, novels that have love as a principal focus, novels that were reviewed in prestigious papers of the day, and novels that are considered representative of their time. Each of the selected years have enough distance between them to expect social change, which has allowed me to question what happens to narrative strategies as a consequence of these changes. Writing from the perspective of a young woman growing up in a culture obsessed with lust and love, I wanted to compare what is available to my generation of readers with what was available to my great-grandmother's and my grandmother's. My hypothesis is that the social norms that are both enforced and abandoned by these authors offer an insight into the forms of love that are allowed to be taken seriously, as well as into how the norms can affect the literary strategies each author uses.



BRIANA FLANAGAN, '19
**'Those French People, They're So Rude!':
Personal Journey of Demystifying French
Stereotypes**

Faculty Sponsor: Dianne Guenin-Lelle
Majors: Biology, French
Hometown: Sioux Falls, S.D.

Forum #3, Norris 102 - 3:15 p.m.

This presentation explores the misconceptions of French culture held by Americans who often misinterpret these differences in behavior stereotyped as "rude." The presentation includes an analysis of social interactions, friendship, the educational system, and interaction within the workplace. This analysis is informed by theory and lived experience because during my time studying abroad, I realized that I never encountered anyone rude, which led me to question my preconceived notion of French behavior and French-American intercultural relations explored in my thesis.



BRANDON GARY, '20
Major: Biology
Hometown: Quincy, Mich.

Kobs

BRIGETTE KOBS, '19
Major: Biology
Hometown: Decatur, Ind.



Moore

WILLIAM MICHELS, '19
Major: Biology
Hometown: Grosse Pointe Park, Mich.

MACKENZIE MOORE, '19
Major: Biology
Hometown: Quincy, Mich.

SYDNEY RUDOWSKI, '20
Major: Biology
Hometown: St. Clair, Mich.



Rudowski

Gene Annotation of *Drosophila takahashii* Contig7

Faculty Sponsor: Ken Saville

**Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.**

The purpose of this project was to successfully annotate each gene present in the contig7 sequence located within the dot chromosome of *Drosophila takahashii*. The dot chromosome, also known as the F element, is one of the most interesting components concerning *Drosophila* genetics. This is in part because of its highly conserved heterochromatin makeup that was considered an utter mystery up until recent discoveries were made. After extensive research, it is now suspected that the dot chromosome may have originally been a sex chromosome, explaining its odd chromosome makeup. Despite this revelation, there is still much about the dot chromosome that is unknown. Gene annotation is used to interpret genetic information so that its function can be understood. This particular gene annotation involving contig7 was conducted through a comprehensive analysis of each individual gene's makeup; including exons, introns, start codons, stop codons, RNA sequences, and protein sequences. In order to do so, the gene sequence was examined via Washington University's online Genome Browser, and evaluated piece-by-piece with help from Washington University's Gene Model Checker, Gene Record Finder, and the National Center for Biotechnology Information's (NCBI) Basic Local Alignment Search Tool (BLAST). Successful annotation of the contig7 sequence, once reported, will provide an increased understanding of the dot chromosome's gene function. This knowledge could prove useful in future research endeavors.



MAGGIE FOWLER, '19
**The Effect of Pop Culture's Stereotypes
on America's Bean Counters**

Faculty Sponsor: John Carlson
Major: Accounting (CPA Emphasis)
Hometown: St. Joseph, Mich.

Forum #3, Norris 102 - 3:00 p.m.

"Bean counter," "number cruncher"— accountants have heard them all. This research studied the effects of pop culture on perceived stereotypes surrounding the accounting profession and how such conceptualizations may have differed across genders and generations. It offers a much-needed perspective on the impact society's perceptions have had on the accounting profession, and how pop culture may affect the decision not only to enter the professional field of accounting, but also one's longevity in such a career. Research was conducted via a survey designed for individuals who have worked or are currently working in an accounting capacity. The survey was directly emailed to 587 alumni of the Economics and Management Department as well as posted on various social media accounts belonging to Economics and Management faculty and Albion College. My data analysis sought to determine whether stereotyping is a mild pressure, or if it is a pervasive problem, perpetuated by pop culture, that has led to significant internalization by professionals in the field.



ELIZABETH GLENN, '20 **Therapy Dogs in Classrooms**

Faculty Sponsor: Suellyn Henke
Major: History
Hometown: Novi, Mich.

Forum #3, Norris 102 - 1:15 p.m.

A dog's mere presence can provide a wide range of benefits for human beings. Two of those benefits include the lowering of stress levels, and the increase in trust. I immediately wondered how these two findings would impact a classroom environment. Would the students feel more comfortable taking risks? Would the relationship between student and teacher be more positive? What about the relationship between peers? As a future educator, my initial goal was to see what the impact of consistently having a therapy dog in a high school classroom would be. (A therapy dog is trained to provide comfort in public settings with others beyond their owner.) As a step to reach this goal, I took the opportunity this past semester to run a pilot study in a first-year classroom where the professor brings in her registered therapy dog two times a week. I set up the pilot study for a college class, paying close attention to variables that I would need to consider. For two weeks I sat and observed the class. At the end, I handed out a survey. With this preliminary study my initial findings showed that having a therapy dog in a classroom positively affects classroom environment and motivation. The study also suggested that having a dog in a classroom could increase the likelihood of retention; follow-up studies will be needed to further confirm this claim. A final review of the structure also indicated that a longer time frame would be needed, along with more attention paid to participation.

SYDNEY GRAHAM, '20 **Institutional Distrust as Observed at Albion College**

Faculty Sponsor: Matthew Schoene
Major: Sociology
Hometown: Flint, Mich.

Forum #3, Norris 102 - 9:30 a.m.

The purpose of this study is to examine the connection between trust and the relationship between students and higher-education institutions. Research that focuses on student trust in these institutions is limited but relevant, because the field of higher education is becoming increasingly competitive. Increasingly, a college education is crucial for labor market success in the United States. More specifically, among American colleges and universities, large spending to attract new students has become more expensive, yet it is less effective than retention. Customer loyalty is an important aspect of retention, which relies on the relationship that higher-education institutions

can build with their students. Trust is essential to relationships; therefore this study focuses on trust and the relationship between Albion College and its students. This presentation will display and interpret the results of a survey of the Albion College student body to evaluate the presence of distrust in elements of the institutions and discuss the determinants of both institutions' trust and distrust.

Supported by: FURSCA

JUSTIN GREEN, '19

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

MEGAN GUTHERIE, '20

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

OLIVIA HANCOCK, '22

(See Irene Corona Avila, '22; Olivia Hancock, '22)



JACQUELYN HARBIN, '19 **Goal Setting: The Relationship Between Grit, GPA, and the Ability to Cope Throughout the College Years**

Faculty Sponsor: Heather Betz
Major: Exercise Science
Hometown: Gaylord, Mich.

Forum #3, Norris 102 - 1:45 p.m.

Grit has been defined as the tendency to pursue long-term challenging goals with perseverance and passion (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011). The purpose of this study was to determine how grit was related to coping and GPA throughout the college years. Subjects included 218 liberal arts college students (ages 18-23 years). Surveys were sent out to students via Google Forms: a demographic survey measured one's GPA, the Coping Self-Efficacy Scale measured the extent of one's ability to cope, and the Short Grit Scale measured one's level of grit. There was a positive correlation between grit scores and coping scores ($r = .363, p < 0.001$). There were also significant differences between grit scores across the GPA category groups ($p < .05$). Students with a GPA between 3.8 and 4.0 were significantly grittier than all other GPA groups, and those with a GPA between 3.2 and 3.59 were significantly grittier than those with a GPA ≤ 2.99 .



There were no significant differences between GPA category groups in terms of coping scores ($p=0.377$). Students who are grittier may be more confident in their ability to cope and therefore have higher coping scores. These grittier students also had significantly higher GPAs across many populations, suggesting that it is one's level of grit that influences one's GPA, not their ability to cope with adversity.

MEGAN HARVEY, '20

(See Matthew Anderson, '19; Chris Breen, '20; Anh Dinh, '22; Hannah Erickson, '21; Megan Harvey, '20; Sydney Rudowski, '20)

SIERRA HAZARD, '21

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

ROSEMARY HERNANDEZ, '22

(See Cesar Cortes, '21; Rosemary Hernandez, '22; Saige Jost, '22; Rachel Stander, '21)



Hill

ELEANOR HILL, '19

Majors: Music, Business and Organizations
Hometown: Cedar, Mich.

ANDREW KLINGER, '19

Majors: Business and Organizations, Religious Studies
Hometown: Rochester Hills, Mich.



Meyer

PHILIP MEYER, '19

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

SPENCER SHAHEEN, '19

Major: Entrepreneurship
Hometown: Rochester, Mich.

KIANA THOMAS, '19

Majors: Business and Organizations, Psychological Science
Hometown: Eastpointe, Mich.

COLE THUNE, '19

Major: Business and Organizations
Hometown: South Lyon, Mich.

Gerstacker Senior Capstone: Equestrian Center Market Analysis

Faculty Sponsors: Laurel Draudt, John Carlson

**Forum #2, Towsley Lecture Hall/
Norris 101 - 10:00 a.m.**

Over the course of the past semester, six seniors enrolled in the Gerstacker Institute Senior Capstone have been completing market research to support the creation of a comprehensive business plan for the Nancy G. Held Equestrian Center at Albion College. The students were asked to research and gather information about equestrian programs within a 500-mile radius of Albion College and to identify trends with prospective students over the last few years. This completed research will help the Albion College Business Office and Held Equestrian Center staff to better understand our competitors and where our center could potentially grow, change, or develop moving forward.



ALEX HOINVILLE, '19

Assessing Pressure-Temperature Conditions of the Seve Nappe, Scandinavian Caledonides, Sweden

Faculty Sponsor: Michael McRivette
Major: Geology
Hometown: Kalamazoo, Mich.

**Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.**

The Scandinavian Caledonides of Norway and Sweden, an ancient mountain belt formed by the collision between the paleocontinents Baltica and Laurentia ~430-400 million years ago, have long been a premier natural laboratory for the study of high pressure (HP) and ultra-high-pressure (UHP) rocks. These are rocks of crustal, near-surface origin that have been subjected to pressures and temperatures of the upper mantle (> ~70 km depth) via subduction and then transported back to the surface, preserving mineral assemblages formed at those depths. Thus, these rocks are valuable archives of information about the transition from subduction to continental collision. The Seve Nappe, a body of highly metamorphosed rock from the middle of the mountain belt in central Sweden, has been a site of ongoing research into high pressure metamorphism, but more work is required to fully characterize the structural and metamorphic relationships in this area. Using optical microscopy to identify mineral textural relationships in conjunction with electron microprobe-derived thermodynamic data to constrain pressure-temperature evolution allows the characterization of the metamorphic history of rocks from areas of the Seve Nappe. Two samples from separate areas of the southern Vasterbotten region of

Sweden were analyzed using optical mineralogy and geochemical thermodynamic techniques in order to constrain their pressure-temperature evolution and characterize metamorphic relationships between mineral textures. This characterization of the thermodynamic history of the rocks in this region in turn allows insights into the tectonic history of the Scandinavian Caledonides.

Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.

The purpose of this research project is to isolate and identify the molecular components of lemongrass extracts that are obtained through a variety of extraction methods. It is widely understood that various techniques for extraction of essential oils and flavorings yield different compositions of product. The goal of this project is to determine the molecular composition of lemongrass extractions obtained by different methods and to use molecular scent/taste databases to identify the components that account for the differences in taste that are known to arise from different methods of extraction.

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



ALINA HOLMSTROM, '19
The Impacts of Women's Cooperatives and Associations on the Economic, Social, and Cultural Aspects of Moroccan Society

Faculty Sponsor: Midori Yoshii
Majors: International Studies, French
Hometown: Lac La Belle, Mich.

Forum #4, Norris 104 - 2:15 p.m.

In order to promote women's economic participation, the Moroccan government has been updating its policies and improving its education system for years. Previous academic research merely evaluated these governmental efforts in education and institutional upgrades, but failed to consider other potentials. Despite the government's efforts, contemporary Moroccan women face many challenges in entering the workforce. The conditions are particularly severe in rural communities. My research identifies that the problems exist not merely in the education system or the top-down government policies, but rather in more practical areas, such as a lack of safe commuter transportation, financial exploitation by male coworkers, and unequal pay. This presentation argues that promoting women's participation in workshops and co-ops would much more effectively combat these issues as they provide women with other female coworkers to commute with, deter men from taking advantage of them, provide informational sessions on marketing and financial skills, and ensure they receive proper pay for their work. In other words, inequality can be combated on the local level, in conjunction with government efforts to achieve a more inclusive work environment. These local and government approaches would consequently benefit the country both economically and socially. This research was inspired by my study-abroad experience in Rabat in the Spring 2018 semester.

SHAKARA JORDON, '20
The Isolation and Characterization of Lemongrass Components Using Various Extract Techniques

Faculty Sponsor: Lisa Lewis
Major: Chemistry
Hometown: Columbus, Ohio

SAIGE JOST, '22

(See Cesar Cortes, '21; Rosemary Hernandez, '22; Saige Jost, '22; Rachel Stander, '21)



Karns

TAYLOR KARNS, '20

Majors: Biology, Biochemistry
Hometown: Marshall, Mich.

SHELBY STAJDL, '20

Major: Biology
Hometown: Saginaw, Mich.

Synthesis and Biological Evaluation of a Photoswitchable Quorum Sensing Molecule

Faculty Sponsor: Craig Streu

Forum #1, Norris 100 - 2:30 p.m.



Stajdl

Quorum sensing is the ability of bacteria to communicate with one another via chemical signals. Within a group of bacteria these chemical signals can produce a single response, ultimately benefiting the bacteria. If this natural process could be controlled or co-opted, the biotechnical applications arising from the natural ability of bacteria to respond to chemical stimuli could be limitless. Photoswitching molecules can respond to a light stimulus. Azostilbenes, in particular, isomerize from the *trans* to the *cis* conformation in response to the appropriate wavelengths of light. If one of the available conformations is bioactive while the other is not, this photoisomerization has the effect of activating or inactivating the molecule in response to light. The power of light-responsive chemical signaling systems comes from their ability to achieve exquisite spatial and temporal control, which is of tremendous



utility for numerous bioindustrial applications. Applications include: targeted treatment of industrial pharmaceuticals, control of biofilm formation, and the production and consumption of antibiotics. We have designed a series of photoswitching molecules based upon N-acyl homoserine lactones (AHLs), which are known to be prominent chemical messengers, by integrating the azo-stilbene motif into the parent molecule scaffold. These molecules are made by Mills coupling between the appropriate aniline and aryl-nitroso species. Their photokinetic properties are measured by UV/Vis spectroscopy and their bioactivity is measured in the presence and absence of isomerizing light. We herein describe the synthesis, photokinetic studies, and bioactivity of this class of photoswitchable molecule with tremendous industrial potential.

Supported by: FURSCA—Orpha Leiter Irwin Fellowship



ALEX KECK, '19
Burnout: A Meta-Analysis on Causes and Intervention Methods

Faculty Sponsor: Vicki Baker
Major: Accounting (CPA Emphasis)
Hometown: Frisco, Texas

Forum #3, Norris 102 - 4:00 p.m.

Burnout is one of those things that everybody knows about, but few actually acknowledge burnout and discuss it openly. Coined by Christina Maslach, burnout is conceptualized as three dimensions involving, “overwhelming exhaustion, feelings of cynicism and detachment from the job, and a sense of ineffectiveness and lack of accomplishment.” The risks of burnout for employers include employee turnover, decreased efficiency, and worsening employee relationships. For the employee, the concerns are similar with the risk of leaving the company and losing valuable relationships in the workplace and at home. The majority of research conducted on burnout was completed in the early 2000s, with less attention being paid to this critical workplace issue. My research focuses on looking at the various causes and intervention methods previously researched to determine if the same factors are still applicable in today’s workplace. I interviewed several students, faculty, recent graduates and finance professionals to understand their experiences of burnout to determine alignment, or misalignment, with research and practice. I found several commonalities with having the right corporate environment and having positive interpersonal relationships in and out of the workplace. Intervention methods are rarely discussed, but ideas will be presented as part of this presentation.

MAXWELL KING, '21

(See Khulan Enkhbaatar, '21; Maxwell King, '21)



EMILEE KINNEY, '19
**Here, the Trees Hold Our Tongues
More Than We Do: Poems**

Faculty Sponsor: Leia Penina Wilson
Majors: English (Creative Writing); History
Hometown: Emmett, Mich.

**Forum #2, Towsley Lecture Hall/
Norris 101 - 3:00 p.m.**

After studying a range of writers who examine the significance of place in contemporary American poetry, I fell in love with the magnitude of poetry—the expanse of its reach, and the extent of its mystery. While at Albion College, I approached the concept of place as both a critical and creative scholar. After



JARED KARSAMA, '19
Researching and Applying Culturally Proficient Instruction in Outdoor Programming

Faculty Sponsor: Suellyn Henke
Majors: English, Secondary Education
Hometown: Berkley, Mich.

Forum #1, Norris 100 - 4:15 p.m.

The goal of my FURSCA project was to develop myself as a culturally proficient instructor. In doing so, I first researched cultural proficiency—the skill that allows both individuals and organizations to interact effectively with those who differ from them—through the completion of the workbook *Culturally Proficient Instruction: A Guide for People Who Teach*. Along with my reading, I met weekly with my instructor to discuss key ideas from the workbook and identify ways in which I could develop cultural proficiency. After researching, I applied ideas from the workbook into the planning and execution of two different summer youth programs—the Albion Recreation Department’s Peapods day camp for ages 4-12, and the Whitehouse Nature Center’s Teens Exploring Nature for ages 13-18. Finally, I wrote weekly journal entries to reflect on my work. Along with my goal to improve myself as a culturally proficient instructor, my FURSCA project also provided the opportunity to gain more experience with long term pedagogical planning and developing rapport with youth—all of which will help lay a solid foundation for being a high school teacher after graduation.

Supported by: FURSCA, Albion Community Foundation

attending Indiana University's Writer's Conference, participating in an internship with *Mentor and Muse: Essays from Poets to Poets*, and completing a directed study, my research culminated into a poetry collection. These poems explore place and identity as a woman, a daughter, and simply as a human in the world. Audre Lorde states: "Poetry is not only dream and vision; it is the skeleton architecture of our lives. It lays the foundations for a future of change." For me, this means learning and practicing the way in which poetry allows us to make sense of the world through language—through archival research, through history. Equally important to my project is the way these poems participate in a broader conversation across cultural boundaries, as well as the way in which poetry encourages empathy through close readings, imagination, and intimacy. My goal for this collection is to reveal how while poetry can be fun, it is also an act of bravery, how being creative while confronting honesty demands courage.

ANDREW KLINGER, '19

(See Eleanor Hill, '19; Andrew Klinger, '19; Philip Meyer, '19; Spencer Shaheen, '19; Kiana Thomas, '19; Cole Thune, '19)

BRIGETTE KOBBS, '19

(See Brandon Gary, '20; Brigette Kobs, '19; William Michels, '19; Mackenzie Moore, '19; Sydney Rudowski, '20)

about other people's mental states, including the concept that others can hold a false belief. This study was therefore designed to assess whether children who have a ToM will be more skeptical of an adult's answers about pretend and real food than children without a ToM.

Children ages 3 to 6 identified a pretend or real food item, and then watched a video of a reliable adult accurately or inaccurately identifying the object. After hearing the testimony from the adult, children were asked to re-identify the food item. Children also completed a ToM task where children watched a doll, Anne, hide a marble from another doll, Sally, and then answered a variety of perspective-taking questions. Results showed that children with a ToM were less likely to change their initial identification than those children without a ToM. Thus, interviewers should consider a child's level of ToM during questioning.

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

MEGHAN KRAWCZYK, '22

Using Concept Maps to Understand Psychology Topic Difficulty

Faculty Sponsors: Andrea Francis, Mareike Wieth
Major: Political Science
Hometown: Aurora, Ill.



Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.

MARIANNE KRAUSE, '19

Skeptical Preschoolers: Role of Theory of Mind in Young Children's Skepticism of Reliable Adults

Faculty Sponsor: Andrea Francis
Majors: Psychological Science, Anthropology and Sociology
Hometown: Oak Park, Mich.



Forum #3, Norris 102 - 2:00 p.m.

Young children sometimes confuse real events with pretend events (Foley, Harris, & Hermann, 1994), which can impact what children remember during interviews (Ceci, et. al., 1994). In addition to confusing pretend and real events, Krause (2009) found that 3-year-olds had more trouble distinguishing between real and pretend food than 4- and 5-year-olds. One reason why children may become better at distinguishing pretend from real food and distinguishing accurate from inaccurate information during interviews may be the development of Theory of Mind (ToM). ToM refers to the ability to reason

Material covered in courses varies in difficulty for students. Sometimes this might result from differences in background knowledge when a course topic is first introduced. For example, studies suggest that before taking Introductory Psychology, undergraduate students are likely to have more developmental psychology knowledge than biopsychology knowledge (Peck, Ali, Matchock, & Levine, 2006; Thompson & Zamboanga, 2003; McNamara, Williamson, & Jorgensen, 2011). Gurung (2018) suggests that a topic like developmental psychology is easier for students than biopsychology or memory because it is more applicable to daily life. In the current study, multiple-choice exam scores in two introductory psychology courses showed that students did better on questions related to developmental psychology than memory. To examine whether the ability to make connections to real life makes developmental psychology less difficult than memory, six students' concept maps were analyzed. A concept map is a visual representation of how the student makes connections from one central subject to details and applications of the central subject.



The total number of connections made versus the applications made on the development versus the memory concept maps were calculated. As hypothesized, there were proportionally more applications in the development concept maps than the memory concept maps. Results support the notion that students' ability to make accurate connections to real life makes some topics in psychology easier than others.

Supported by: Student Research Partners

MADISON KROETSCH, '19

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

JONAS LAMONT, '20

An Exploration of the Effectiveness of Different Methods of Conductive Polypyrrole Synthesis

Faculty Sponsor: Craig Bieler
Major: Chemistry
Hometown: Bear Lake, Mich.

**Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.**

Highly conductive organic polymers have several applications such as in electronic devices and sensor technology. One of the most well-known and commonly used conductive polymers, polypyrrole (PPy) can be synthesized using a few different methods. To date, the least common but most promising method utilizes photochemical initiation to begin the polymerization. In this presentation, I will show results of experiments using the photochemical method of PPy synthesis with the goal of optimizing this synthetic procedure and producing the highest quality product. Additionally, modifications which improve upon an instrument which measures the conductivity of thin films will be described.



LUCAS LUSK, '19

Out of Control: Social Attitudes Towards Alcohol

Faculty Sponsor: Andrew Christopher
Majors: Psychological Science,
Communication Studies
Hometown: Naperville, Ill.

Forum #3, Norris 102 - 10:00 a.m.

According to the National Institute of Alcohol Abuse and Alcoholism, 60% of college students consume alcohol in some capacity. Despite alcohol being quite

normalized in our American society, it is often looked down upon, especially when consumed in excess (Van Boekel, Brouwers, van Weeghel, & Garretsen, 2013). In addition to studying impressions of those who drink, other work has found that non-drinkers on college campuses feel pressured and isolated because of their decision to not drink (Conroy, Visser, & Oliver, 2014). This disconnect between drinkers and non-drinkers can create issues between the two groups as they may hold prejudices against one another which can manifest themselves in a variety of ways.

In this study, we explored the impression formed of non-drinkers and drinkers. Three hundred thirty participants (140 men, 186 women, and four non-binary individuals) enrolled in higher-education institutions were recruited through Amazon mTurk. Participants completed a survey that indicated their own personality before reading a vignette about a character who either consumed or did not consume alcohol. Afterwards, participants rated the character they read about based on how they perceived their personality and would ultimately indicate their own drinking behaviors.

Results indicated that those who drink and do not drink alcohol are perceived in different ways. The character who drank was seen as more extroverted and open to experience, whereas the character who did not drink was seen as more conscientious and agreeable. Additionally, female participants were somewhat more likely to perceive the female character who drinks as more open to experience compared to male participants, who saw the male character who drinks as more open to experience. In future research, it will be important to bridge the gap between these two groups to ensure their differences do not create greater conflicts.

Supported by: FURSCA



KATHERINE MAHER, '19

Resources for Intimate Partner Violence Between Queer Women

Faculty Sponsor: Scott Melzer
Major: Sociology
Hometown: Troy, Mich.

Forum #3, Norris 102 - 3:45 p.m.

Despite rates of intimate partner violence in LGBTQ relationships being on par with, or higher than, heterosexual relationships, there is a dearth of adequate or appropriate resources for queer survivors. Resource availability reflects our narrow, heteronormative view of relationships—especially ones marked by violence. My research focuses on the resources available for queer women experiencing intimate partner violence and the significant barriers they can face when seeking help. I conducted

qualitative interviews with victim advocates throughout the United States who work with queer survivors of intimate partner violence. Because there are so few LGBTQ-specific intimate partner violence resources, many queer people must seek help from organizations that lack adequate training. I find that some of the barriers queer women face include trouble accessing legal intervention, emergency housing, and appropriate medical care. Further, when service providers use a heteronormative model of intimate partner violence, queer clients face biphobia and homophobia from the very people charged with helping them. Going forward, resource providers need to prioritize inclusivity for all of their clientele, including being intentional about the language they use and assumptions they make, and actively participating in the LGBTQ community to better understand their needs.

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

The Duff reaction forms aryl aldehydes from substituted phenols, which are important compounds when making the principal components of vanilla and cinnamon, and biochemicals like testosterone, progesterone, and cortisone. The Duff reaction's major drawback is that it can take up to five days to run under reflux and the product yields can be lower. By using a microwave for the heat source, the reaction times can be dramatically reduced and yields generally increased. This project looks at the regiochemistry and yields of products formed from a Duff reaction with the three regioisomers of bromophenol. The products are identified with ¹H NMR, GC/MS, and comparison to pure forms of the predicted products (where available). From the reactions run with para, meta, and ortho-bromophenol, p-bromophenol forms one product with high yields around 64 percent. The meta and ortho chemicals produce two to three possible products with yields as high as 98 percent. The o-bromophenol is specifically interesting because it produces a mono-aldehyde and di-aldehyde product in the same reaction. Previous mechanistic work on the Duff reactions stated that the aldehyde is added ortho to the phenol group, but this work shows formylation can also occur para to the phenol group. Mechanistic details will be discussed.

Supported by: FURSCA

MICHAEL MARTINEZ, '21

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



SAVANNAH MANNING, '19 **From the Page to the Stage: The Costuming Process from Conceptualization to Construction**

Faculty Sponsor: Stephanie Henderson
Major: Theatre
Hometown: Muskegon, Mich.

Forum #2, Towsley Lecture Hall/
Norris 101 - 3:15 p.m.

As with many artistic disciplines, the most important yet most difficult aspect to define is the process. The artistic process—regarding theatrical fields—is a series of steps artists takes to produce their art. This process should be replicable, but it is unique to each artist. In my research, I used a practical application of the artistic process regarding costume design. I used my surroundings and online research to serve as the basis of my concept, and this culminated in the construction of two dresses—costumes for the female leads in Mozart's *Così fan Tutte*.

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



NICOLE MCCANN, '20 **Eurocepticism on the Rise? The Impact of Eurocepticism through Economic, Political and Cultural Aspects**

Faculty Sponsor: Matthew Schoene
Majors: Sociology, Psychological Science
Hometown: Adrian, Mich.

Forum #4, Norris 104 - 2:30 p.m.

Eurocepticism is defined as the depreciating degree of trust and confidence that citizens of a country hold in the institutions of the European Union (EU). This phenomenon has spread across the EU through various channels and has manifested itself in life-altering fashions, such as the United Kingdom's decision to leave the EU. This manuscript differentiates among three separate forms of Eurocepticism: political, cultural and economic, and asks which of these three forms of Eurocepticism was most responsible for Brexit. This case study of the United Kingdom, and the British-Exit (Brexit) ruling is



ANNIKA MARKOVICH, '19 **Microwave-Assisted Duff Formylation Reactions**

Faculty Sponsor: Vanessa McCaffrey
Major: Biology
Hometown: Eden Prairie, Minn.

Forum #1, Norris 100 - 3:30 p.m.



examined to both explore the determinants of Brexit and accentuate how Euroscepticism impacts day-to-day life. Using data from the European Social Survey, I argue that while all three forms of Euroscepticism are present in the UK, political and cultural channels are most responsible for Brexit. I conclude with implications for the European Union.



Mellema

PAIGE MELLEMA, '20

Major: Biology
Hometown: Grand Rapids, Mich.

MACKENZIE MOORE, '19

Major: Biology
Hometown: Quincy, MI



Moore

Delivery of Photoisomerizable Molecules into *Drosophila melanogaster*

Faculty Sponsor: Roger Albertson

Forum #1, Norris 100 - 3:45 p.m.

This research project was designed to study the effects of the anti-tubulin drug, azo-Combretastatin A4, on *Drosophila melanogaster* embryos. The addition of an azo bond (nitrogen-nitrogen double bond) to the Combretastatin A4 molecule provides a photoisomerizable effect allowing the molecule to change from its *trans* form (inactive) to *cis* form (active) when in the presence of 420 nm wavelengths of light. When the drug is in its active form, it inhibits tubulin from functioning normally resulting in the cessation of cellular processes. In theory, this sort of light-activated drug could potentially be utilized as a localized cancer therapeutic. This experiment was conducted using a series of methods to remove the difficult outer chorion layers of the embryo, and then permeabilize the inner layers just enough to insert the drug, but also maintain a high rate of viability. The results proved to be variable in that some trials showed tubulin inhibition, but other trials showed the permeabilization methods could have been harmful, and causing the tubulin inhibition. More trials would need to be conducted with a higher efficacy in order for strong support of the hypothesis.

Supported by: FURSCA—Orpha Leiter Irwin Fellowship



PHILIP MEYER, '19
Three Solo Selections from the Operetta *Candide* by Leonard Bernstein

Faculty Sponsors: Maureen Balke, James Ball
Majors: Music (Vocal Performance), Business
Hometown: Lake Orion, Mich.

**Forum #2, Towsley Lecture Hall/
Norris 101 - 3:45 p.m.**

Candide is based on Voltaire's satire of the same name. It tells the tale of the eponymous protagonist Candide. Initially a bit naïve, he firmly believes and trusts in the goodness of mankind. When reunited with his love, Cunegonde, after thinking that she has died, he discovers that she has changed—lusting after wealth and



LAUREL MCGERTY, '19
The Effect of Health Message-Framing and Healthcare Practitioner Gender on Opinions and Intentions to Vaccinate

Faculty Sponsors: Tammy Jechura, Holger Elischberger, Katey Price
Major: Psychological Science
Hometown: Troy, Mich.

Forum #3, Norris 102 - 2:45 p.m.

Parental fear of vaccines began when a publication linked vaccines to autism in children (Wakefield et al., 1998). The study was redacted due to fabrication of data and ethical violations, but the fear it generated remains today. The current experiment investigates what factors might influence a parent's opinions on and intentions to vaccinate.

Participants were given either a message with a positive-frame, which emphasized the benefits of vaccinations, or one with a negative-frame, which emphasized the consequences of refusing vaccinations. Several studies have shown a negative-frame advantage in regard to increasing intentions to vaccinate as well as improving attitudes toward childhood vaccination (Abhyanker et al., 2008; Gerand & Shepherd, 2007). The message was accompanied by a photo of a male or female practitioner. Research has shown higher patient satisfaction among those treated by a practitioner of the opposite gender; however, female practitioners offer more preventative services, like vaccinations, and focus on interpersonal communication with patients, which are factors that are highly favored by female patients (Schmittiel et al., 2000; Flocke & Gilchrist, 2005).

268 participants were assigned to one of the four conditions, and then surveyed about their opinions and intentions to vaccinate through Amazon Mechanical Turk. Results found that women who read a positive-frame message given by a female practitioner reported greater intentions to vaccinate and more positive beliefs about vaccine safety. The results give more insight into ways a message can be delivered to reach a target audience and hopefully reduce the fear and misinformation about vaccines.

Supported by: FURSCA

not philosophy, wisdom, or the gentle domesticity he thought they both desired. Heartbroken, Candide gives her a final kiss in the song “Nothing More Than This.”

PHILIP MEYER, '19

Cloudy Skies: Songs Composed to the Poetry of Shel Silverstein

Faculty Sponsor: Maureen Balke
Majors: Music (Vocal Performance), Business
Hometown: Lake Orion, Mich.

Forum #2, Towsley Lecture Hall/
Norris 101 - 1:30 p.m.

Shel Silverstein is one of the 20th-century's most important poets and authors—his writings still are known and loved today—The Giving Tree, Where the Sidewalk Ends, and The Missing Piece are all remembered by many. This project seeks to take some of Silverstein's poetry and apply it to a contemporary context, setting six of his poems to new, original music. The music was composed with inspiration from Silverstein's work, either taking the words and setting them to music, or exploring the ideas of the poetry through sound.

PHILIP MEYER, '19

(See Eleanor Hill, '19; Andrew Klinger, '19; Philip Meyer, '19; Spencer Shaheen, '19; Kiana Thomas, '19; Cole Thune, '19)

WILLIAM MICHELS, '19

(See Brandon Gary, '20; Brigette Kobs, '19; William Michels, '19; Mackenzie Moore, '19; Sydney Rudowski, '20)

professions with an academic experience intended to prepare them for entry-level positions in human-services settings and give them a competitive edge in applying to related graduate programs. However, informal inquiry suggested that current Albion students were either unaware of the concentration or unaware of what human services provides. Therefore, the current study was designed to determine the understanding of, and extent of, interest in human services on the Albion campus.

As part of a directed study, we developed a measure of student interest and understanding of human services. Surveys were administered to 138 introductory psychology students during the Fall 2018 semester. Descriptive analyses showed that participants had an interest in activities that are part of human services. However, similar to informal inquiries, the average knowledge about the concentration and field itself were not as high as the interest in the related activities. For example, students seemed particularly interested in aspects of social work. We hope this information will help guide the format and exposure of the Human Services program on Albion's campus.

MACKENZIE MOORE, '19

(See Paige Mellema, '20; Mackenzie Moore, '19)

MACKENZIE MOORE, '19

(See Brandon Gary, '20; Brigette Kobs, '19; William Michels, '19; Mackenzie Moore, '19; Sydney Rudowski, '20)



ANNA MOORE, '19

Major: Psychological Science
Hometown: Battle Creek, Mich.

TAYLOR ANTAL, '19

Majors: Psychological Science, Sociology
Hometown: Manistee, Mich.

Student Interest in Human Services at Albion College

Faculty Sponsor: Andrea Francis

Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.

The Human Services concentration at Albion College was created in 1976 to provide students interested in the helping



EMILY MUDD, '19

Equality Under the Law? Effects of Gender, Gender Role Conformity, and Traditional Gender Role Beliefs on Sentencing Outcomes

Faculty Sponsors: Holger Elischberger, Eric Hill

Major: Psychological Science
Hometown: Midland, Mich.

Forum #3, Norris 102 - 2:30 p.m.

Sentencing outcomes for criminals do not only vary with the crime committed. Studies have found more lenient sentences for women than men for property- and drug-related, but not violent crimes (Rodriguez et al., 2006). Ward et al. (2012) found that people also stereotype crimes along gender lines—unlike property crimes, violent crimes are strongly male-stereotyped. Gender role non-conforming people (e.g., masculine women) are generally viewed more negatively than

Moore



Antal



conforming ones (Motro & Ellis, 2017), although this has not yet been examined in a legal context. Black and McCloskey (2013) found that an increase in traditional gender role beliefs correlated with shifting responsibility away from a male rapist toward his female victim.

Because most studies have focused on the effects of individual factors, we examined the joint effects of defendant gender, gender role conformity, and mock jurors'/judges' own beliefs about gender roles on sentencing outcomes for a masculine-stereotyped crime (arson; Study 1) and a gender-neutral one (embezzlement; Study 2). In Study 1, those with more traditional gender role beliefs gave longer prison sentences to the masculine than feminine woman; this was reversed for participants with less traditional beliefs. Those with more traditional beliefs also perceived it as more wrong and serious for the female defendant to commit arson. When a gender-neutral crime was committed (Study 2), participants with more traditional beliefs gave longer sentences regardless of any gender-related defendant characteristics. These results suggest that sentencing outcomes are influenced by a complex combination of defendant, crime, and judge/juror characteristics relating to gender.

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

TIFFANY NEWMAN, '20

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

problems, rest, and relationships. (Seggar, Pederson, Hawkes & McGown, 1997). Stress and anxiety also take a large toll on the body, both mentally and physiologically, and being able to cope with these stressors effects the overall performance of the athlete. The ability of an athlete to cope is very much an individual trait and is adapted based on personal characteristics such as personality, motivation and cognition (Sabato, Walch, & Caine, 2016). The purpose of this study was to examine the impact of coping mechanisms on athletic performance in Division III college cross-country runners (16 male and 14 female). Data was collected in the form of two surveys, sent out via Google Forms, to each participant the evening before each in-season competition. It was hypothesized that Division III cross-country runners who are able to effectively cope with stress would show an increase in overall performance throughout the season.



IKPEMESI OGUNDARE, '20 The Performance of the Countess's Arias, *Porgi Amor* and *Dove Sono*

Faculty Sponsor: Maureen Balke
Major: Music (Vocal Performance)
Hometown: Westerville, Ohio

Forum #2, Towsley Lecture Hall/
Norris 101 - 2:00 p.m.

This piece was premiered on May 1, 1786 at the Burgtheatre in Vienna, Austria. *Le Nozze di Figaro*, translated to English meaning *The Marriage of Figaro*, is an opera based on the stage comedy *La folle journée, ou le Mariage de Figaro* by Pierre Beaumarchais. It is the middle of three operas within the Figaro trilogy, *Le Barbier de Siviglia (The Barber of Seville)* and *La Mère Coupable (Guilty Mother)*. The piece was written and produced through the partnership of Mozart and Italian librettist Lorenzo Da Ponte. While it didn't reach the level of fame that Mozart's *The Magic Flute* achieved, it had a level of acclaim that allowed it to be performed nine times in its opening run. The opera is now not only considered a staple performance piece as well as a cornerstone of performance repertoire, it is one of the top 10 most frequently performed operas.

The opera tells the story of the young lovers Susanna and Figaro as they plan to marry. They are the head servants to the Count and the Countess, and they help the Countess expose the Count for his mischief when his eye begins to wander. Figaro, Susanna and the Countess join forces to prevent the Count from seducing Susanna and ruining her marriage. *Porgi, amor qualche ristoro* is the Countess's introductory aria at the beginning of the second act and is a very powerful entrance indeed. Her desperate cry to give her back her beloved or let her die, perfectly prefaces the drama and hilarity that ensues within after this



NATALIE NICHOLS, '19 Performance, Coping Skills, and Stress in College Cross-Country Athletes

Faculty Sponsor: Heather Betz
Major: Kinesiology
Hometown: Carmel, Ind.

Poster Session, Science Complex
Atrium - 4:00 p.m.-5:00 p.m.

In recent years, researchers have begun to investigate the effect that coping styles have on the overall athletic performance of athletes (Anshel, Kang, & Miesner, 2010). Coping can be defined as "constantly changing cognitive and behavioral efforts to manage specific internal and/or external demands" (Bahramizade & Besharat, 2010). In addition to the physical stress placed on a college athlete in terms of their sport, some may also experience other types of stressors in their lives, including academics, life

point. *E Susanna non vien!...Dove sono I bei momenti*, the second and more elaborate aria, comes later in the opera as the Countess and Susanna set their trap to expose the Count for his hypocritical ways.



ANGELA PANZICA, '19
Improving Curriculum and Teaching Requirements for English Education in Japan

Faculty Sponsor: Kyle Shanton
 Majors: Biochemistry, International Studies
 Hometown: White Lake, Mich.

Forum #1, Norris 100 - 4:00 p.m.

Japanese students perform among the worst, globally, on English competency exams such as the Test of English as a Foreign Language (TOEFL), especially scoring the lowest in speaking as compared to listening, writing, and reading. This paper discerned underlying reasons for the overall low performance among Japanese test takers and, in particular, the speaking portion. By analyzing personal experiences of teaching English in Japan and reviewing published works on English education in Japan, I found the following factors to be true: English teachers in Japan lack fluency in speaking in English, do not have training in teaching English, use outdated teaching materials that do not optimize student learning abilities, misuse material and fail to create a goal for the lesson. In an attempt to remedy many of these issues, I propose a widespread and uniform use of the Communicative Language Teaching (CLT) method among English teachers in Japan because it stresses speaking, the use of authentic, modern English texts, and motivates students to learn and use English outside of the classroom. Additionally, I argue that secondary- and higher-education English teachers must have at least one year of international education in an English-speaking country where they take intensive English language courses. Improvements in English education in Japan will allow students to attend better colleges, receive better jobs, and be given opportunities to study and/or work internationally.

ANGELA PANZICA, '19

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



ZACHARY PLUMMER, '20
Examining Methods for the Synthesis of Azo-Indole Compounds

Faculty Sponsor: Craig Streu
 Major: Pre-Engineering
 Hometown: Edwardsburg, Mich.

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

I have conducted research on synthetic routes to azo-indole compounds. Azo compounds contain a nitrogen-nitrogen double bond. Drugs with this group are known to be photo-switchable, with the compound changing from the *trans* conformation to the *cis* conformation (and vice versa) when irradiated with a specific wavelength of light. Given that a drug's shape is critical for its effectiveness, changes in a molecule's conformation translate to changes in its bioactivity. This property can be harnessed to make drugs which can be activated in a location-specific manner. By activating the drug in a location-specific manner, we reduce the potential for side effects that are caused by drugs acting in undesired locations. Although such drugs are becoming more prevalent, all current examples are based on azo-benzene. Azo-indole compounds are particularly interesting as drugs given the prevalence of indole motifs in drug molecules. However, synthetic methods for creating drug-like azo-indoles are far less established. We have therefore set out to develop new methods for synthesizing such compounds. My efforts have focused on the addition of indole to various diazonium salts to create azo-indoles. My presentation will focus on the synthetic challenges associated with these particular molecules, as well as our advances in their synthesis.

MARAH RANGER, '20

(See Emilee Weiblen, '19; Marah Ranger, '20)



EVAN RIETH, '19
Let Us Yeet: The Diversified Joy of a Millennial Farmer

Faculty Sponsor: Nels Christensen
 Majors: Environmental Studies, English
 Hometown: Three Oaks, Mich.

Forum #2, Towsley Lecture Hall/ Norris 101 - 1:15 p.m.

In the fall of 2018, I began writing in a directed study I titled "The Agrarian Essay." I wrote a series of essays focused on farming in the style of agrarian writers I admired. But I wasn't satisfied. I longed to produce agrarian writing that spoke to me from this day and age, yet I had written essays that sounded like they



could've been written a hundred years ago. So I intentionally started writing essays with people of my generation as a target audience.

This shift in target audience provided a new and exciting challenge: how can I write so that my essays are relatable to my generation, a generation that has very little experience farming? In writing my way towards answering that question, I found myself returning to four categories of experience that spoke simultaneously to the agrarian past, my current generational moment, and the possibilities of an agrarian future: bodies, work, art, and pleasure.

This collection of essays unabashedly proclaims why I find farming to be the most gut-wrenchingly joyous occupation. As such, these essays also present my firm conviction that farming exemplifies everything I love and value about liberal arts education.



TAYLOR ROSENTHAL, '19
The Influence of Mating Type Proteins on Mating Type Recognition in *Tetrahymena thermophila*

Faculty Sponsor: Marcella Cervantes
 Major: Biology
 Hometown: Vicksburg, Mich.

Poster Session, Science Complex
 Atrium - 4:00 p.m.-5:00 p.m.

The single-cell organism *Tetrahymena thermophila* contains seven mating types, each containing mating type proteins MTA and MTB. It is unknown how these proteins affect the cells ability to recognize different mating types, pair, and produce offspring, as well as how the proteins influence each other. Cells will be altered to contain MTA from mating type II and MTB from mating type III to simulate complete failure of mating type selection. This will allow a further look into the influence of the role of the proteins in *T. thermophila* mating behaviors and how the proteins interact with one another.

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

SYDNEY RUDOWSKI, '20

(See Brandon Gary, '20; Brigitte Kobs, '19; William Michels, '19; Mackenzie Moore, '19; Sydney Rudowski, '20)

SYDNEY RUDOWSKI, '20

(See Matthew Anderson, '19; Chris Breen, '20; Anh Dinh, '22; Hannah Erickson, '21; Megan Harvey, '20; Sydney Rudowski, '20)

SOPHIA SANFILIPPO, '19

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



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

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

Forum #1, Norris 100 - 1:30 p.m.

This presentation outlines the synthesis of a small molecule immunotherapy drug that can be reversibly activated by certain wavelengths of light. Immunotherapy is a type of cancer treatment where an individual's own immune system is manipulated to attack cancer cells in the body. Cancer evades the immune system by utilizing an immune checkpoint that tells the immune system which cells belong in the body. However, such therapies often lead to side effects caused by dysfunctional attack of healthy cells. By blocking this checkpoint with a drug that can change shape with light, the immune system can be turned "on" in certain areas of the body so fewer healthy cells are killed in the process. Such targeted immunotherapy would therefore be predicted to result in fewer side effects.

Supported by: FURSCA

MAXIM ROSENBERG, '19

(See Andrew Baker, '20; Maxim Rosenburg, '19)



HANNAH SCHOON, '19
Cancer: Going Viral

Faculty Sponsor: Brad Rabquer
 Major: Biochemistry
 Hometown: Canton, Ill.

Forum #1, Norris 100 - 3:15 p.m.

Mutations that can alter cellular proliferation, migration, and immune system regulation work synergistically to develop cancerous

cells that are capable of systemic infiltration and destruction. The innate and adaptive immune system provides the body with a sophisticated defense mechanism that cancer has learned to evade and use as a malignant ally. Oncolytic viruses (OVs) are specific viruses that invade and replicate in tumor cells, novel cancer therapeutics that have shown to increase patient survival without the damaging side effects from traditional treatments. After effective infection with OVs, the immune system becomes activated to work against and kill the cancer cells which creates a type of in situ vaccine. While administering OVs intratumorally has proved successful, it hinders the types and locations of cancers that can utilize this therapy. However, combining OVs with checkpoint inhibitors and other personalized immune regulators can potentially overcome these obstacles. Oncolytic viruses are the cancer therapy of the future that will eventually lead to cancer vaccinations.

HANNAH SCHOON, '19

(See Matthew Anderson, '19; Hannah Schoon, '19)

SLONE SCHULTZ, '21

(See Mary Beall, '21; Slone Schultz, '21)

conflicts effectively. To help illustrate the advantages and usefulness of my proposed permanent UN peace force, I conduct three case studies on UN peace operations in Rwanda, Somalia, and Darfur. As long as UN peace operations continue to be one of the main tools used to help address complex conflicts around the globe, then the need to properly prepare peace operations will continue to be of great significance for the UN and its member states.

EVAN SEURYNCK, '20

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

SPENCER SHAHEEN, '19

(See Eleanor Hill, '19; Andrew Klinger, '19; Philip Meyer, '19; Spencer Shaheen, '19; Kiana Thomas, '19; Cole Thune, '19)

KAYLA SHARP, '21

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



ZACHARY SERZO, '19

Reforming United Nations Peace Operations: A Proposal for a Permanent UN Peace Force

Faculty Sponsor: Carrie Walling

Major: Political Science

Hometown: Lake Orion, Mich.

Forum #4, Norris 104 - 3:15 p.m.

In the post-Cold War era, United Nations (UN) peace operations have become one of the main tools used by the UN and its member states to help confront some of the most complex conflicts around the globe. However, despite the continued reliance on peace operations, I have found that member states consistently fail to properly prepare operations for the complex conflicts that they operate in. Recognizing and understanding the challenges peace operations continue to face, this thesis puts forward a proposal to establish a permanent UN peace force. I argue that to properly prepare contemporary peace operations the four issues of lack of resources, insufficient peace forces, ability to rapidly deploy, and the command-and-control structure must be addressed. To address these four issues, my proposal of a permanent UN peace force includes a reformed command-and-control structure, an estimated force size, and the type of force structure needed to operate in post-Cold War



BRAM SIEMERS, '19

Biomaterials with Functionally Graded Stiffness

Faculty Sponsor: Craig Streu

Major: Biochemistry

Hometown: Jackson, Mich.

Poster Session, Science Complex Atrium - 4:00 p.m.-5:00 p.m.

There are many different tissues in the body, each possessing different mechanical properties and varying amounts of stiffness that are needed for cells to function properly and survive. A challenge to recreating *in vitro* tissues is to accurately recapitulate the mechanical properties of the native tissue. The focus of this research was to produce a substrate with a functionally graded stiffness for use with *in vitro* culture of cardiomyocytes, the cells of the heart responsible for contraction.

Young's modulus, a measure of stiffness of materials, is a key characteristic parameter for tissues. Currently, there is a lack of substrate systems that span the range of Young's modulus needed to represent both healthy and diseased myocardium. This is problematic when



trying to model cardiovascular disease. For example, after myocardial infarction, there are regions of soft and stiff underlying tissue that impact the behavior of cardiomyocytes differently.

The goal of this research was to create a substrate system with a stiffness gradient spanning from 5 to 50 kPa upon which the cardiomyocytes derived from stem cell could be cultured. This *in vitro* substrate system was designed to mimic the range of physiological environments in which cardiomyocytes exist in vivo. This substrate model is specifically being designed to aid in better understanding and treatment of cardiovascular disease.

The method that showed the most promise was UV curing of polyacrylamide hydrogels. A gradient photomask was designed to allow different amounts of UV light to penetrate over the span of the substrate. This mask was then placed over the prepolymer gel during UV exposure. This method produced a stiffness gradient of 55 to 75 kPa over a 1 cm distance. Further work is needed to optimize the photomasks and gel reagents to produce the lower end of modulus representative of healthy myocardium.

Supported by: FURSCA, Karen Thompson Medhi Professor at the University of Wisconsin-Madison and the National Science Foundation through the University of Wisconsin-Madison Materials Research Science and Engineering Center (DMR-0520527) and Nanoscale Science and Engineering Center (DMR-0425880)

of American Orthodox churches and Hindu temples, I argue that Greek Orthodox and Hindus residing in the United States will follow a similar pattern to that of the Catholic Church and become accepted as part of the mainstream United States. I argue that the pressure to adapt is balanced against the desire to retain a connection to their country of origin, such as adopting a more community-centered style of worship, an American trait, in order to keep a strong sense of identity and faith.

LAUREN SOLANO, '19

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

SHELBY STAJDL, '20

(See Taylor Karns, '20; Shelby Stajdl, '20)

RACHEL STANDER, '21

(See Cesar Cortes, '21; Rachel Stander, '21)

RACHEL STANDER, '21

(See Cesar Cortes, '21; Rosemary Hernandez, '22; Saige Jost, '22; Rachel Stander, '21)



LEAHA SINNAEVE, '19
The Greek Orthodox and Hindu Diasporas in the United States

Faculty Sponsor: Peter Valdina
Majors: Anthropology, Religious Studies
Hometown: Mason, Mich.

Forum #4, Norris 104 - 3:45 p.m.

Religious minorities in the United States have long faced pressures of assimilation. For instance, even communities that are today accepted into mainstream America, such as Catholics, have faced discrimination and pressures to assimilate. In response to these pressures, religious communities have sought to preserve their cultural distinctiveness, a trend that continues today. This thesis examines the pressures of religious assimilation in contemporary America by looking at Greek Orthodox and Hindu communities in the United States, two religious minorities. Both the Church and Temple follow a similar pattern of cultural preservation of the Catholic Church, serving as places for cultural preservation. Both communities have also made many changes in their practice of religions, while keeping a connection to Greece and India. Drawing on site visits and ethnographic studies



IAN STEWART, '19
Sexism and Recipient Gender as Predictors of Resource Allocation

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

Forum #3, Norris 102 - 9:00 a.m.

Research has linked sexist beliefs to many other negative values. For instance, hostile sexism is associated with gender harassment in the form sexist jokes (Diehl et al., 2018). Likewise, benevolent sexism is positively correlated with social dominance orientation, which is the endorsement of the current social hierarchy and the justification for social inequality (Radke et al., 2018). However, very little prior research has investigated how sexist beliefs are related to economic decision-making and resource allocation. The current study investigated the effects of sexist beliefs and recipient gender on resource allocation decisions. I predicted that individuals

expressing hostile sexism would allocate more resources to men than women, whereas individuals expressing benevolent sexism would allocate more resources to women than men.

In this study, I recruited 124 adults (79 women) through the introductory psychology participant pool at a small liberal arts college in the Midwest U.S. Participants first played a modified version of the dictator game, a behavioral measure of resource allocation. Participants then completed self-report measures of social dominance orientation, narcissism, and sexism, among others.

Regression analyses revealed a significant interaction between hostile sexism and recipient gender on resource allocation, ($b = -1.05$, $SE_b = .30$, $\beta = .43$, $p = .001$). Simple slopes analyses showed that individuals high in hostile sexism gave more resources to women than men ($p = .048$), whereas individuals low in hostile sexism gave more resources to men than women ($p = .004$).

Supported by: FURSCA—Orpha Leiter Irwin Fellowship

forces that allows this type of violence against humans to happen in the first place. I will show the ways in which (neo)colonialism, economic policy, and African political economy contribute to the physical and structural violence associated with conservation.

Supported by: FURSCA

KIANA THOMAS, '19

(See Eleanor Hill, '19; Andrew Klinger, '19; Philip Meyer, '19; Spencer Shaheen, '19; Kiana Thomas, '19; Cole Thune, '19)

COLE THUNE, '19

(See Eleanor Hill, '19; Andrew Klinger, '19; Philip Meyer, '19; Spencer Shaheen, '19; Kiana Thomas, '19; Cole Thune, '19)

JAMES TONGE, '19

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



MARYAM SYED, '19 **Conservation Violence: Where Is the Development?**

Faculty Sponsor: Allison Harnish
Major: Anthropology
Hometown: Troy, Mich.

Forum #4, Norris 104 - 3:30 p.m.

The country of Zambia in southern Africa has experienced a long history of international intervention, dating back to the time of British colonialism. Imperialism did not end, however, when then-Northern Rhodesia became officially recognized as the independent nation of Zambia in 1964. Today, it is not just former colonial powers controlling growth and development; larger international organizations such as the International Monetary Fund (IMF) and World Bank are playing a role by implementing “demands for improved economic efficiency” (Cliggett 2006: 171). One strategy for economic development is based on environmental conservation and wildlife tourism. Ideally, this form of development is community-based, with tourism revenues trickling down to local communities living in Game Management Areas (GMAs) abutting Zambia’s national parks. Drawing on a review of the literature, as well as ethnographic fieldwork conducted in summer 2017, this thesis finds that many conservation policies privilege the life of animals and foreign tourists over those of local people. The results are often violent, including beatings, the burning of property, the killing of livestock, and even murder. In this presentation, I wish to acknowledge the structural



TESSA TRIEST, '19 **Creativity and Disordered Eating**

Faculty Sponsor: Mareike Wieth
Majors: Psychological Science, English (Creative Writing)
Hometown: Oak Park, Mich.

Forum #3, Norris 102 - 9:15 a.m.

Eating disorders are serious mental illnesses characterized by eating concern, restricted eating, purging, and over-eating. Individuals with an eating disorder often show changes in cognitive functioning characterized by reduced attention, memory, and cognitive flexibility (Harrison, Tchanturia, Naumann & Treasure, 2010). Schmidt and Treasure (2006) found evidence for less cognitive flexibility in individuals with eating disorders by using a card sorting task, and Burns, Zhang, Wieth, and Touyz (2017) found evidence of cognitive inflexibility by using a divergent creativity task. Divergent creativity is the ability to see a problem or situation from multiple perspectives and generate as many possible ideas or solutions (Guilford, 1967). This is often contrasted with convergent creativity, which is the ability to choose the most appropriate solution for a problem from a variety of possibilities (Mednick, 1962). The current study was designed to test the relationship between disordered eating, cognitive flexibility, and divergent and convergent creativity.



Participants were asked to fill out the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994), complete a cognitive flexibility task (Anagram Mental Set Task, Maltzman & Morrisett Jr., 1953) and complete a convergent and divergent creativity task. For divergent creativity, analyses revealed that individuals who indicated more eating concern and less cognitive flexibility showed decreased creativity compared to the individuals indicating more eating concern and more cognitive flexibility. For individuals indicating less eating concern, cognitive flexibility did not impact divergent creativity. For convergent creativity, analyses revealed that individuals reporting greater eating concern showed less creativity than individuals reporting less eating concern.

Supported by: FURSCA

TROY TROMBLEY, '19
Messianic Exegesis in the Letter to the Hebrews
 Faculty Sponsor: Jocelyn McWhirter
 Majors: Religious Studies, Philosophy
 Hometown: Manistee, Mich.

Forum #4, Norris 104 - 2:45 p.m.

The author of Hebrews deals with a difficult question in his epistle: how could Jesus be a God's great, anointed king given his crucifixion, and the persecution Christians were undergoing? Creative exegesis was required in order to find an answer. In answering this question the author turned to the scriptures and used first-century Jewish rules of interpretation. I argue that shared vocabulary with established messianic prophecies allowed the author to interpret texts that were not clearly messianic as being about Jesus.

Supported by: FURSCA – Bethune Fellows Student Research Endowment



ISAAC VERHELST, '20
Strangers to the European Family: How Finnish-Americans Became White in the Upper Midwest
 Faculty Sponsor: Deborah Kanter
 Major: Political Science
 Hometown: Troy, Mich.

Forum #4, Norris 104 - 9:15 a.m.

In 1907, Finnish miner John Svan applied for United States citizenship, only to be denied on the grounds that he was not white. In the Svan case, the local prosecutor argued that Finnish Americans were a "stranger to the European family" since Finnish is

more closely related to languages in Siberia than any European languages. From 1790 until 1954, immigrants applying for citizenship to the United States were required to be white. The law did not define which peoples were or were not white. As a result, societal standards dictated whiteness. My contention is that the court's opinion was based on more than race. I would argue that the linguistic and ethnic differences of Finns were a cover for something else: distrust of their politics. When he filed his papers, Finnish iron miners, including Svan, from the Mesabi Range of Minnesota had just concluded a controversial strike for safer working conditions and wages. Many of the miners involved were members of the radical Western Federation of Miners and/or the Socialist Party of America. In this presentation I will explore how the Mesabi Iron Strike of 1907 impacted John Svan's immigration status and more broadly the citizenship status of Finns.



PHILLIP VOGLEWEDE, '19
Visualizing the American Midwest: Photographic Interpretations of Rural Identity, Leisure Culture, and Socioeconomic Change, 1933-1953
 Faculty Sponsor: Joseph Ho
 Major: History
 Hometown: Oxford, Ind.

Forum #4, Norris 104 - 9:00 a.m.

This study is a cultural and photographic history of the Midwest derived largely from a collection created by my grandfather, photographer William Martin Wert. My research examines how both commercial and family photographic collections visually represented the Depression Era '30s, the wartime patriotism of the '40s, and the American Dream of the '50s. This visual history illuminates the spread of documentary-style photography from national sources to amateurs, the spread of artistic and political ideologies to the rural Midwest, and depictions of travel that expanded Midwestern space and communal mobility.



CAMERON VOSS, '20
Post-Genocide Understanding within Rwandan Families
 Faculty Sponsor: Jocelyn McWhirter
 Majors: Anthropology, Religious Studies
 Hometown: Sault Ste. Marie, Mich.

Forum #4, Norris 104 - 4:00 p.m.

This research strives to understand and record the various ways caregivers (dis)engage with the children under their care through their own, others', and

their country's challenging history within Rwandan families. The informal aspects of family structures, while highly influential, are difficult to navigate, and this research endeavors to unveil some of the hidden trends in Rwandan families with children born after the 1994 genocide against the Tutsi. This study explores how a generation of survivors, perpetrators, returnees, and other Rwandan citizens undertake the essential act of caring for children in a post-genocide society. An analysis of 37 interviews with Rwandan caregivers shows that children are asking questions about Rwanda's past within their home setting, and not all caregivers are engaging in the conversation. Each unique response, or lack thereof, provides a better insight into the complexities surrounding informally educating a child in a post-genocide society.

Supported by: FURSCA—Kim Tunnicliff Endowment



ANNA WATSON, '19
The Relationship Between Music Preference and Identity

Faculty Sponsor: Katey Price
Majors: Communication Studies, Sociology
Hometown: Rochester, Mich.

Forum #3, Norris 102 - 2:15 p.m.

Music is a dynamic medium with the unique ability to communicate meaning and emotion (Bailes, 2005). Researchers have found significant relationships between the music individuals listen to and aspects of their self-concept (Hortacsu & Tekman 2002; Rentfrow & Gosling 2007, 2003; Shepherd & Sigg 2015). To extend current research, the present study attempts to gauge college-age students music preferences through an online survey that has them self-report on specific categories of social and personal identity. Given the college student sample, the study also aims to examine the relationship between college major and individuals' music preferences, which no current literature explores.

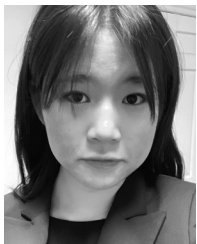
Supported by: FURSCA

SADIE WAYMAN, '19
No Way-Man Equestrian Facility

Faculty Sponsor: John Carlson
Major: Accounting
Hometown: Holly, Mich.

Forum #4, Norris 104 - 1:15 p.m.

This thesis is a plan for an equestrian facility I would like to own in the future. It will be written to take place around five years from now. The plan will be from start, the buying of the property, through the operations of the facility. It will show estimated operation expense and income per quarter. There will be two different paths to this plan. One will be if the land has a preexisting facility and the other will be one being built from scratch.



CECILIA WANG, '19
An Ontological Analysis of Human Beings from a Buddhist "Non-Self" Perspective

Faculty Sponsor: Daniel Mittag
Majors: Philosophy, Psychological Science
Hometown: Chengdu, China

Forum #4, Norris 104 - 1:45 p.m.

It seems like a truism to say that I am myself, but what is the "self?" A tradition in philosophy appeals to the self to explain how we can survive the changes that we undergo during lifetimes. Contrary to this picture, however, Buddha argues that there is no "self." Something similar is the case for ordinary material objects. While we believe that mirrors can be used to check our appearances and trees can bear fruit, Buddha explains that those objects are illusions. They are useful fictions. Despite the world's existence, trees are not "trees," and mirrors are not "mirrors." Physics tells us that atoms are the building blocks of all material things. Buddha's view is somewhat similar to this atomic view. He thinks that both ordinary objects and human beings could be reduced into some fundamental particles, and there are no mirrors or trees or selves, since all that exists are simply perishing fundamental elements. Even so, it is in our interest to treat collections of particles as mirrors or trees. Similarly, the fictitious "self" is useful because it helps us to manage our existence (as a bunch of psychophysical elements) in the world. Buddha says that no existing things can be permanent. Though we mistakenly assume that our selves survive our whole life, when there is no self at all, there is nothing that could possibly persist throughout one's lifetime.

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



Weiblen

EMILEE WEIBLEN, '19

Majors: Biology, Spanish
Hometown: Grand Rapids, Mich.

MARAH RANGER, '20

Major: Religious Studies
Hometown: Kalamazoo, Mich.



Ranger

Synthesis and Evaluation of Photoswitchable c-Raf Inhibitor

Faculty Sponsor: Craig Streu

Forum #1, Norris 100 - 9:00 a.m.

Cancer is one of the leading causes of death in the United States. As a result of its staggering impact, it is unsurprising that scientists have been working diligently to find treatments. The main issue with many

cancer medications is the high rate at which healthy, noncancerous cells are damaged alongside the cancer cells. Highly desirable cancer treatments are those that can selectively target cancerous cells while excluding healthy cells. This issue can be addressed through the use of photoisomerizable compounds, more specifically azo-stilbenes.

Photoisomerizable compounds are molecules that are isomerized by light. In other words, their structures change when exposed to specific light wavelengths. The azo-stilbenes, in particular, undergo a *trans* to *cis* isomerization when exposed to blue or UV light. This isomerization is easily reversible and can be accomplished quickly by irradiating the molecule with a longer wavelength of light.

Photoisomerizable compounds like the azo-stilbene group have become widely used in many fields, yet these azo-compounds have more recently found utility in cancer research. Given that shape complementarity is critical for many drug-target interactions, this isomerization results in a change in the bioactivity of these molecules. When in their *trans* form, the azo-compounds cannot bind to the same target that they can bind in their *cis* form. Judicious application of the appropriate wavelengths of light can be used as a switch that will allow for selectivity of cytotoxic treatments. With the use of azo-stilbenes, off-target side effects could be greatly reduced and potentially eradicated.

One example of a potential target for photo-switchable therapeutics is c-Raf. This kinase plays a key role in a pathway that regulates the cellular cycle, including the production of new cells and apoptosis, which is dysregulated in some cancers. This work will describe the design, completed synthesis, and photokinetic analysis for two lead molecules with potential as photoswitchable drugs based upon a previously reported c-Raf inhibitor.

Supported by: FURSCA—Orpha Leiter Irwin Fellowship



ZOE WILSON, '19

The Exploration of Energy, Growth, and Movement

Faculty Sponsor: Lynne Chytilo
Majors: Art, Psychological Science
Hometown: Hobart, Ind.

Forum #2, Towsley Lecture Hall/
Norris 101 - 2:15 p.m.

My ceramic sculptures and thrown pottery pieces are abstract representations of myself. I am inspired by what I see in my everyday environment, particularly in nature, like roots, branches, fallen trees, and vines. By focusing on the idea of growth and energy, my forms can be out of control, overwhelming, or chaotic at the same time they can be stretching, smooth, and look to be full of potential. The work reflects an excitement about how my forms change as I do. As my time at college draws to an end, I am seeking new opportunities and redefining who I am as an artist. I am curious to know more about the world and look forward to new challenges. Working with clay is a way to document who I am and what I have experienced.

Last summer a FURSCA research grant allowed me to develop this concept in my art. I started by making pristine thrown forms that contrasted forms that had collapsed. Eventually I began working on a larger scale, exploring different building methods to convey this concept. I took coils of clay and pressed them together, slowly building up into a series of hollow connecting tubes, reaching out in different directions.

By working with the concept of growth, I've realized a parallel with organisms striving for a destination in order to survive. Roots reach for water, branches reach out for the sun and humans reach out for their goals. Without this destination, growth just turns into chaotic movement.

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

LAUREN YOUNG, '19

(See Matthew Chen, '19; Lauren Young, '19)



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

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

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 took on the next steps to continue working 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 Elkin R. Isaac Student Research Symposium in Albion, visiting their American teammates and putting the final touches on their plan, culminating in final 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 on the following pages.



**BUSINESS PLAN DEVELOPMENT:
An International Partnership Between the USA and
France – Campus Management App**

MICHAEL MARTINEZ, '21
Major: Communication Studies
Hometown: South Lyon, Mich.

TIFFANY NEWMAN, '20
Major: Communication Studies
Hometown: Ypsilanti, Mich.

KAYLA SHARP, '21
Major: Economics and Management
Hometown: Farmington, Mich.

LAUREN SOLANO, '19
Major: Accounting (CPA Emphasis)
Hometown: Trenton, Mich.

JESSICA COURTIAL
Major: International Business
Hometown: Herblay, France

BAMBI DIAWARA
Major: International Business
Hometown: Garches, France

ANNE-JULIE FRANCOIS
Major: International Business
Hometown: Réunion Island, France

QUENTIN JURVILLIER
Major: International Business
Hometown: Saint-Louis, France

**Forum #2, Towsley Lecture Hall/
Norris 101 - 9:00 a.m.**

Campus Management App is an application designed to initiate clear and efficient communication between students, staff, and the facilities department to save money for the institution. The goal—make students' lives easier and allow staff to work smarter with the available features to find reported maintenance problems instantly. Campus Management App is an upgrade from any current system in place at any college or university on a national and global scale.

**BUSINESS PLAN DEVELOPMENT:
An International Partnership Between the USA
and France – OPTEE**

SYDNEY COHN, '21
Major: Finance
Hometown: Stanford, Mich.

SIERRA HAZARD, '21
Major: Accounting (CPA Emphasis)
Hometown: Saline, Mich.

ANGELA PANZICA, '19
Majors: Biochemistry, International Studies
Hometown: White Lake, Mich.

JAMES TONGE, '19
Major: Accounting (CPA Emphasis)
Hometown: Farmington Hills, Mich.

CORALINE BRAUN
Majors: Business, Sales, Entrepreneurship,
English, Management
Hometown: Rueil-Malmaison, France

ANNE GIRAUD
Majors: Economics, Business, Sales,
Entrepreneurship, English, Management
Hometown: Marly-le-Roi, France

MATHIEU LE BRETON
Majors: Business, Sales, Entrepreneurship,
English, Management
Hometown: Eragny-sur-Oise, France

HUGO MOULIN
Major: Economics, Business, Sales, Entrepreneurship,
English, Management
Hometown: Courbevoie, France

SYDNEY NININO
Majors: Business, Sales, Entrepreneurship,
English, Management
Hometown: Troyes, France

**Forum #2, Towsley Lecture Hall/
Norris 101 - 9:15 a.m.**

OPTEE is a software program that assists on-the-road sales representatives in reducing travel time and administrative tasks. The software is an add-on to existing CRM software and offers benefits like optimization of route, identifying prospective customers in the area, locating/booking travel accommodations, voice-activated-command capability, and providing reminders to contact clients. OPTEE will increase efficiency resulting in increased customer satisfaction.

**BUSINESS PLAN DEVELOPMENT:
An International Partnership Between the USA
and France – SPORTWORK**

ALONDRA ALCAZAR, '20

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

DILLON DEJONG, '21

MAJOR: FINANCE

Hometown: Wixom, Mich.

JUSTIN GREEN, '19

Major: Finance
Hometown: Novi, Mich.

MEGAN GUTHERIE, '20

Major: Kinesiology
Hometown: Northville, Mich.

KEVIN BARRET

Major: Management and Business Engineering
Hometown: Frépillon, France

MATHIS MICHEL D'ANNOVILLE

Major: Management and Business Engineering
Hometown: Poissy, France

ADRIEN URIDAT

Major: Management and Business Engineering
Hometown: Noisy-le-Roi, France

**Forum #2, Towsley Lecture Hall/
Norris 101 - 9:30 a.m.**

We are corporate team builders who, cost effectively, enable small- and medium-sized companies to enhance employee team building, wellness, and internal and external networking through sporting events. SPORTWORK's unique app provides all of the organization for team-building events: scheduling practices and games, making sure equipment is available, forming teams, providing referees, coaches, and more.

**BUSINESS PLAN DEVELOPMENT:
An International Partnership Between the USA
and France – STAR**

CHELSEI CARPENTER, '19

Majors: Psychological Science, Business
Hometown: Muncie, Ind.

MADISON KROETSCH, '19

Majors: Accounting (CPA Emphasis), Business and Organizations
Hometown: Novi, Mich.

SOPHIA SANFILIPPO, '19

Major: Economics and Management (Human Resources Emphasis)
Hometown: Grand Rapids, Mich.

EVAN SEURYNCK, '20

Major: Economics and Management
Hometown: Plymouth, Mich.

MARION ALLAIR

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

AMIR AOUES

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

AMINE DARIH

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

CYRIELLE RAFLE

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

**Forum #2, Towsley Lecture Hall/
Norris 101 - 9:45 a.m.**

STAR is a company that offers both professional and personal networking activities for small businesses in your area. We do this by organizing events such as professional speakers, or entertainment activities such as escape rooms or Major League Baseball games. In addition to these events, being a STAR member would give you access to an online networking platform (think of LinkedIn but exclusive to local STAR members).



About the Symposium

Albion College's Student Research Symposium is now in its 30th year. The first symposium, held on April 20, 1990, involved seven students making presentations describing their research projects in the sciences. Three years later, a poster session was added. The program has been offered annually since its founding and now typically features the work of more than 100 students recommended by their faculty mentors. Representing a broad array of disciplines, the symposium has become the College's principal showcase for outstanding student research, scholarship, and creative activity.

The Elkin R. Isaac Endowment

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

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

The Isaac Endowment Committee

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

Past Isaac Symposium Speakers

Elkin R. Isaac Alumni Lecture

Wilbur Hurst, '61 (1997)
Terrence Karpowicz, '70 (1998)
Emilio DeGrazia, '63 (1999)
James Misner, '66 (2000)
John Vournakis, '61 (2001)
Joseph Serra, '56 (2002)
Denise Cortis Park, '73 (2003)
John Porter, '53 (2004)
Elkin Isaac, '48 (2005)
Joseph Calvaruso, '78 (2006)
Eileen Hebets, '94 (2007)
James Beck, '97 (2008)
James Gignac, '01 (2009)
Kristen Neller Verderame, '90 (2010)
John Ferris, '89 (2011)
Lawrence Schook, '72 (2012)

Michael Harrington, '85 (2013)
Hugh McDiarmid, '84 (2014)
Samata Singhi, '05 (2015)
Mallory Brown, '08 (2016)
Nick Whitney, '00 (2017)
Amy Elaine Wakeland, '91 (2018)

Joseph S. Calvaruso Keynote Address

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

The 2019 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)
Jill Mason (Stockwell-Mudd Libraries)
Anne McCauley (Art and Art History)
Patrick McLean (Ford Institute)
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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