

Elkin R. Isaac
Student Research Symposium
Albion College



2013



Albion College

2013 Elkin R. Isaac Student Research Symposium

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The Twenty-Fourth Annual Elkin R. Isaac Student Research Symposium

Albion College | April 17-18, 2013

SCHEDULE OF EVENTS

Wednesday, April 17, 2013

7:30 p.m. Elkin R. Isaac Alumni Lecture: Michael J. Harrington, '85
"Reflections on the Globalization of American Business
and Its Implications for Future Leaders"

Welcome: President Donna M. Randall
Speaker Introduction: Eugene Cline,
Professor Emeritus of Philosophy
Towsley Lecture Hall/Norris Center 101

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

Thursday, April 18, 2013

8:30-10:15 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
*Morning: Goodrich Chapel
Afternoon: Norris Center 104*

10:45 a.m. Honors Convocation
Goodrich Chapel

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

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

7 p.m. Joseph S. Calvaruso Keynote Address: Alexander McCall Smith
"The Very Small Things of Life"

Welcome: President Donna M. Randall
Speaker Introduction: Allison C. Navarra, '13
Goodrich Chapel

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

Elkin R. Isaac Alumni Lecture



MICHAEL J. HARRINGTON, '85

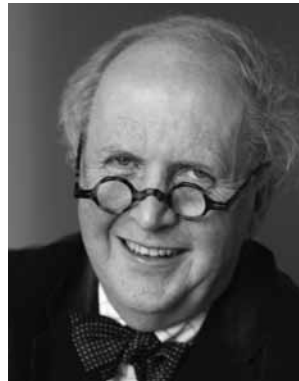
For the past 22 years, Michael Harrington has worked for Eli Lilly and Company, currently serving as the firm's senior vice president and general counsel and as a member of the company's executive committee. Previously he was deputy general counsel of global pharmaceutical operations, overseeing legal matters for Lilly's global business units in animal health, biomedicines, diabetes,

emerging markets, and oncology. Among other positions he has held with Lilly, Harrington served as managing director of Eli Lilly New Zealand and as general counsel for Lilly's operations in the Asia Pacific region. As a member of various leadership teams at Lilly, he enhanced the company's internal and external diversity initiatives.

Along with serving as an Albion College trustee, Harrington currently serves on the boards and executive committees of the Indiana Chamber of Commerce, Lawyers for Civil Justice, the Indiana Repertory Theatre, and the International School of Indiana. He is a former director of the St. Francis Healthcare Foundation in Indianapolis and has been a board member of the American Tort Reform Association and the Indiana Legal Foundation. Harrington frequently shares his litigation expertise as a speaker, recently addressing the American Conference Institute and the International Association of Defense Counsel.

At Albion College, Harrington majored in English, and was a member of Delta Tau Delta and Omicron Delta Kappa. After graduating from Albion with Phi Beta Kappa honors, he earned a J.D. from Columbia University. He is married to Judy Small Harrington, '86, and they and their family live in Zionsville, Indiana.

Joseph S. Calvaruso Keynote Address



ALEXANDER MCCALL SMITH

Alexander McCall Smith has written and contributed to more than 100 books ranging from specialist academic titles to children's literature. He is best known for his No. 1 Ladies' Detective Agency series, which to date has been translated into 45 languages and sold over 20 million copies worldwide. The series, which was adapted for BBC Radio and HBO television,

has inspired a cookbook and led McCall Smith to share the young Precious Ramotswe's story in a series of children's books.

While he has written many popular stand-alone novels and short stories, McCall Smith is a master of series fiction, including *The Sunday Philosophy Club*, *Portuguese Irregular Verbs*, and three children's series. Fascinated with the challenge of writing to deadline, McCall Smith began two other series with novels written in installments. *44 Scotland Street* was a cultural obsession when published in weekday installments in the *Scotsman* newspaper. *Corduroy Mansions* was likewise originally published and podcasted serially by the United Kingdom's *Daily Telegraph*. McCall Smith is currently working on a book about W. H. Auden, scheduled for publication by Princeton University Press in 2014.

McCall Smith was born in what is now Zimbabwe and was educated there and in Scotland. He first returned to Africa to help establish a new law school at the University of Botswana. Now a professor emeritus of medical law at the University of Edinburgh, he also served as vice chairman of the Human Genetics Commission of the United Kingdom, chairman of the British Medical Journal Ethics Committee, and as a member of the International Bioethics Commission of UNESCO.

McCall Smith is the recipient of numerous awards, including the Crime Writers' Association's Dagger in the Library Award, the United Kingdom's Author of the Year Award (2004), the Saga Award for Wit, and Sweden's Martin Beck Award. In 2007 he was made a Commander of the British Empire for his services to literature. He holds honorary doctorates from 12 universities, and the Presidential Order of Merit given by the president of Botswana. He lives in Edinburgh.



Student Presentation Schedule | Thursday, April 18, 2013

FORUM #1 – NORRIS 100

8:30	Haley Plasman (McCurdy)	Biomonitoring Water Quality in Rice Creek, Michigan Using Community-Level Macroinvertebrate Composition
8:45	Jessica Koehler (Olapade)	Utilization of Microbiological and Molecular Approaches for the Detection of <i>Escherichia coli</i> in Environmental and Food Samples
9:00	Alex Nanna (French)	Methylation of Heterocycles Using Fenton Chemistry
9:15	Hannah Allgaier (Rohlman)	Identification of the DNA Binding Surface on the SIRV-YNP Capsid Protein
9:30	Anna Miller (Skean)	Vascular Flora and Plant Communities of the Ott Biological Preserve, Calhoun County, Michigan
9:45	Ashley Miracle (Rabquer)	The Role of sJAM-A and sJAM-C in Angiogenesis
10:00	Abby Hess (Rabquer)	Effect of sJAM-A on Actin Cytoskeleton Rearrangement
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1:15	Aaron Hiday (Wilch, T. Lincoln)	Investigation of Bioturbation and Groundwater Sapping as Possible Causes of Diel Turbidity Cycles in Rice Creek, Kalamazoo Watershed, Michigan
1:30	Krysta Schroeder (French)	Isolation of Podophyllotoxin from <i>Juniperus virginiana</i> Post Essential Oil Extraction
1:45	Michael Dix (Metz)	Design and Activity of Nanoscale Palladium Catalysts on Carbon Substrates
2:00	Ethan Brock (Saville)	Further Development of an Eye Model of Parkinson's Disease Using <i>Drosophila melanogaster</i>
2:15	Cassandra Waun (McCaffrey, Zellner)	Analysis of Glycolaldehyde After Simulated Terrestrial Impact Experiments
2:30	Stephanie Sanders (Metz)	Room Temperature Synthesis of Shaped Palladium Nanoparticles on Carbon Microspheres
2:45	Isaac Veysey-White (Albertson)	An Analysis of the Virulence of the <i>Wolbachia</i> Bacterium in Wild Michigan Populations of <i>Drosophila melanogaster</i>
3:00	Alyssa Olson (McRivette)	Mapping the Whitehouse Nature Center at Albion College: Developing a Comprehensive Geospatial Database Using GIS and GPS Technologies
3:15	Helen Habicht (Menold)	Metamorphic Evolution of Tso Morari Ultra High-Pressure Terrane in the Himalayas, India
3:30	Chris Kruppe (Metz)	Manipulation of Palladium Nanoparticles Tethered to Graphitic Carbon for Catalysis
3:45	Adam Ronk (Saville)	Developing a <i>Drosophila</i> Model for the Characterization of Mumps Virus/Host Interactions

FORUM #2 – TOWSLEY LECTURE HALL/NORRIS 101

8:30	Adam Collins, Lauren Wysocki, Thibault Andre, Romain Dugal, Nadège Jaouahdou, Damien Labasle (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—World Wide Cardio
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8:45	David Budka, Trevor Peterson, Anne-Sophie Lavrard, Julie Le Peru, Roman Moreau, Romain Timsit (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—SmartMart
9:00	Kimmy Leverenz, Ryan Moretti, Benjamin Babiz, Julie Doualle, Maxime Fonteneau, Marie Ly (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—The Swish: A Revolutionary Diaper Washing Machine
9:15	Tsiporah Davis, Jared Minor, Jordane Bonaventure, Franck Ferreira, Raj Kaniah (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—Premium Online Wines
9:30	Claudia Toro (Boyan)	The Community or the Non-Profit Business: Culture in Communication
9:45	Dannie Lynn Fountain (Baker)	The Correlation between Voting and Protesting and the Socioeconomic Factors That Influence Each
10:00	Alicia Rigoni (Boyan)	Making Magic!
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1:15	Shonté Daniels (Mesa)	Creating New Forms of Poetry
1:30	Alex Sovansky (Mittag)	The Ontology of Fiction
1:45	Phillip Carlisle (Jordan)	The Life, Trials, and Legacy of Oscar Wilde: Homosexual Identity and Camp in a Culture of Oppression
2:00	Soe Yu Nwe (McCauley, Chytilo)	Narratives on “House”
2:15	Gina Piazza (Guenin-Lelle)	Ricardo Viñes: Son Legs Oublié
2:30	Christopher Mantay (Madhok)	This Is Noise: An Aesthetic Examination of Punk Rock Music
2:45	Megan Poirier (Wickre)	Determining a Relationship between How Curators and Artists Define Successful Exhibitions
3:00	Tim DeLong (Mourad)	From Shoes to Souls: Dwight Moody’s Revivals and the Workingmen of Nineteenth-Century Chicago
3:15	Andrew Zimmer (Kirby)	Crito Withholds His Best Cock
3:30	Joseph Barden (Ball)	Science and the Sublime: Exploring Quantum Mechanics through Musical Composition

FORUM #3 – NORRIS 102

8:30	Laura Wendt (Christopher)	Academic Burnout over the Course of a Collegiate Career: A Cross-Sectional Analysis of First-Year and Senior Students
8:45	Katlyn Foster (Wieth)	The Effect of Anxiety and Anticipation on Memory: To Dwell or Not to Dwell?
9:00	Zachary Kribs (Christopher)	Age, Personality, and Time of Day Preference: A Mediation Model
9:15	Blake Schuetz (Hill)	The Role of Preference for Order in the Relationship between Permissive Parenting and Aggression
9:30	Jessica Weiler (Elichberger)	How Is Change in Knowledge and Attitudes toward Gay/Lesbian Parenting Affected by Presentation of Research Findings?
9:45	Alesha Steenbergh (Bujdos)	Gender Differences in Attachment and Parenting Styles: Psychological and Sociological Perspectives

(continued on next page)



FORUM #3 (CONTINUED) – NORRIS 102

1:15	Anne Sutherland (Carlson)	Pedagogical Aids in College Textbooks: Aids Do Not Significantly Facilitate Learning
1:30	Paula Sands (Francis)	Exploring the Relationship between Performance Anxiety in the Performing Arts and Individual Beliefs about Control
1:45	Holly Paxton (Wilson)	Conditioned Place Preference in the Earthworm
2:00	Brian Weiss (Christopher)	Openness and Divergent Thinking: Testing Three Possible Mediators
2:15	Erin Sovansky (Wieth)	Creativity in Musicians: Creativity Requires More Than Simply Playing Music
2:30	Alice Coyne (Keyes)	Methodological Challenges: Conducting Practice-Based Research in a Small Outpatient Clinic
2:45	Amanda Douglas (Hill)	The Benefits of Equine-Assisted Therapy
3:00	Courtney Pickworth (Keyes)	Treating Anorexia Nervosa: Differences in the Intensive Care Spectrum
3:15	Phu Khat Nwe (French)	Noninvasive MRI of Fat in Obese Mice Following Vertical Sleeve Gastrectomy Surgery
3:30	Robert Gibson (Rabquer)	Novel Biomarkers for Osteoarthritis Using a Rat Model
3:45	Grace Dougherty (Rohlman)	The Role of CSF1 in Hepatocellular Carcinoma-Recruited Macrophages

FORUM #4 – GOODRICH CHAPEL AND NORRIS 104

These morning presentations will occur in Goodrich Chapel.

9:00	Erin Sovansky (Ball)	<i>Morceau Symphonique</i> , Op. 88, Alexandre Guilmant (1837–1911)
9:15	Brian Wu (Abbott)	Franz Liszt: Piano Concerto No. 1 in E-flat Major, S.124
9:30	McKenzie Schafer (Balke)	Two Opera Arias from the Romantic Period

These afternoon presentations will occur in Norris 104.

1:15	Kevin Markey (Boyan)	Social Media Trends
1:30	Paxton Mueller, Logan Woods (Dick)	The Orangeburg Massacre: February 8, 1968
1:45	Desirae Salswedel (Dick)	Communities of Homelessness: Hoovervilles in the Great Depression
2:00	Robert Cermak (Chase)	Ethnoarchaeology among the Maasai: Subsistence and Faunal Remains in Northern Tanzania
2:15	Tom Dukes (Hagerman)	Imperialism and the Early Republic: Josiah Harlan, the First American in Afghanistan
2:30	Charles Hatch (Yoshii)	Japan's Siberian Ambition: Diplomacy and Militarism toward Soviet Russia, 1917–1925
2:45	Kate Sexton (Dick)	Beaver Island, Michigan: Assassination of a Mormon King on an Irish Isle
3:00	Chris Blaker (Dick)	Where Have All the Memories Gone? Albion College and World War II
3:15	Michelle Burke (Rose)	Evaluating the Use of Emergency Department Services by Patients with Non-Emergent Health Needs: Public Health Implications and Policy Recommendations

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

Bailey Ahmad (Walling)	Syrian Civil War
Kristen Chung (Lyons-Sobaski)	Cross-species Amplification of <i>Sabatia campestris</i> Microsatellite Markers for Investigation of Genetic Diversity in <i>S. angularis</i> , <i>S. formosa</i> and <i>S. stellaris</i>
Christopher Claes (Bartels)	Geographic Information System Analysis of the Distribution of Recent Reptiles with Respect to Climate and Its Use in Generating Quantitative Paleoclimatic Estimates
Chelsea Copi (Harris)	Making Cows Fatter Faster: Toward the Synthesis of ethyl-3-oxo-2,3,4,5,6-pentadeutero-4-phenylbutanoate
Ruth Doering (B. Lincoln)	Fluid Inclusion Study of Quartz Veins from the Black Hills, South Dakota
Erica Earl (McCaffrey, Zellner)	The Formation of Erythrose from Glycolaldehyde Using Bentonite Clay as a Catalyst
Hayley Gerber (McCaffrey, Rabquer)	The Effect of Electron Density within Vanadium Complexes Having Differing Substituents on Toxicity to Cancer Cells
Marissa Messenger, Bian Wang (Wilch)	J Harlen Bretz Boulder Collection: Legacy of an Albion College Alumnus and Geologist
Mitch Pender (McCaffrey)	Synthesis and Characterization of Substituted Bis-sulfate-bridged Binuclear Oxovanadium (IV) Macrocyclic Complexes
Josh Peters (Bartels)	Invertebrate Paleontology of the Mississippian Michigan Formation, Bellevue, Michigan
Courtney Pickworth (Keyes)	Degrees, Methods, and Locations of Outpatient Practitioners Treating Anorexia Nervosa
Oren Shewach (Christopher)	The Protestant Work Ethic: Its Relationship to the Big Five Personality Factors
Dana Sorensen (Walling)	The United States and Torture
William Sturdavant (McCaffrey)	Optimization of the Acetoxylation of (+)-limonene in the Presence of Zeolite H- β
Emily Walker (Walling)	Sex Trafficking
Anna Ward, Haley Plasman (McCurdy)	Using Macroinvertebrates as Bioindicators of Water Quality in Rice Creek, Michigan
Alyssa Kulczycki, Allison McClish Megan Moore, Emily Morlock, Victoria Sochor, Brittney Stanton, Thomas Strautz, Isaac Veysey-White, Zachary Wells (Saville)	Comparative Genomics in <i>Drosophila</i>
Rachel Gates, Katie Meeth, Lauren Scott, Sarah Wojcik, (Baker, Nolan)	Management Consulting Projects—Mental Space Manager
Brian Fiorillo, Mitchell Jeffery, Brad Melpolder, Carl Weedman (Baker, Nolan)	Management Consulting Projects—Ericka's Wonderland
Dorothy Cheng, Wangyili Huang, Sophia Khan, Laura Wendt (Baker, Nolan)	Management Consulting Projects—In-School Marketing
Kyle Formanczyk, Jace Garcia, Sarah Morris, Tom Newvine (Baker, Nolan)	Management Consulting Projects—Running Race
Peter Brunotte, Christina Henry, Megan Prister, Diana Schultz (Baker, Nolan)	Management Consulting Projects—Torrance Learning



Abstracts of Student Presentations



BAILEY AHMAD, '13 **Syrian Civil War**

Faculty Sponsor: Carrie Booth-Walling
Major: Political Science
Hometown: Royal Oak, Mich.

The ongoing civil war in Syria has been characterized by gross human rights violations. For more than three years since the uprising began, the Syrian government under the military rule of President Bashar al-Assad has violated the human rights of its people including those that are protected by the International Covenant on Civil and Political Rights and international humanitarian law (the laws of war). Opposition forces are also guilty of violations of international law, but to a lesser degree. Using a combination of scholarly research, personal accounts of abuses by Syrians, media reports, the human rights reports produced by international human rights organizations like Human Rights Watch, and YouTube videos that have been verified as authentic, I examine the causes of these violations as well as the domestic and international responses to them. My research begins with the recent history of Syria and how the uprisings developed as part of the Arab Spring and focuses on the character and conduct of the civil war. I have used this research to create an educational and advocacy website to bring awareness of the situation in Syria to others and to promote human rights change.

protein domain and the double-stranded DNA viral genome associate, and furthers our knowledge about how SIRV assembles.

Supported by: National Science Foundation Research Experiences for Undergraduates, Western Michigan University



JOSEPH BARDEN, '13 **Science and the Sublime: Exploring Quantum Mechanics through Musical Composition**

Faculty Sponsor: James Ball
Majors: Music, Psychological Science
Hometown: Livonia, Mich.

Originally, *The Quantum Enigma* was proposed as a musical composition for symphony orchestra which would serve to convey various fundamental concepts within the field of quantum mechanics (e.g., wave-particle duality, quantum superposition) metaphorically. The piece, in three movements, has been composed to be a celebration of the concepts, history, and natural wonder of quantum theory and the sciences in general. *The Quantum Enigma* addresses the highly mysterious nature of quantum mechanics, a field of study that, while poorly understood by the layman, pervades everyday life through technologies as complex as the MRI scanner and as common as the light switch. This piece and the accompanying lecture are meant to introduce the average person to the puzzling and beautiful world of quantum mechanics in non-technical terms and, hopefully, promulgate a newfound understanding and admiration of scientific thinking and thinkers.

Supported by: FURSCA—James W. Hyde Endowed Student Research Fellowship



HANNAH ALLGAIER, '14 **Identification of the DNA Binding Surface on the SIRV-YNP Capsid Protein**

Faculty Sponsor: Christopher Rohlman
Major: Biochemistry
Hometown: Ortonville, Mich.

Viruses of Archaea have a wide range of morphologies that may be manipulated for use in the nanotechnology field. Viruses that have the ability to survive in harsh conditions, such as extremely high temperatures and at very acidic pH levels, are especially attractive candidates. The *Sulfolobus islandicus* rod-shaped virus (SIRV) fills both of these requirements by being able to survive in solfataric fields all over the world. The SIRV isolated from Yellowstone National Park (SIRV-YNP) can survive at 80°C and at pH 6, making it a prime candidate for manipulation into a nanomaterial. To use this virus for this purpose, an understanding about how its components assemble into the mature virion is essential. Previously, the structure of a capsid protein domain from this virus was determined to be a four-helix bundle. Our study reveals how this capsid



CHRIS BLAKER, '14 **Where Have All the Memories Gone? Albion College and World War II**

Faculty Sponsor: Wesley Dick
Major: History
Hometown: Farmington, Mich.

In 1938, Albion College President John Seaton said to the senior students in the chapel: "It would be useless to deny that we are living in days dark with distress and fear." Indeed the "winds of war" were already being felt at the College. In the days before Pearl Harbor, President Seaton told the Michigan Methodist Conference: "The students at Albion as elsewhere have felt a constant undertow of restlessness. . . . The

uncertainties of the future are deeply felt, and no doubt [they] share at times in the too prevalent mood that nothing is worthwhile except the present moment.” On December 7, 1941, the Japanese attack on Pearl Harbor brought America into World War II, the most monumental struggle in history, so encompassing that it poses problems on how to tell the story. Recently, Ken Burns, documentary film maker, set out to narrate America’s participation in the war. Realizing this was an impossible task, Burns decided to tell the story of the war through the experiences of four American towns. His highly acclaimed series reminded the public of the value of local and regional history.

Inspired by Ken Burns’ *The War*, this study focuses on Albion College during World War II. What was the impact of the war on the campus? Male students were drafted and others enlisted. Female students worked on the home front, raising money for the war effort. An Army Air Force Crew Detachment was assigned to campus to train as pre-flight cadets. How many college students and pre-flight cadets were wounded or killed during the war? No American town or campus could escape the war’s impact, and as Burns has written: “Nothing would ever be the same.”

There is another catalyst for this undertaking. When one walks the halls of the Albion College library, it is hard to miss a most impressive plaque headed with the words: Albion College Honor Roll for the World War. This honor roll includes nearly 500 names of Albion College men who served, including the names of 12 who died in World War I. It is a fitting memorial. But something is missing. Where is the memorial for those who served in World War II? The goal of this study is to tell the story of the impact of the war on Albion College and in the process identify those from the College who served and those who gave their lives in the hope that the College can provide a fitting memorial, an honor roll for World War II.

The cause of Parkinson’s disease is not fully understood. However, it is largely believed to be related to the buildup of certain neuronal inclusions and the degeneration of specific neurons. Post-mortem examinations of patients have shown an age-dependent loss of dopaminergic (dopamine producing) neurons in the substantia nigra of the brain, as well as the presence of seemingly toxic neuronal inclusions called Lewy bodies. Lewy bodies are mainly comprised of the protein α -synuclein which has been associated with familial (genetic) Parkinson’s disease. My research is concerned with investigating a likely interaction between α -synuclein and the ubiquitin-proteasome system, the main mechanism responsible for intracellular protein degradation. By targeting gene expression to the eye in *Drosophila melanogaster* (fruit fly), I have obtained preliminary qualitative data that may suggest an interaction between these two components. I have continued to qualitatively assess this interaction, and have begun preparations for future quantitative measures. If there is indeed collaboration between these two factors, critical knowledge may be gained about this disease which could lead to a new model for how we look at Parkinson’s.

Supported by: FURSCA

PETER BRUNOTTE, '13

(See Management Consulting Projects—Torrance Learning)

DAVID BUDKA, '13

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—SmartMart)



ETHAN BROCK, '13

Further Development of an Eye Model of Parkinson’s Disease Using *Drosophila melanogaster*

Faculty Sponsor: Kenneth Saville
Major: Biology
Hometown: Grosse Pointe, Mich.

Parkinson’s disease is a prevalent neurodegenerative disorder that affects 1-2% of the population over the age of 60. It is characterized by muscle tremors, movement retardation, and difficulty initiating and sustaining movements, as well as degeneration of balance and memory. While the vast majority of documented cases have no apparent genetic cause (sporadic Parkinson’s disease), 5-15% of them do.



MICHELLE BURKE, '13

Evaluating the Use of Emergency Department Services by Patients with Non-Emergent Health Needs: Public Health Implications and Policy Recommendations

Faculty Sponsor: William Rose
Major: Public Health Policy
Hometown: Jackson, Mich.

Emergency department use has increased over the last several years, particularly by those insured. A large percentage of patients have been identified as Medicaid patients. This increase in emergency department use has led to crowding in many hospitals which can cause delays in care, ambulance diversions to other hospitals, inadequate capacity to handle a large influx of patients in the event of a disaster, and the inability to move patients from the emergency department to inpatient beds if necessary. Patients are thus waiting longer to be seen, waiting longer to be admitted, and, due to



long wait times, leaving the emergency department without being seen or receiving the care they need. This increased risk for patients can lead to a greater cost of care, either within the healthcare system or to a different source of healthcare, leading to a loss within the system.

It is proposed that finding a way to divert non-emergent patients from using the emergency department would lead to more efficient emergency department utilization. Through literature review and interviews with emergency department administrators, providers, medical staff, and patients, a policy can be created that is suitable for use at the local or state level to help in the efficiency of emergency department utilization. By acknowledging the views of the stakeholders involved in this issue, the policy has the potential to bridge the gap of understanding that currently exists between providers of care and their patients. The policy would not only decrease patient volume in emergency departments, but would also provide more appropriate care for all patients, including those classified as emergent, non-emergent, and mental and behavioral health. By identifying what drives patients to choose the emergency department over other health care services, and in what context they are making their decisions, providers can better understand how best to divert them toward more appropriate forms of care.



PHILLIP CARLISLE, '15
The Life, Trials, and Legacy of Oscar Wilde: Homosexual Identity and Camp in a Culture of Oppression

Faculty Sponsor: Sally Jordan
 Majors: English, Music
 Hometown: Indianapolis, Ind.

Although the term “homosexual” was invented over 140 years ago, the image of the homosexual man has solidified itself into a collection of traits gay men are “supposed” to have: flamboyance, fashion, and campy humor. But from where did these stereotypes originate, and what entrenched them so thoroughly in popular culture?

Oscar Wilde—renowned author, playwright, and wit—is considered by many to be “ground zero” for these common traits of homosexual men. Specifically, Wilde’s involvement in the Queensberry Trials (which led to his fall from the public’s favor) serves as a crystal-clear example of how homosexual men had their image reified in the public’s eye.

But whether or not Wilde’s notorious “posing” as a sodomite is what led to this image, his legacy continues to be a hotly debated topic in academia. One of the leading texts on the topic, *The Wilde Century*, by Alan Sinfield, states that Wilde’s over-the-top persona was the cause for the public’s perception of effeminate and flamboyant men as being homosexual (and vice versa); however, there is reason and proof to say otherwise.

While Sinfield argues that Wilde’s trials are the reason we view homosexual men in the way that we do, I argue that many of these stereotypes already existed prior to the Queensberry Trials—exemplifying what it often takes for a homosexual man to live and thrive in an oppressive culture. Wilde’s defiance of the heteronormative serves as both a cautionary tale and a standard for which to strive.

Supported by: FURSCA—James W. Hyde Endowed Student Research Fellowship

ROBERT CERMAK, '14
Ethnoarchaeology among the Maasai: Subsistence and Faunal Remains in Northern Tanzania

Faculty Sponsor: Bradley Chase
 Major: Anthropology
 Hometown: Grand Ledge, Mich.

The pastoral Maasai of northern Tanzania and southern Kenya have traditionally held to a diet built exclusively upon the remains of their livestock, predominantly goats/sheep (*ovis*) and cattle (*bos*). However, the restrictions placed upon this lifestyle by the encroachment of outside interests in Maasai land have threatened the ideal pastoralist strategy of subsistence in recent decades. This study utilized both ethnographic methods to examine how the Maasai process food animals today and archaeological methods to collect and analyze faunal remains at an abandoned *boma*, in order to observe how such processes translate into the archaeological record. The ritual of *orpul*, or ceremonial slaughter of livestock, remains the chief means of processing and consuming meat products among the Maasai. The nearly universal reliance upon livestock as the source of meat has also remained consistent throughout the last three to four decades.

Dorothy Cheng, '14

(See Management Consulting Projects—In-School Marketing)



KRISTEN CHUNG, '13
Cross-species Amplification of *Sabatia campestris* Microsatellite Markers for Investigation of Genetic Diversity in *S. angularis*, *S. formosa*, and *S. stellaris*

Faculty Sponsor: Sheila Lyons-Sobaski
 Major: Biology
 Hometown: Dubai, United Arab Emirates

My research project involved identifying potential genetic microsatellite markers of three different plant species within the genus—*Sabatia: S. angularis* (Rose Pink), *S. stellaris* (Rose of Plymouth) and *S. formosa* (Stately Rose Gentian)—through carrying

out polymerase chain reactions, making gels through the method of gel electrophoresis, and then sequencing DNA using the DNA sequencer. Microsatellite markers are short segments of DNA made up of 1- 6 base pairs that occur tandemly and have numerous alleles. They are used for detecting polymorphisms (variations in alleles at a gene locus) in different species, which can be used to develop genetic maps and conduct diversity studies for a species. I used genetic markers that were designed for *S. campestris* (Prairie Rose Gentian) and cross-amplified them in the populations of the three other species by using the polymerase chain reaction (PCR).

Carrying out cross-amplification studies can reveal genetic relatedness within a population and genetic difference between different populations. Finding genetic markers is essential to understand the importance of the conservation of endangered and threatened populations of each species, which are often located at the edge of their range. Such populations are called peripheral populations. These populations may be important for the evolution of new species and thus are important to conserve. After appropriate genetic markers for the three species are identified, genetic diversity tests will be carried out for each population.

Supported by: FURSCA



CHRISTOPHER CLAES, '13
Geographic Information System Analysis of the Distribution of Recent Reptiles with Respect to Climate and Its Use in Generating Quantitative Paleoclimatic Estimates

Faculty Sponsor: William Bartels
 Major: Geology
 Hometown: Clinton Township, Mich.

The diversity of reptiles in any given area is controlled by climate; therefore, the number of species of reptiles found in fossil faunas should provide proxies for estimating ancient climates. I used geographic information system (GIS) technology to produce range maps of North American turtles, lizards, and crocodylians and overlaid them to generate biodiversity maps for reptilian groups. These were then analyzed against climate maps representing a variety of climatic measurements.

When diversity was regressed against climatic parameters, minimum and maximum climatic values were linked with the species count of each reptile group. The overlap of the different estimates was then used to establish criteria for assessing paleoclimatic conditions for fossil assemblages.

Crocodylids are restricted mostly by cool annual and winter temperatures. Lizards thrive with high annual temperature, solar radiation, and low rainfall. Aquatic turtles diversify with high annual temperature,

warm summers, and high humidity, but terrestrial turtles better correlate with low seasonality and warm summers.

My climatic limits were then applied to Paleogene fossil assemblages from Wyoming to create paleoclimate estimates. Analyses of these faunas indicate that climates were similar to those existing today along the Gulf Coast. Relatively minor climatic change occurred through most of the early Paleogene, with a warming and wetting of the area into the middle Eocene. The goal of this research is to contribute both to the paleoclimate record and to the understanding of biodiversity as it changes in response to a dynamic earth and atmosphere.

Supported by: FURSCA—Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellows, Lawrence D. Taylor Undergraduate Geology Research Fund

ADAM COLLINS, '14

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—World Wide Cardio)



CHELSEA COPI, '13
Making Cows Fatter Faster: Toward the Synthesis of ethyl-3-oxo-2,3,4,5,6-pentadeutero-4-phenylbutanoate

Faculty Sponsor: Clifford Harris
 Major: Spanish
 Hometown: Carleton, Mich.

The compound 6-benzyl-2-thiouracil, a thyrostatic agent, is an illegal chemical in Europe commonly used to make cows grow larger, more quickly. In order to support the development of a more reliable detection method, we are synthesizing the closely related chemical 6-(pentadeutero)-benzyl-2-thiouracil. The replacement of five hydrogen atoms with five deuterium atoms will allow European regulatory agencies to detect the harmful chemical in commercial meat samples. Our goal is to prepare this pentadeuterated form of the chemical as conveniently as possible.

We are currently working on the first step in a two-step synthesis. This first step would synthesize ethyl-3-oxo-2,3,4,5,6-pentadeutero-4-phenylbutanoate, which would ultimately be used to synthesize deuterated 6-benzyl-2-thiouracil. A Reformatsky reaction was selected as our first approach to this problem. We present the results of our efforts to date.

Supported by: FURSCA, The Prentiss M. Brown Honors Program Research Fund



ALICE COYNE, '13
Methodological Challenges: Conducting Practice-Based Research in a Small Outpatient Clinic

Faculty Sponsor: Barbara Keyes
 Major: Psychological Science
 Hometown: Cedarville, Mich.

Retention is a pervasive problem in clinical settings. This study explored factors that may enhance client retention. Participants were recruited from a small Midwestern outpatient psychological clinic. Therapists were randomly assigned to either a feedback (receiving weekly client feedback) or a control (treatment as usual) condition. All participants were given a symptom checklist at the beginning and end of the study to assess symptom improvement.

Clients displaying more paranoid symptoms attended fewer sessions. Suspiciousness, hostility, and inability to trust may weaken the therapeutic alliance. Future studies could examine whether addressing paranoid symptoms early in therapy enhances retention.

Moreover, preliminary analyses suggested that providing regular client feedback to therapists may increase the number of therapy sessions attended by clients. Perhaps the act of giving feedback helps the clients commit to therapy and fosters a stronger therapeutic alliance, strengthening the bond between therapist and client. Ideally, client feedback should also help therapists improve and tailor therapy to fit clients' needs and preferences.

Qualitative analyses of written feedback showed the most common theme was how much clients appreciated their therapist's ability to listen and truly hear what they were saying. One common criticism was participants' perception they did not get to address the problem they came in for that day.

Perhaps, if therapists take client feedback into consideration (i.e., checking in with clients to ensure the issues most important to them are being addressed), clients will feel more committed to the therapeutic process and will be less likely to drop out of therapy. Finally, if paranoid symptoms are present, therapists need to pay particular attention to the quality of the therapeutic alliance.

Supported by: FURSCA

example, a sonnet must have fourteen lines, iambic pentameter, a ghost turn, and a *volta* (a turn that signifies a dramatic change within the poem). Open forms give the poet more flexibility than closed forms; for example, in an erasure poem, the poet draws on another writer's text, and crosses out words and phrases in order to make a new poem. However, although the sonnet holds a stricter structure, the erasure can be just as difficult to create.

For my project, "Creating New Forms of Poetry," I studied established poets who use form in unprecedented ways, and then used their work as models for inventing 15 new forms of poetry. I borrowed forms found in technology and nature, such as a satellite's revolution in space and the disjointedness of shattered glass. I also explored other modes of writing and turned them into new forms, such as structuring a poem to look like a how-to guide or divorce paperwork. While exploring the world around me, I discovered forms already in my surrounding world, and used my writing to translate those forms into poetry that related back to my life.

Supported by: FURSCA

TSIPORAH DAVIS, '14

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—Premium Online Wines)

TIM DELONG, '14

From Shoes to Souls: Dwight Moody's Revivals and the Workingmen of Nineteenth-Century Chicago

Faculty Sponsor: Ronney Mourad
 Major: Religious Studies
 Hometown: Troy, Mich.

Dwight Lyman Moody is considered by some scholars and religious groups to be the greatest Christian evangelist of the nineteenth century. However, most of the academics who have studied Moody's work conclude that he was not successful in converting impoverished, working-class citizens, the demographic he desperately wanted to reach. This project, which partly examines the life of Dwight Moody and partly sketches Chicago's growing labor movement, seeks to answer why the great evangelist was not successful, for the most part, in converting Chicago's laborers. An analysis of Moody's theological convictions shows that the evangelist's individualistic view of conversion turned off workingmen who were urgently fighting for their right to unionize. Along with his emphasis on paradise in the afterlife rather than political reform on earth, Moody's message of individualism alienated him from the men and women he sought to convert.



SHONTÉ DANIELS, '14
Creating New Forms of Poetry

Faculty Sponsor: Helena Mesa
 Majors: English/Creative Writing, Spanish
 Hometown: New Brunswick, N.J.

Poetic form pushes a writer into exploring new ways to evoke an emotion, an image, or a story. Closed forms force the poet to abide by the set rules of the form; for



MICHAEL DIX, '14
Design and Activity of Nanoscale Palladium Catalysts on Carbon Substrates

Faculty Sponsor: Kevin Metz
 Major: Biochemistry
 Hometown: Rockford, Mich.

We have developed a method to fabricate palladium nanoparticles tethered directly to a carbon support using greener synthetic methods. This approach is advantageous because metal nanoparticles have been shown to be effective as catalysts in heterogeneous catalysis. However, due to their small size, unsupported metal nanoparticles can be difficult to recover and reuse. As a result, many procedures call for synthesizing nanoparticles in one step, and attaching them to a support in a second step. Our approach circumvents this second step, saving time and energy.

To demonstrate the utility of our nanoparticles as catalysts, we employed the hydrogenation of methyl trans-cinnamate as a model system. In this study, we are investigating the effectiveness of supported palladium nanoparticles fabricated on top of porous carbon microspheres, charcoal, and carbon planchets. These carbon surfaces provide a substrate that can be removed from a reaction mixture easily as well as allowing for wide dispersion in the reaction. Each substrate possesses different qualities which lead to different advantages and disadvantages when considering them for use as a catalytic substrate. This study aimed to find which of these substrates and methods would provide the most effective catalyst.

Supported by: FURSCA—Robson Family Fellowship

Orogeny and then underwent uplift in the Tertiary Laramide Orogeny.

Through microthermometric and petrographic analysis, clathrate and homogenization temperatures are taken from 2- and 3-phase fluid inclusions that have an H₂O aqueous solution, a CO₂ vapor bubble that homogenizes to liquid, and, in the 3-phase inclusions, a CO₂ liquid bubble. NaCl salt is also present. These temperatures are used by the computer program BULK to calculate density, salinity, and H₂O/CO₂ that are then used by the program ISOC to graph temperature and pressure relationships as isochore paths. The results are compared to peak- and post-metamorphic conditions derived from other studies of mineralogy. Depending on where the isochores contact the metamorphic path, the fluid inclusions are classified as post- or peak-metamorphic.



GRACE DOUGHERTY, '14
The Role of CSF1 in Hepatocellular Carcinoma-Recruited Macrophages

Faculty Sponsor: Christopher Rohlman
 Major: Biochemistry
 Hometown: Canton, Mich.

Hepatocellular carcinoma (HCC) is the most common form of liver cancer, and it is clear that the local tissue microenvironment plays a key role in its progression. Macrophages in the local microenvironment are suspected to have a manifold effect on tumor expansion and malignancy by promoting inflammatory responses as well as tissue remodeling. Colony stimulating factor (CSF1) has been shown to promote macrophage differentiation, survival, and proliferation. Although CSF1 is highly expressed in the liver and pre-clinical studies of the effects of CSF1 and CSF1 receptor inhibition have shown promising efficacy in various cancers, not much is known about how CSF signaling impacts macrophage phenotype in HCC. We found that CSFR-positive macrophages are located in hyperplastic non-tumor and peri-tumoral regions of a chemically induced murine HCC model. This expression pattern mimics what is seen in HCC specimens from human patients with a poor prognosis. We hypothesized that CSF1 derived from HCC cells promotes macrophage differentiation and viability.

In this study, bone marrow derived precursor cells (BMDCs) were isolated from mice and were successfully differentiated into macrophages using HCC conditioned culture media. To establish the role of CSF signaling, these macrophages were subsequently treated with a colony stimulating receptor small molecule inhibitor (CSFRi), and we observed altered morphology and decreased proliferation *in vitro*. We also observed that small molecule mediated inhibition of CSFR promoted a shift in macrophage polarization from M2 (pro-tumor) to M1 (anti-tumor). These findings point to a



RUTH DOERING, '13
Fluid Inclusion Study of Quartz Veins from the Black Hills, South Dakota

Faculty Sponsor: Beth Lincoln
 Majors: Geology, English
 Hometown: Cadillac, Mich.

Fluid inclusions are microscopic bubbles of liquid and/or vapor that are trapped in growing or fracturing rock and minerals. They are important because primary fluid inclusion content provides information on the conditions of formation of the rock, and secondary fluid inclusion content provides information about subsequent fluids that interact with the rock. A basic objective of any fluid inclusion study is to determine the timing of entrapment of the fluid inclusions.

In this study, fluid inclusions are observed within quartz veins collected from the Rough Rider Mine in the Bugtown formation in the Berne Quadrangle, the Black Hills, South Dakota. The mine is located in the core of the Black Hills, which was metamorphosed and deformed during the Proterozoic Trans-Hudson



critical role of HCC-cell mediated CSF signaling for macrophage proliferation, viability, and polarization.

Supported by: The STAR Program, College of Graduate Studies at Georgia Health Sciences University, and start-up funds to the Duncan Lab from the Department of Medicine at Georgia Health Sciences University



AMANDA DOUGLAS, '13
The Benefits of Equine-Assisted Therapy

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

Prescriptions for horseback riding as treatment for illnesses date back to early Greek medicine (Willis, 1997). Human-

animal contact has been shown to be beneficial for both mental and physical health (Wells, 2011). Equine-assisted therapy programs have been growing rapidly in recent years (*Equine Psychotherapy*, 2008), and participation is correlated with positive changes including increased physical ability and heightened social attentiveness (Chandler, 2012). Questionnaires used before and after therapy have provided a body of data for researchers. Macauley and Gutierrez (2004) found significant improvements in speech and communication skills and generally high parent satisfaction when they surveyed child participants and their parents. Many different facets of equine-assisted therapy could affect the children involved in therapy, as well as the satisfaction of their parents.

The present study expanded on Macauley and Gutierrez's study and focused on identifying key predictors of effectiveness and parental satisfaction within local programs. We hypothesized that key predictors of parent satisfaction would be clinician ratings, therapy environment, child's interests, and the rated importance of basic horsemanship skills. Parents of children currently participating or having recently participated in equine-assisted therapy completed a survey containing demographic questions and measures of each of the hypothesized predictors of program effectiveness and parental satisfaction. Ratings of therapy environment, including program resources and overall aesthetic appeal, positively predicted parent satisfaction. Child's interest did not emerge as a significant predictor, challenging research that shows interest and motivation to be important to equine-assisted therapy effectiveness (Yorke, Adams, and Coady, 2008).

Supported by: FURSCA



TOM DUKES, '13
**Imperialism and the Early Republic:
Josiah Harlan, the First American in
Afghanistan**

Faculty Sponsor: Christopher Hagerman
Majors: International Studies, German
Hometown: Midland, Mich.

The writings of Josiah Harlan, the first American to travel to Afghanistan in the mid-nineteenth century, offer a unique account of the country and the period. Although ostentatious, Harlan's prose, including the unpublished "Oriental Sketches" (1841), shows considerable insight into Afghanistan and its people, produced by perceptive observation. My thesis asks the question of whether Harlan's being an American made him different from his British contemporaries, or made it illogical to act like an imperialist in Asia. I conclude that Harlan was politically and culturally similar to British imperialists and, although he tried to set himself apart as an American, unconsciously modeled himself after them. Nonetheless, several unique aspects of the text, including those that result from Harlan's personal dislike of specific British policy, set "Oriental Sketches" apart from its contemporaries as an Orientalist text of singular importance.

Supported by: FURSCA, Earhart Emerging Scholars Award, Student Research Partners Program



ERICA EARL, '14
**The Formation of Erythrose from
Glycolaldehyde Using Bentonite Clay as a
Catalyst**

Faculty Sponsors: Vanessa McCaffrey,
Nicole Zellner
Major: Chemistry
Hometown: Marshall, Mich.

Biologically relevant compounds, such as simple sugars, have been detected in molecular clouds in space. The detection of these molecules has caused theories to be developed on how these materials were formed and their subsequent delivery to planetary surfaces. One compound that has been detected is the two-carbon sugar glycolaldehyde (GLA).

The four-carbon sugar erythrose is formed from GLA through a dimerization reaction. Different types of smectite clay, modeling early Earth volcanic ash, were used as a catalyst. GC-MS analysis was used to look for formation of erythrose. The reaction was found to be most efficient when the solution was heated for an extended period of time. The data were then compared to samples of glycolaldehyde that were subjected to a high velocity impact by the NASA Johnson Space Center flat plate accelerator that mimics the impact of an interstellar object's delivery to Earth. Conclusions about these reactions will be discussed.

Supported by: NASA Exobiology Program

BRIAN FIORILLO, '14

(See Management Consulting Projects—Ericka's Wonderland)

KYLE FORMANCZYK, '15

(See Management Consulting Projects—Running Race)

**KATLYN FOSTER, '13****The Effect of Anxiety and Anticipation on Memory: To Dwell or Not to Dwell?**

Faculty Sponsor: Mareike Wieth
Majors: Psychological Science, English
Hometown: Livonia, Mich.

Does the anticipation of an upcoming event help or hurt your performance? This study was designed to determine the impact of anxiety sensitivity and anticipation on memory. Previous research has shown that an individual with high anxiety sensitivity (and, therefore, more sensitivity to anxiety-related symptoms) tends to recall threatening words significantly more than neutral or positive words (McCabe, 1999). Also, individuals with high test anxiety who were forced to wait to complete a task performed worse than others (Sarason and Stoops, 1978). In the current study, participants first took an Anxiety Sensitivity Index survey and then were given three word lists containing neutral and threatening words to memorize and later recall. To test the effect of anticipation on memory for these words, participants were given an anxiety induction either at the beginning, middle, or end of the experiment. For the anxiety induction, participants were told that they would be video recorded later in the study.

Results indicated that the anxiety induction had no impact on the number of words recalled. However, individuals with low anxiety sensitivity remembered more threatening words from Word Lists 1 and 3 compared to Word List 2. In contrast, individuals with high anxiety sensitivity only remembered more words from Word List 3. Consistent with previous research, these findings suggest that the way individuals react to threatening stimuli impacts their performance on memory tasks. The trend seen in this study implies that those with high anxiety sensitivity may use avoidance to cope with threats in the environment until the point of being forced to face the threat.

**DANNIE LYNN FOUNTAIN, '14****The Correlation between Voting and Protesting and the Socioeconomic Factors That Influence Each**

Faculty Sponsor: Vicki Baker
Major: Media and Marketing Management
Hometown: Lexington, Mich.

While generalizations are made about age and the connection of that factor to voting versus protesting, the purpose of this project was to identify other possible demographic and educational variables that may also aid understanding of the differences that lead an individual to protest or vote. Through research completed in Lansing, Michigan, two logistic regressions were conducted. Logistic regressions are the most appropriate statistical analysis technique, given the use of categorical outcome variables. The dependent variables were labeled yes/no (1= vote, 0 = did not vote; 1 = protest, 0 = did not protest). Upon completion of these two regressions, the standardized regression coefficients were compared. The typical Lansing voter, found as a result of this research, is female, middle-aged, prefers her state legislature to be Democratic and her U.S. legislature to be Republican. She's well educated and is employed. The data were then studied to find ways to market to the nonvoter demographics to increase overall voter turnout.

JACE GARCIA, '13

(See Management Consulting Projects—Running Race)

RACHEL GATES, '13

(See Management Consulting Projects—Mental Space Manager)

**HAYLEY GERBER, '14****The Effect of Electron Density within Vanadium Complexes Having Differing Substituents on Toxicity to Cancer Cells**

Faculty Sponsors: Vanessa McCaffrey,
Bradley Rabquer
Major: Biochemistry
Hometown: Dexter, Mich.

In recent years, the pharmacological activity of vanadium complexes—particularly in the treatment of diabetes—has been thoroughly explored. These studies sparked interest in the other pharmacological activities of vanadium complexes, leading to research into vanadium as a potential anti-carcinogenic agent. Building on previous research, I am interested in the anti-tumor properties of vanadium complexes bearing different substituents. Therefore, several vanadium complexes with different substituents on the benzene



ring have been synthesized. Three of the substituents are electron donating groups (CH_3 , $\text{C}(\text{CH}_3)_3$, and OCH_3), and two of the substituents are electron withdrawing groups (NO_2 and CF_3). The different substituents change the electron density within the dioxovanadium center, which can cause differences in the physical properties of the complexes. To see if electron density affects their toxicity, the complexes have been applied to mammary tumor cells (MCF-7).

Supported by: FURSCA, Petroleum Research Fund



ROBERT GIBSON, '13
Novel Biomarkers for Osteoarthritis Using a Rat Model

Faculty Sponsor: Bradley Rabquer
 Major: Spanish
 Hometown: Grosse Ile, Mich.

Osteoarthritis (OA) is one of the leading causes of chronic disability. The development of biomarkers—a biological indicator of a biological state, like osteoarthritis—has previously relied on proteins and carbohydrates; however, these markers had many issues. Post-traumatic osteoarthritis (PTOA) makes up approximately 12% of the cases of OA and serves well as a model for OA. The development of a biomarker for PTOA could indicate pathways of the disease pathology of OA, benefit the prediction of progression of OA pathology, and serve as a guide to therapeutic intervention in PTOA and OA.

The goal of this research is to identify microRNA (small non-coding RNA that serves in the regulation of gene transcription) which could be developed into a biomarker for PTOA. Using microRNA overcomes the issues of the previously tried biomarkers for OA. This research employs a rat model with joint and cartilage damage similar to that of PTOA. Serum microRNA are amplified and analyzed.



HELEN HABICHT, '13
Metamorphic Evolution of Tso Morari Ultra High-Pressure Terrane in the Himalayas, India

Faculty Sponsor: Carrie Menold
 Major: Geology
 Hometown: Albion, Mich.

Ultra high-pressure eclogites from the Tso Morari gneiss dome in Ladakh, India are the focus of this study. The Tso Morari dome is located in the Himalayas and was formed during the continental collision of India and Asia. The UHP unit consists of numerous discrete blocks of eclogite ranging in size from one meter to hundreds of meters within a leucocratic quartzo-feldspathic orthogneiss. Eclogite blocks within the dome represent the leading edge of the subducted Indian continental margin. The occurrence of eclogite

boudins within leucogneisses is a common feature of many other UHP localities including Dabie Shan, China and the Western Gneiss Region, Norway. Mafic eclogite blocks preserve the best mineral indicators that the rock has experienced ultra high-pressure conditions. Garnet, omphacite, and phengite are compositional zoned suggesting changing pressure and temperature conditions during growth.

Electron microprobe analyses of the mineral composition in the eclogites including garnet traverses and spot analysis of omphacite and phengite were collected. The data have been converted to atoms per formula unit, which was then used to calculate pressure and pressure conditions using published thermometers and barometers. Thermobarometric calculations on the eclogite facies assemblage yield peaks of 19-23kbars and 500-600°C. Reconstruction of the growth history using these P-T plots provides a proxy for position in crust during collision, depth of subduction, and exhumation paths. Donaldson et al age calculations on metamorphic zircon from the same sample (DD71710-2b) used in this study suggest that the UHP stage occurred at $44.1 \pm .9$ Ma. P-T path reconstruction will help to clarify the timing of UHP metamorphism, and subsequent exhumation, helping to better understand the India-Asia collision and Himalayan orogeny.

Supported by: FURSCA, Faculty Development Committee



CHARLES HATCH, '13
Japan's Siberian Ambition: Diplomacy and Militarism toward Soviet Russia, 1917–1925

Faculty Sponsor: Midori Yoshii
 Major: History
 Hometown: Ann Arbor, Mich.

The Japanese Taisho era, 1912-1926, is an understudied time period. Even less researched is the 1918-1922 Siberian intervention by the Allied powers. Relying on the original texts of international treaties, Japanese newspapers from the era, and English secondary sources, my thesis surveys the transition of Japan's relations with Russia, Soviet Russia, and the Soviet Union from 1917 to 1925. Through the analysis of the 1905 Portsmouth Treaty, the 1907 Russo-Japanese Treaty Concerning Fisheries, and the 1925 Soviet-Japanese Basic Convention, I argue that the 1918 Siberian Intervention played a vital role in Japanese diplomacy as it worked as leverage for Japan to receive economic concessions from Russia.

One of the key reasons why the Japanese government decided to intervene in Siberia was to promote U.S.-Japanese cooperation. Pursuing President Wilson's ideals of internationalism and self-determination, the Japanese government desired to help White Russians gain these ideals through intervention. Japanese military expansionists, however, opposed cooperation with the West. As the Bolshevik revolutionaries had nullified previous treaties such as the 1905 Portsmouth

Treaty with Japan, expansionists believed that only through the use of force would Japanese supremacy in Asia be assured. Through the compromise between the civilian government and the military, Japan achieved economic concessions in Siberia from the Soviet Union in 1925.

CHRISTINA HENRY, '13

(See Management Consulting Projects—Torrance Learning)



AARON HIDAY, '13

Investigation of Bioturbation and Groundwater Sapping as Possible Causes of Diel Turbidity Cycles in Rice Creek, Kalamazoo Watershed, Michigan

Faculty Sponsors: Thomas Wilch, Timothy Lincoln
Major: Geology
Hometown: Burlington, Mich.

Turbidity is an important water quality parameter. Our past research on daily turbidity cycles in Rice Creek described turbidity increases of 2-4 times during the night. These cycles are roughly anti-phase with dissolved oxygen and pH, which is compatible with a biological control. Groundwater cycles in adjacent wetlands are in-phase with turbidity, suggesting groundwater sapping as a cause.

In 2012, we monitored turbidity cycling at 15-minute intervals in Rice Creek and Cold Creek of the St. Joseph River watershed. Rice Creek has extensive adjacent wetlands, whereas Cold Creek has insignificant adjacent wetlands. During an 18-day comparison, Rice Creek had strong (5-15 NTU), regular turbidity cycles, whereas Cold Creek had weak (4-6 NTU), irregular fluctuations. Because the creeks have similar animal faunas, the lack of regular cycling in Cold Creek suggests nocturnal bioturbation is not the cause of turbidity cycling.

We postulated that water seeping into the creek at a higher rate at night causes increased turbidity. However, rates measured with a seepage meter placed in fine-grained sediment recorded virtually identical day and night seepage rates. An in-lab, uniform seepage experiment was conducted, and no change in turbidity was observed until 100x the stream's measured seepage rate. At this rate, seepage was no longer uniform, and localized sand boils formed, causing a turbidity increase. This work suggests that bioturbation and uniform seepage are unlikely causes of the turbidity cycles, but leaves localized sapping as a possible cause.

Data from fall 2011 show that stage and groundwater cycles die out in early November. Current work is investigating as to whether turbidity cycles also die out.

Supported by: FURSCA—Vernon and Gladys B. Lawson Endowed Research Fellowship, Department of Geological Sciences

WANGYILI HUANG, '13

(See Management Consulting Projects—In-School Marketing)



ABBY HESS, '13

Effect of sJAM-A on Actin Cytoskeleton Rearrangement

Faculty Sponsor: Bradley Rabquer
Major: Biology
Hometown: Dexter, Mich.

Junctional adhesion molecules (JAMs) exist in endothelial cells, which are cells that line the interior of blood vessels. JAM proteins function in the adhesion between these cells, and play an important role in promoting angiogenesis, the formation of blood vessels as well as cell migration in blood vessels. The purpose of this research was to investigate how sJAM-A promotes angiogenesis through actin cytoskeleton rearrangement.

A chemical messenger, sJAM-A binds to a receptor on the surface of the cell. The signal pathway was followed through the cell and into the actin cytoskeleton by immunofluorescence staining and western blotting, which allowed us to see the pathway and how the actin skeleton moves as a result of the sJAM-A signal. Western blotting was used to identify the presence of a given protein in a cell, specifically pFAK, a protein that stimulates cytoskeleton movement. In immunofluorescence, cells were stimulated with sJAM-A, and then treated with antibodies, such as actin, in order to visualize the change in the actin cytoskeleton.

The effects of sJAM-A on actin cytoskeleton movement showed that this protein did indeed affect the cells and their cytoskeleton. The protein FAK was phosphorylated, which implies that the cytoskeleton moved. Actin fibers also formed after stimulation with sJAM-A, which showed that the cytoskeleton grew new fibers in order to move. This research could have health implications as JAM proteins are tightly linked with angiogenesis. These implications could involve how sJAM-A is related to cardiovascular disease, cancer, and rheumatoid arthritis.

Supported by: FURSCA



MITCHELL JEFFERY, '14

(See Management Consulting Projects—Ericka's Wonderland)

SOPHIA KHAN, '14

(See Management Consulting Projects—In-School Marketing)



ZACHARY KRIBS, '15

Age, Personality, and Time of Day Preference: A Mediation Model

Faculty Sponsor: Andrew Christopher
Majors: Psychological Science, Music
Hometown: Mason, Mich.

Time of day preference is a person's preference for performing daily activities, both physically and intellectually. Previous research (e.g., Randler, 2008) has established that, as people age, they tend to have a preference for morning activity. Studies also show that conscientiousness, a major personality factor, is strongly related to a morning time of day preference, as well as age; as people grow older, they prefer earlier times of day and become more conscientious (Tsaousis, 2010). The current study tested a model in which conscientiousness mediated the relationship between age and personality.

Our sample consisted of 491 participants from students attending a small liberal arts college in the Midwest, and members of StudyResponse.net, an online survey service. Participants completed the 19-item Horne and Ostberg (1976) Morning-Eveningness Questionnaire and the 60-item NEO-PI-R (McCrae and Costa, 1992) conscientiousness inventory.

Using simple correlations, we found that age had a strong relationship with time of day preference and older participants were more likely than younger participants to have a morning time of day preference. When conscientiousness was controlled, regression analysis suggested that it mediated the relationship between age and time of day preference, accounting for one-third of the variability in this relationship. Thus, conscientiousness is part of the reason why older individuals have a morning as opposed to evening preference. Knowing how individuals differ in their age, level of conscientiousness, and time of day preference holds important implications, from college class scheduling to career counseling.

Supported by: FURSCA, Faculty Development Committee



CHRIS KRUPPE, '13

Manipulation of Palladium Nanoparticles Tethered to Graphitic Carbon for Catalysis

Faculty Sponsor: Kevin Metz
Major: Biochemistry
Hometown: Naperville, Ill.

The use of nanoparticles in catalytic applications is well established. There has been a growing interest in the use of shaped nanoparticles, including nanocubes, for catalysis because they often display selectivity and can be used for asymmetric catalysis. One drawback in the use of nanoparticles for catalysis is removing the particles from the reaction mixture. Often, this

JESSICA KOEHLER, '13

Utilization of Microbiological and Molecular Approaches for the Detection of *Escherichia coli* in Environmental and Food Samples

Faculty Sponsor: Ola Olapade
Major: Biology
Hometown: Ira, Mich.



The rapid detection of coliform bacteria is essential to public health. Among known indicator organisms, *Escherichia coli* is the most reliable indicator for fecal contamination in aquatic systems and an important indicator for food contamination. *E. coli* is a reliable indicator because its gene *uidA*, and product beta-glucuronidase, are specific only to the bacteria. The current culture-based techniques for testing are relatively slow; therefore, this study is looking at the potential of PCR techniques for detecting *E. coli* contamination in aquatic systems and food products, specifically meat.

Water samples were taken from the Kalamazoo River and then filtered to extract DNA and gain a viable colony-forming unit (CFU) count. The extracted DNA was used for both conventional and quantitative PCR assays. The DNA from one sample at each site was used to find the detection limit of the three methods mentioned above. Samples from old ground beef were diluted to see if *E. coli* could be detected with the same three methods. Dilution standards were created from *E. coli* culture to about 10^8 /mL *E. coli* cells. These were used to create a standard curve for the qPCR and to make sure the methods worked for CFU counts and conventional PCR. After analysis it was found that pPCR was more sensitive overall and thus better at implicating *E. coli* contamination.

Supported by: FURSCA

is alleviated by first synthesizing the nanoparticles and then incorporating them into or onto a micro- or macro-sized support. This approach, however, is a two-step process which can be difficult and time-consuming. Our lab is interested in synthesizing shaped nanoparticles anchored directly onto supports, specifically, palladium nanocubes on graphite. Currently SEM characterization has established that we have developed a reproducible method for synthesizing these nanoparticles (Figure 1).

Here, we report a comparative study on the catalytic effects of shaped nanoparticles as a catalyst in the Suzuki coupling reaction. The Suzuki coupling reaction produces a carbon-carbon bond by combining an aryl- or vinyl-halide with an aryl- or vinyl-boronic acid over a palladium catalyst. This reaction is advantageous since it can be done at room temperature in polar solvents. The results of a model Suzuki reaction with bromotoluene and phenylboronic acid, in various solvents (DI H₂O, MeOH, EtOH, and (1:1) EtOH:DI H₂O), as determined by GC-MS will be presented.

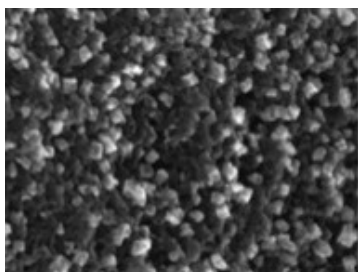


Figure 1

Supported by: FURSCA

ALYSSA KULCZYCKI, '14

(See Genomics Education Partnership)

KIMMY LEVERENZ, '13

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—The Swish: A Revolutionary Diaper Washing Machine)



CHRISTOPHER MANTAY, '13

This Is Noise: An Aesthetic Examination of Punk Rock Music

Faculty Sponsor: Bindu Madhok
Major: Philosophy
Hometown: Novi, Mich.

In order to understand the aesthetics of music, it is important that we analyze it from both producer- and listener-centered perspectives. This implies consideration of the essential qualities which make up music such as rhythm, pitch, tone, and melody from the point of view of those who create music as well as those who listen to it. Punk rock is a musical movement which, at its beginning in the 1970s, made a departure from the previously accepted standards of rhythm and melody in order to produce a newer sound. It was created by people who rebelled against prevailing societal norms. Its listeners also wished to express their own rebellion, creating a new unique sub-culture within the movement itself. The purpose of this thesis is to apply some prominent aesthetic theories of philosophy to punk rock music from the movement's inception to the present. In doing so, I hope to discover which aesthetic qualities of the music have changed over time and how these changes have impacted the different groups of people who now listen to punk rock music.



KEVIN MARKEY, '13

Social Media Trends

Faculty Sponsor: Andrew Boyan
Major: Business Communication
Hometown: Rochester Hills, Mich.

Over the course of the semester, I have been examining the trends of the social media industry. Using credible sources of information provided by mavens of the industry via blogs, podcasts, news articles, and books, I have summarized the most popular of these trends and tested their effectiveness on various social media outlets. I am looking at the trends of the industry, as well as the outcomes of these strategies.

ALLISON MCCLISH, '15

(See Genomics Education Partnership)

KATIE MEETH, '13

(See Management Consulting Projects—Mental Space Manager)

BRAD MELPOLDER, '14

(See Management Consulting Projects—Ericka's Wonderland)



Messenger

MARISSA MESSENGER, '14

Major: Integrated Science-Elementary Education
Hometown: East Lansing, Mich.

BIAN WANG, '14

Major: Geology
Hometown: Wuhan, China



Wang

J Harlen Bretz Boulder Collection: Legacy of an Albion College Alumnus and Geologist

Faculty Sponsor: Thomas Wilch

Sitting between the Albion College Science Complex Atrium and Kresge Hall, Albion's "Boulder Strewn" rock garden consists of 47 boulders with unique geologic origins from around the world. These rocks were collected and donated by well-known geologist and Albion alumnus J Harlen Bretz, Class of 1905. In his time as a

geologist, he won the Penrose Medal (the Geological Society of America's highest award). Our project, inspired by these rocks and Bretz's Albion connection, focuses on the fascinating geologic history of Bretz's rock collection and the life and career of J Harlen Bretz. Bretz is best known for his explanation of a gigantic catastrophic flood in eastern Washington that formed the channeled scablands. His hypothesis, however, was actually not accepted by the geologic society until over 50 years after it was first published. Our research sources include his journal articles, one published biography, an unpublished autobiography, an interview with emeritus geology professor Lawrence Taylor who knew Bretz in person, and notes on the boulder collection.

Bretz traveled worldwide and was an enthusiastic rock collector. The rocks he graciously donated to the Department of Geological Sciences represent different aspects of geologic history and are worth studying from different geologic perspectives. For this part of the study, we are examining and documenting the origin of each rock, with the help of existing records. The complete results of our study will be on a Web page, hosted by Albion College and the Department of Geological Sciences.

Supported by: Department of Geological Sciences



ANNA MILLER, '13 Vascular Flora and Plant Communities of the Ott Biological Preserve, Calhoun County, Michigan

Faculty Sponsor: Daniel Skean
Major: Biology
Hometown: Grand Haven, Mich.

The Harvey N. Ott Biological Preserve consists of ca. 125 hectares of diverse plant communities, including

oak-hickory forests, hardwood swamps, a prairie fen, and a highly disturbed remnant prairie. This property, owned by Calhoun County, was once Albion College's nature center. From September 2011 to November 2012, I conducted a floristic inventory of the area that began by using herbarium specimens and an unpublished checklist prepared by Dr. William Gilbert from 1946 to 1954. I hypothesized that the proportions of introduced and invasive species had increased since Gilbert's thorough study. After making 278 collections, including over 100 species that were not noted or collected by Gilbert, I have documented an increase in proportions of introduced and invasive species, supporting my hypothesis.

Succession and non-native introductions have probably been the major factors affecting biodiversity. Of the three state-listed rare plants that were documented by Gilbert, only two species with small populations were found in 2012. Currently, a trail that connects the area to the expanding North Country Trail is being finalized. I was able to locate and map these two rare species (*Geum virginianum* L. and *Amorpha canescens* Pursh) before trail placement. This study, including Gilbert's work, may provide a baseline for preserve management.

Supported by: FURSCA—James W. Hyde Endowed Student Research Fellowship

JARED MINOR, '14

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—Premium Online Wines)



ASHLEY MIRACLE, '13 The Role of sJAM-A and sJAM-C in Angiogenesis

Faculty Sponsor: Bradley Rabquer
Major: Biology
Hometown: Redford, Mich.

Adhesion molecules are proteins located at the surface of the cell. They bind with other cells or the extracellular matrix. Soluble junctional adhesion molecule-A (sJAM-A) and sJAM-C are both special types of adhesion molecules that are expressed by endothelial cells (ECs) and have roles in transendothelial migration. sJAMs play roles in angiogenesis as well, which is the formation of new blood vessels from existing vessels. Angiogenesis is important to many diseases, such as cancer, rheumatoid arthritis, and tumor growth. The purpose of my project was to determine which sJAM will have the higher magnitude of angiogenic response. I hypothesized that sJAM-A would have a higher angiogenic effect due to its stimulation of Id-1.

After doing *in vitro* HMVEC (human microvascular endothelial cell) chemotaxis assays, I found that neither sJAM-A or sJAM-C had a higher angiogenic response; they both had about the same number of cells migrate through the membrane. However, it was found that when the two were combined, there was not an additive effect but almost the same level of cells migrating through the membrane as each sJAM alone. This indicates that even though the sJAMs have different receptors on the cell surface, they use the same pathway inside the cell or target the same genes inside the nucleus.

Supported by: FURSCA

MEGAN MOORE, '13

(See Genomics Education Partnership)

RYAN MORETTI, '14

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—The Swish: A Revolutionary Diaper Washing Machine)

EMILY MORLOCK, '15

(See Genomics Education Partnership)

SARAH MORRIS, '13

(See Management Consulting Projects—Running Race)

On the evening of February 8, students gathered around a bonfire on the South Carolina State College campus. When police attempted to put out the fire, an officer was injured by a thrown projectile. Then, some state policemen began firing indiscriminately into the crowd of students. The shooting lasted only a few seconds, but three young African American men—Samuel Hammond, Delano Middleton, and Henry Smith—lost their lives. Twenty-eight students, men and women, suffered gunshot wounds, most shot in the back as they tried to flee the scene. The police claimed they heard shots coming from the students, but an FBI investigation found no evidence of students firing weapons from the campus.

Most people have heard of the four students killed at Kent State University in 1970, but few know about the three African American students killed at Orangeburg. What are the reasons that Orangeburg remains relatively unknown? Utilizing historical sources, independent reports, documentary film, and the only comprehensive account of the event that is available, our research attempts to answer that question. In the process, we reconstruct the events of February 8 and explore the escalating tensions of the previous three days. We also examine the role of the news media in the popular perception of the event. Finally, we provide a commentary on the absence of accountability for this bloody tragedy—a tragedy known today as the Orangeburg Massacre.

Our presentation is also inspired by Cleveland Sellers, one of those shot on February 8 and the only person sentenced to prison because of the Orangeburg protests. We were honored to meet him when he visited Albion College to deliver the 2013 Martin Luther King, Jr. Convocation and Coy James Memorial History address.



Mueller

PAXTON MUELLER, '15

Majors: Mathematics, Economics and Management (Accounting)
Hometown: Monroe, Mich.

LOGAN WOODS, '14

Major: History
Hometown: Marshall, Mich.

The Orangeburg Massacre: February 8, 1968

Faculty Sponsor: Wesley Dick

In 1968, Orangeburg, South Carolina was home to two historically black colleges: South Carolina State College and Claflin University. In spite of the passage of the 1964 Civil Rights Act, Harry Floyd's "All Star Bowling Lane" remained off limits to African Americans. In February, student protestors attempted to desegregate the bowling alley. Following clashes between students and Orangeburg police, South Carolina officials called in the state police and the National Guard to cordon off the black schools.



Woods



ALEX NANNA, '13

Methylation of Heterocycles Using Fenton Chemistry

Faculty Sponsor: Andrew French
Major: Chemistry
Hometown: Fraser, Mich.

The methylation of pharmaceuticals has been shown to prevent the buildup of toxic drug metabolites in the liver by inhibiting cytochrome P450 (CYP) binding and metabolism. Thus, direct methods for the methylation of heteroaromatic systems, often components of bioactive molecules, are in high demand in the pharmaceutical industry. Herein we report our efforts to methylate a pharmaceutical model, caffeine, and other heterocycles using Fenton chemistry. The reaction utilizes substituted ferrocene compounds as catalysts with hydrogen peroxide and DMSO to generate methyl radicals. This one-step reaction proceeds at ambient temperature and has already been used to successfully methylate the anti-smoking drug Chantix. The prominence of heterocycles in nature and



society also makes this reaction extremely valuable in other fields including agricultural chemistry, food chemistry, and materials science.

Supported by: Scripps SURF, Pfizer

TOM NEWVINE, '13

(See Management Consulting Projects—Running Race)



PHU KHAT NWE, '13 **Noninvasive MRI of Fat in Obese Mice Following Vertical Sleeve Gastrectomy Surgery**

Faculty Sponsor: Andrew French
Major: Biochemistry
Hometown: Taungoo, Myanmar

Weight loss surgery, such as vertical sleeve gastrectomy (VSG), has recently been found to be more effective than dietary restrictions. In these experiments, we utilized magnetic resonance imaging (MRI) to assess the fat content of the liver and abdominal cavity in obese mice following VSG. Three groups of mice were fed a high fat diet and imaged at magnetic field strength 7Tesla: (1) Naïve (control) mice that were cholesterol fed, (2) mice that had undergone VSG, and (3) sham-operated mice that were fed cholesterol and the same diet restriction as the VSG group. Axial T1 weighted MR images of the abdomen were used to quantify body fat content. Diffusion weighted MR images were also acquired to measure the apparent diffusion coefficient (ADC) in different tissues. Localized MR spectroscopy of the liver was used to quantify hepatic fat content.

Both VSG and sham-operated mice had significant weight loss compared to the control group after two weeks. MRI images showed a significant reduction in body fat following VSG surgery, with the VSG group having 14.8% fat and the sham group, 27.1% fat. Spectroscopy data showed that VSG mice had significantly lower liver fat (1.6%, $p < 0.05$) than both sham-operated (7.3%) and naïve (4.9%), which was corroborated by *ex vivo* tissue analysis of hepatic triglycerides. The ADC measurements demonstrated higher water diffusion in the liver of VSG mice compared to the control and sham-operated groups. To conclude, MRI imaging and localized MR spectroscopy prove to be valuable methods in assessing fat content.

Supported by: Cincinnati Children's Hospital (SURF)



SOE YU NWE, '13 **Narratives on "House"**

Faculty Sponsors: Anne McCauley, Lynne Chytilo
Major: Art
Hometown: Yangon, Myanmar

Narratives on "House" originate from my interest in the use of symbols such as a house, a shrine, or a body as metaphors for the human emotional and spiritual condition as I see and experience it. This condition is expressed in amalgamations of human figures and natural and architectural forms that meld into one uncertain but solid dreamlike spectacle in the sculpture "House." I strive to explore, narrate, and encapsulate these emotional and spiritual experiences in various art forms such as drawing, printmaking, sculpture, artist's books, and video. The resulting narratives come together in a body of artworks produced in different media, each piece acting as context for the other because of their common back-story.

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



ALYSSA OLSON, '13 **Mapping the Whitehouse Nature Center at Albion College: Developing a Comprehensive Geospatial Database Using GIS and GPS Technologies**

Faculty Sponsor: Michael McRivette
Majors: Geology, English
Hometown: Clarkston, Mich.

The Whitehouse Nature Center is known as a multidisciplinary outdoor research center for Albion students. Many research and class projects have been conducted within its premises, and each project is held, and often only known, within its respective department. This semester I started to overcome this lack of information-sharing by creating and developing a comprehensive geospatial database using ArcGIS, a geographic information systems (GIS) software package. A geospatial database functions as a repository for multiple spatial datasets that are related. The database will be used to hold information such as, but not limited to, parcel data, Nature Center trails and landmarks, historical photographs, remote sensing imagery, and government-distributed environmental and ecological datasets. Many past and present student projects conducted at the Nature Center have used

global positioning system (GPS) technology to record locations, and the corresponding data are therefore compatible for inclusion in the database. Ultimately, the spatial database will function as both a resource of information for future studies conducted in the Nature Center and a repository for the results of such research.

Creation of the database began by compiling existing data (parcel data, satellite imagery, etc.) for the Nature Center and GPS collection of locational data for trails and other important features and landmarks. Currently, the data are being organized for ease of manipulation and analysis, and existing research data are being added. Data within the database have already been used to produce a new map for the Nature Center to be used for visitors and the Nature Center website.



MITCH PENDER, '13
Synthesis and Characterization of
Substituted Bis-sulfate-bridged Binuclear
Oxovanadium (IV) Macrocyclic Complexes

Faculty Sponsor: Vanessa McCaffrey
 Major: Chemistry
 Hometown: Iron Mountain, Mich.

Molecular magnets have been a very popular topic of research recently due to their potential applications in optoelectronics, information storage, and switching devices. However, before such materials can be used in these applications, a thorough understanding of how both structural and electronic perturbations affect magnetic exchange is needed. Vanadium (IV) oxides are interesting materials in that they are antiferromagnetic, thus exhibiting temperature-dependent behavior when in an applied magnetic field. In order to systematically probe magnetic properties, a series of bis-sulfate-bridged binuclear oxovanadium (IV) macrocycles was synthesized to determine the correlation between Hammett parameters of the substituent and the physical properties of the compound. The series of synthesized macrocycles includes substituents from a range of electron donating groups ($-\text{CH}_3$, $-\text{C}(\text{CH}_3)_3$, and $-\text{O}(\text{CH}_3)$) and electron withdrawing groups ($-\text{Br}$, $-\text{Cl}$, and $-\text{CF}_3$).

Supported by: FURSCA, Petroleum Research Fund



HOLLY PAXTON, '14
Conditioned Place Preference in the
Earthworm

Faculty Sponsor: W. Jeffrey Wilson
 Major: Psychological Science (Neuroscience)
 Hometown: Flint, Mich.

Earthworms are capable of learning, and have nerve cells similar to those of mammals. The current study will examine learning in the earthworm, a simple animal model, by establishing conditioned place preference. This type of Pavlovian classical conditioning is designed to specifically measure the effect of a rewarding stimulus on location preference. A pretest was first used to help worms become familiar with the apparatus, which consists of two distinct platforms made up of different neutral, yet salient, tactile cues. In the conditioning phase, the rewarding stimulus and a designated tactile cue were paired. Finally, the worms were tested to determine the amount of time spent on each platform. It was predicted that the worms would spend significantly more time on the platform which had been paired with the rewarding stimulus. Findings from the present study could provide researchers with insight into the motivational effects of rewarding stimuli, specifically the approach response which results from this type of learning. The discovery of CPP in earthworms could also provide a mechanism for further study of both learning and drug effects in this relatively simple nervous system.

Supported by: Lego Corporation; Department of Psychological Science; Neuroscience Program



JOSH PETERS, '13
Invertebrate Paleontology of the
Mississippian Michigan Formation,
Bellevue, Michigan

Faculty Sponsor: William Bartels
 Major: Geology
 Hometown: Marshall, Mich.

This study describes the invertebrate fossils from the Mississippian Michigan Formation as exposed in limestone quarries in Bellevue, Michigan. While limestone and gypsum have been quarried from the Michigan Formation for well over 100 years, the fossils in the formation are largely undescribed. The uppermost three meters of the Michigan Formation are exposed at Bellevue, revealing a massive gray muddy to silty limestone. It was deposited in a shallow seaway that covered Michigan during the Mississippian Period about 330 million years ago.

The Michigan Formation contains a limited fauna of the strophomenid brachiopod (lamp shell) *Orthotetes* (*O. cf. kaskaskiensis*), the spiriferid brachiopod *Anthracospirifer* (*A. cf. bifurcatus*), a conulariid (problematic group, possibly jellyfish), possibly *Paraconularia*, rare fragmentary remains possibly referable to conodonts (fish), and common trace fossils (burrows and/or trails) of worms.



Although not very diverse, the assemblage is more diverse than that recovered from more evaporitic Michigan Formation deposits close to the edge of the Michigan Basin near Grand Rapids where bottom dwelling organisms are not preserved. This may be due to more normal marine salinity in the center of the basin near Bellevue. The Bellevue fauna is much more limited, however, than that from the overlying and purer Bayport Limestone, suggesting that the muddy and silty waters present during deposition were unfavorable to most animals.

The presence of *Anthracospirifer cf. bifurcatus* and *Orthotetes cf. kaskaskiensis* indicates a Chesterian (Late Mississippian) age for the formation which has been reported as dating to the older Meramecian Age.

Supported by: Lawrence D. Taylor Undergraduate Geology Research Fund

TREVOR PETERSON, '13

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—SmartMart)



COURTNEY PICKWORTH, '13 Treating Anorexia Nervosa: Differences in the Intensive Care Spectrum

Faculty Sponsor: Barbara Keyes
Majors: Psychological Science, Biology
Hometown: Columbus, Ohio

While anorexia nervosa is a well-known psychiatric disorder that is relatively easy to diagnose, it is incredibly difficult to treat. Given the complexities of the disorder, governmental treatment guidelines describe a wide array of treatment approaches (Agency for Healthcare Research and Quality, 2012). The purpose of this study is to identify the most widely used treatment interventions for anorexia nervosa across several types of intensive treatment programs.

Data were collected using several different sources. To analyze the current state of residential programs, inpatient hospitalization, and partial hospitalization, a series of 10 on-site and phone interviews were conducted. The interviews were separated into clinical and administrative subsections that were intended to completely describe the treatment protocol and philosophies as well as success rates (if available) and marketing/promotional procedures associated with each program. The interviewees represented a wide variety of practitioners associated with eating disorder treatment: physician, social worker, psychiatrist, and dietician.

The interview series revealed that all programs employ either cognitive-behavioral or dialectical behavior therapy as their main model for psychotherapy. Alternative therapies were used in all programs, with art therapy and moving meditation or exercise therapy being the most common practices across the board. Results indicated a wide variety of options in many facets of treatment at the intensive level. Future research on the topic will hopefully solidify preliminary results. Using all of the compiled data, a clear view of the state of anorexia nervosa treatment in the United States will be available.

Supported by: FURSCA, Prentiss M. Brown Honors Program

COURTNEY PICKWORTH, '13 Degrees, Methods, and Locations of Outpatient Practitioners Treating Anorexia Nervosa

Faculty Sponsor: Barbara Keyes
Majors: Psychological Science, Biology
Hometown: Columbus, Ohio

Preliminary research has indicated potential inconsistencies in methods and qualifications of outpatient practitioners treating anorexia nervosa. It was predicted that analysis of outpatient practitioner information would reveal great variance in aspects



GINA PIAZZA, '13 Ricardo Viñes: Son Legs Oublié

Faculty Sponsor: Dianne Guenin-Lelle
Major: French
Hometown: Troy, Mich.

Despite having numerous compositions dedicated to him, debuting countless piano pieces, and creating a network within the

Parisian art and music community, Ricardo Viñes has essentially escaped mention in American scholarship on musical history. Considering his great influence at the turn of the twentieth century, how is it possible that Viñes has remained unknown? Perhaps a lack of scholarly sources in English could be responsible. Seeking to remedy this problem, the present study represents the first English translation of his personal journal from French to English. The journal provides a window into the daily life of this prominent figure by highlighting his personal interactions with other cultural icons in the early 1900s. Viñes studied at the prestigious Paris Conservatory, and frequently performed for audiences made of the most noteworthy people in the artistic and musical community at the time. From sight-reading duets with Claude Debussy to dinner parties with Maurice Ravel, Viñes had close ties to many well-known composers, and his journal presents an insider's view of one of the most important artistic communities in modern European history.

of eating disorder treatment. Online databases connecting patients with therapists (EDReferral.com and ANAD.org) were used to find practitioners who identified themselves as eating disorder specialists. Information from these online databases was used to examine the credentials reported by professionals as well as the location of their practices (N=914). Using surveymonkey.com, an online survey was distributed to 706 of these specialists for whom e-mail addresses were available. The survey assessed additional elements of outpatient treatment with a series of open-ended questions (e.g., “What practices do you employ to treat eating disorders?”); responses were analyzed to determine the most frequently used treatment modalities and preferred referral sites for residential treatment.

Results revealed a remarkable variability in the credentials characterizing eating disorder specialists. Among the 189 degrees and certifications self-identified by the practitioners, the most common degree held was a Ph.D., followed by L.C.S.W. and R.D. The online survey data also indicated that the most popular method of treatment was cognitive-behavioral therapy, although more than 90% of practitioners reported using more than one treatment modality. Additionally, almost 25% of eating disorder specialists practiced in California, suggesting a significant inequity in the availability of treatment in some areas. This information has practical implications for sufferers of anorexia nervosa seeking effective treatment that will meet their needs.

HALEY PLASMAN, '13

(See Anna Ward, '14, Haley Plasman, '13)



MEGAN POIRIER, '13

Determining a Relationship between How Curators and Artists Define Successful Exhibitions

Faculty Sponsor: Bille Wickre
Majors: Art History, French
Hometown: Washington Township, Mich.

In my thesis, I studied the parameters for success in art exhibitions as they were defined by exhibiting artists and gallery or museum professionals who planned and produced exhibitions. Every artist, gallery, or museum professional has a different perspective and different qualifications for determining success in an art exhibition. My study examines the metrics of success, according to artists and gallery/museum professionals, in order to understand the differences or similarities that can help create more successful exhibitions. My study's attempt to define success is driven by the contemporary demands on museums, galleries, and artists to fabricate more attractive exhibitions designed to draw larger crowds, increase sales or memberships, and to promote the art experience.

My experience as an intern in a Parisian gallery, during my time spent studying abroad, has fueled my interest in this subject. My research was done mainly through a survey given to artists and gallery/museum professionals. The questions were geared toward finding out what went into the preparation of exhibitions, as well as the experience of said exhibitions. Other research, such as that derived from articles and books on art management, provided a foundation for this project.

The results of this study were surprising and fascinating, and helped me find a way to determine success that incorporates the thoughts of both artists and gallery/museum professionals. This has also helped me create an assessment plan for the Elsie Munro and Martha Dickinson Galleries at Albion College. This study can be applied in numerous galleries and adapted for individual artists, so each can work toward a goal of greater success.

MEGAN PRISTER, '13

(See Management Consulting Projects—Torrance Learning)



HALEY PLASMAN, '13

Biomonitoring Water Quality in Rice Creek, Michigan Using Community-Level Macroinvertebrate Composition

Faculty Sponsor: Dean McCurdy
Major: Biology
Hometown: Comstock Park, Mich.

Benthic macroinvertebrates are useful indices in assessing freshwater biological health. Differing pollution tolerances associated with different organisms, diversity, and abundance distribution are factors that allow macroinvertebrates to be used to quantify stream health. I conducted a survey of macroinvertebrate community composition at 14 sites along Rice Creek, Michigan in summer 2012. Using the standardized method of scoring found in GLEAS Procedure #51, I was able to quantify stream health by assigning scores to each of the sites. I used data from a similar study conducted on Rice Creek in 2002 to then compare the present state of health to its state 10 years prior. Results indicate that the creek has maintained stable health scores over the past decade, both within individual sites and in the creek overall.

Supported by: FURSCA, Department of Biological Sciences



ALICIA RIGONI, '13
Making Magic!

Faculty Sponsor: Andrew Boyan
Major: Mass Communication,
Communicating Gender
Hometown: Kingsford, Mich.

Last spring, I had the privilege of working at the “happiest place on earth,” Walt Disney World. This was a dream come true for me as I am a Disney fanatic and have been since I was very young. I never thought that I could actually work for them one day, that is, until I came to Albion College. Here I was encouraged and supported by Career Development, my academic advisers, and the registrar to pursue this dream of mine. The Walt Disney Company is a multibillion-dollar business with over 15 million visitors yearly. I have been one of those visitors for as long as I can remember. I am now also a proud alumna of the Walt Disney College Program and former cast member of the Magic Kingdom, Main Street team. I want to share my experiences working within a company of this size and reputation. I want to point out both the positives and negatives involved in working with such a revered and often imitated business structure. I will discuss how this opportunity changed me and how it has helped to prepare me for my life after Albion College.

will be analyzed using a variety of immunological and molecular techniques. This model will facilitate research on the molecular biology of mumps virus infection, and, by extension, that of related viruses which pose serious global public health threats. This model may also have applications in drug discovery, where it could be used to screen antiviral drug candidates targeted at HN.

Supported by: FURSCA, Biology Department



DESIRAE SALSWEDEL, '13
Communities of Homelessness: Hooverilles in the Great Depression

Faculty Sponsor: Wesley Dick
Majors: History, Anthropology
Hometown: Almont, Mich.

In 1928, Republican presidential nominee Herbert Hoover captured the optimism of 1920s prosperity when he declared: “. . . We shall soon with the help of God be in sight of the day when poverty will be banished from the nation.” Rewarded with a landslide election victory, Hoover’s presidential honeymoon came to an abrupt halt with the 1929 stock market crash. Banks failed, factories closed, and people, who lost their jobs, saw themselves in song lyrics: “They used to tell me I was building a dream. . . . Why should I be standing in line, just waiting for bread?” Yip Harburg’s “Brother, Can You Spare a Dime?” exemplified the mood shift from the 1920s to the 1930s. America’s worst economic crisis would be called the Great Depression.

Foreclosures and evictions followed in the wake of skyrocketing unemployment, creating an army of the homeless. With no government “safety net,” how would the dispossessed respond? In this dark time, the homeless responded creatively by building makeshift towns. The shantytowns became known as “Hooverilles” in mockery of President Hoover who was reluctant to intervene on behalf of the poor.

While Hooverilles were a last resort for poor Americans who had exhausted their resources, they developed as more than just a place for the homeless to congregate. Case studies of the Hooverilles in New York City, Seattle, and Michigan explore questions of how the residents constructed their new homes, how they lived there, and what they thought about their situation. Hooverville residents attempted to maintain a sense of normalcy in their lives as everything changed around them. Hooverilles became communities where human resiliency and ingenuity were necessary components for survival.

My study also examines the national response to the Hooverilles popping up all over the country. Homelessness remained a national problem even after the election of Franklin Roosevelt and the introduction of the New Deal. With the defense buildup, unemployment eased by 1941. Hooverilles began to



ADAM RONK, '13
Developing a *Drosophila* Model for the Characterization of Mumps Virus/Host Interactions

Faculty Sponsor: Kenneth Saville
Major: Biology
Hometown: Paw Paw, Mich.

Though it is now largely controlled by a vastly successful vaccination program, the mumps virus still presents a major public health challenge in developing nations and for those individuals in the developed world who do not receive the vaccine. In addition, the use of mumps virus as a model organism is an alternative to some types of research utilizing much more dangerous viruses, such as the Ebola, Marburg, and Nipah viruses. Furthermore, the molecular biology of mumps virus infection is poorly understood, as research on this virus has been of a very low priority since the success of the MMR vaccine, though recent drops in vaccine use have caused several outbreaks in the United States and United Kingdom.

I am in the process of creating a research model of the interactions of the mumps virus protein hemagglutinin-neuraminidase (HN), which facilitates viral attachment to cells, with a host organism. To do this, I plan to express HN in various tissues of the common fruit fly, *Drosophila melanogaster*, using the GAL4/UAS system. The effects of expression

disappear when the United States entered World War II. The memory and lessons of the Hoovervilles are timely in 2013 as our generation witnesses the homelessness of the “Great Recession.”



STEPHANIE SANDERS, '15
Room Temperature Synthesis of Shaped Palladium Nanoparticles on Carbon Microspheres

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

Shaped palladium nanoparticles (PdNPs) have the potential to be selective catalysts. Unfortunately, there are some obstacles that hinder their use in heterogeneous catalysis; e.g., nanoparticles are difficult to remove from solution after a reaction. Attaching nanoparticles to a support addresses this issue. However, it is typically a two-step process, and the time and energy involved circumvents the energy-saving goals of catalysis. Additionally, shaped nanoparticle synthesis usually occurs at high temperatures, which is counterproductive as well.

We have developed a method to synthesize shaped nanoparticles directly onto carbon supports using a mild reductant at room temperature. Specifically, we have developed a method to create shaped PdNPs directly on graphite disks and porous carbon microspheres using coffee as a room temperature reductant. By adding stabilizing agents, including Br- and ethylene glycol, the surface energy of the {100} face is lowered, thus promoting its growth and yielding cubic nanoparticles. Analysis by SEM indicates that our synthesized PdNPs are roughly 50nm in dimension. The size, shape, and distribution of nanoparticles varied based on the ratios of the reactants in the synthetic process. Different ratios of reactants and adjustments in the synthetic process are being tested in hopes of maximizing the percentage of cubic particles. Current results will be presented. If successful, our PdNP show promise in being effective, environmentally friendly selective catalysts.

Supported by: FURSCA, American Chemical Society Petroleum Research Fund, Faculty Development Committee



PAULA SANDS, '13
Exploring the Relationship between Performance Anxiety in the Performing Arts and Individual Beliefs about Control

Faculty Sponsor: Andrea Francis
 Major: Psychological Science
 Hometown: Ann Arbor, Mich.

Performance anxiety is a social phobia, where the person fears being judged by others (Kirchner, 2003).

Cases of performance anxiety in academics, athletics, public speaking, and music differ. This study explores individual differences when experiencing music performance anxiety in the hopes of developing individualized suggestions on how to reduce music performance anxiety (MPA). Previous studies on academic anxiety suggest that one personality factor associated with anxiety is locus of control, or how much control over life an individual feels he or she has (Allen, 1974). The current study looks at the relation between MPA and locus of control.

An online survey measuring MPA (Kenny, 2006) and locus of control (Rotter, 1966) was given to students involved in performances at a small Midwestern college. Results found people who felt they have little control over life (very external) and people who felt they have a lot of control over life (very internal) both experience more MPA than people who are not extremely external or internal. Causes of MPA in people with internal and external locus of control are different. Therefore, treatment for the two groups should be different. I discuss specific treatments.



MCKENZIE SCHAFER, '15
Two Opera Arias from the Romantic Period

Faculty Sponsor: Maureen Balke
 Major: Music (Performance)
 Hometown: Marshall, Mich.

These two arias by Smetana and Offenbach are from the Romantic period and offer appealing lyricism and sweet sentiment

reflective of the era. They are appropriate for a young lyric voice.

Smetana's opera *The Bartered Bride* was first performed in its final form in 1870. The opera takes place in a village in Czechoslovakia, where the leading characters, Marenka and Jenik, are two young people in love. However, there is some mystery surrounding the past of the young man. Later in the opera the mystery is cleared up, and the two lovers are finally happy together. The aria sung today takes place at the very beginning of the opera, when the two lovers declare their feelings for each other, but the mystery stands in their way.

The text of Offenbach's opera *The Tales of Hoffmann* is based on writings of the Romantic poet E.T.A. Hoffmann. In this opera, first performed in 1881, Hoffmann tells the tales of several of his past loves, all of which ended tragically. In this tale, his love Antonia misses Hoffmann terribly, and sings a folk-song about a turtle dove which has fled, but is really thinking about her lover, and hoping his heart still belongs to her, and that he will return.



KRYSTA SCHROEDER, '13
Isolation of Podophyllotoxin from *Juniperus virginiana* Post Essential Oil Extraction

Faculty Sponsor: Andrew French
 Major: Chemistry
 Hometown: Grosse Pointe Woods, Mich.

Podophyllotoxin is the active chemical compound found in botanical leaf samples such as mayapple, junipers, and other selected plants. It is a chemotherapy agent used to treat prostate and colon cancer, along with being an antibiotic for genital warts. The purpose of this experiment is to isolate the active compound in *Juniperus virginiana*. The active compound is to be isolated from juniper samples collected by the University of Wyoming that have already had their essential oils, used for the cologne industry, extracted from them. The characterization of podophyllotoxin will be tested using high performance liquid chromatography. The successful isolation and characterization of podophyllotoxin in high yield from previously extracted juniper botanical samples is the primary goal. The primary extraction of the essential oils done by the University of Wyoming had varying distillation times, and this will be used to determine the distillation time necessary to accumulate the highest yield of podophyllotoxin. If this experiment is successful, then juniper botanicals would be able to be promoted for two different markets at the same time: the perfume industry and for the treatment of cancer.

Supported by: FURSCA



BLAKE SCHUETZ, '13
The Role of Preference for Order in the Relationship between Permissive Parenting and Aggression

Faculty Sponsor: Eric Hill
 Majors: Psychological Science, Biology
 Hometown: Rochester, Mich.

This study sought to examine permissive parenting as a predictor of aggression. Researchers have long understood that certain parenting styles are related to hostility. Permissive parenting, which is characterized by lenient disciplinary action, is commonly associated with both physical and verbal aggression in boys and girls (Casas et al., 2006). One study has shown that mother's permissiveness for aggression has the largest impact on the development of aggression in boys (Olweus, 1980). Aggressive behavior has also been shown to be related to certain cognitive styles, such as impulsivity (Luengo, Carillo de la Pena, Otero, and Romero, 1994).

The current study looks to combine these areas of research by examining the role of cognitive style in the relationship between permissive parenting and aggression. Students at a large, public university (N = 350) completed measures of mother's and father's

parenting styles, aggression, and preference for order (a cognitive style measure of the extent to which one desires rules and structure). We expected that permissive parenting would be related to aggressive tendencies, as well as lower preference for order.

Results indicated that permissive mothering was positively related to anger and general hostility. Father's permissiveness was positively related to anger and physical aggression. Preference for order mediated the relationships between permissive parenting, both mothering and fathering, and anger. Preference for order also mediated the relationship between permissive fathering and physical aggression. These results suggest that permissive parenting may predict aggressive tendencies, in part, because such parenting is associated with less acceptance of order and structure.

DIANA SCHULTZ, '13

(See Management Consulting Projects—Torrance Learning)

LAUREN SCOTT, '13

(See Management Consulting Projects—Mental Space Manager)



KATE SEXTON, '13
Beaver Island, Michigan: Assassination of a Mormon King on an Irish Isle

Faculty Sponsor: Wesley Dick
 Majors: History, Anthropology/Sociology
 Hometown: Munith, Mich.

Beaver Island, located at the northern end of Lake Michigan, has been home to many closely knit communities such as Ottawa and Chippewa tribes, fur-trading French *voyageurs*, a splinter sect of Mormons, Irish fisher-folk, and German lumberjacks, among others. Sometimes these different groups did not see eye-to-eye, resulting in conflict. While research for my honors thesis encompasses all of these microcultures, this presentation will focus on the settlement of Beaver Island by the Irish, the Mormon occupation between 1848 and 1856, the return of the Irish, and the ethnic tensions between these two disparate groups.

The original Irish settlers were mostly traders and the families of fishermen. Beginning in 1848, Mormons following their new prophet, James Jesse Strang, who would soon have himself crowned King of Beaver Island, arrived at the island's harbor. There were numerous violent altercations between the Mormons and the Irish in the process of trying to lay claim to the land, resources, and the promised safety of the island. The most intense periods of conflict on Beaver Island occurred in 1852 and in 1856, wherein the Irish were removed by the Mormons and, later, the Mormons in

turn were forced from the island by the returning Irish. However, it was not the Irish that dealt the final blow against the Mormon community on the island; rather it was a disgruntled, apostatic group of Mormons that assassinated King Strang. With the removal of the Mormon leader, the Irish in the area swiftly reclaimed the land they had been forced to abandon. Today, Irish heritage and tradition are very visible on Beaver Island. Stepping down from the ferry in the harbor, visitors are greeted warmly by shouts of “céad míle fáilte,” Gaelic for “a hundred thousand welcomes.”

Supported by: FURSCA

VICTORIA SOCHOR, '15

(See Genomics Education Partnership)



DANA SORENSEN, '14

The United States and Torture

Faculty Sponsor: Carrie Booth-Walling
Major: Political Science
Hometown: Birmingham, Mich.

In October 1994 the U.S. Senate ratified the United Nations Convention against Torture and Other Cruel, Inhuman or Degrading

Treatment or Punishment. The convention defines torture as “any act by which severe pain, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person, information or a confession, punishing him for any act he or a third person has committed or is suspected of having committed. . . .”(Torture Convention, Article 1.1). The Torture Convention prohibits public officials from authorizing, ordering, or inflicting torture against any individual. In the years following 9/11, however, officials of the U.S. government have been accused of authorizing and committing torture during interrogations of suspected terrorists detained in Abu Ghraib prison in Iraq and the detention facility at Guantanamo Bay.

My research examines U.S. detention practices relative to international human rights law and more specifically how the federal government took steps to attempt to legalize torture in order to make its interrogation practices consistent with its responsibilities under domestic and international human rights law. I have used my research to create a website that seeks to educate the Albion community about the issue of torture and the U.S. government detention practices in its war on terror.

ALEX SOVANSKY, '13

The Ontology of Fiction

Faculty Sponsor: Daniel Mittag
Majors: Philosophy, Mathematics
Hometown: Saginaw, Mich.

Talk about fictional characters is not at all uncommon in day-to-day conversation, so it is quite natural to begin to wonder what, if anything, fictional characters like Sherlock Holmes might be. We say things like, “Sherlock Holmes resided in London,” “Sherlock Holmes is wildly popular, even in the twenty-first century,” and “there is no such thing as Sherlock Holmes,” but we cannot simultaneously hold each of the intuitions that accompany those sentences (without being inconsistent). In this brief talk, I will challenge our intuitions on the nature of fictional characters with the use of some puzzles. I will see which intuitions can be salvaged, and which ones can satisfactorily be cast aside or re-framed. In the end, I



OREN SHEWACH, '14

The Protestant Work Ethic: Its Relationship to the Big Five Personality Factors

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

The Protestant work ethic (PWE) is a concept whose seeds sprouted the roots of capitalism in now-developed economies and is commonly associated with values of hard work, individuality, asceticism, delay of gratification, and efficient use of time (Weber, 1904-05/1958). Surprisingly, no studies have examined how PWE is rooted in the five basic personality factors of conscientiousness, agreeableness, extraversion, neuroticism, openness to experience, and their smaller facets. This study fills this void.

We recruited participants through StudyResponse.net. A total of 267 adults (52.8% women; M age = 44.1 yrs, SD age = 11.6 yrs) completed measures of the Big Five Personality Factors and facets, as well as a measure of PWE.

Simple correlations revealed significant ($p < .01$) relationships between five of the Big Five facets and PWE endorsement. These facets were activity ($r = .23$) and excitement seeking ($r = .18$) from the extraversion factor; fantasy ($r = -.19$) and values ($r = -.32$) from the openness to experience factor; and achievement striving ($r = .30$) from the conscientiousness factor.

We next conducted a multiple regression analysis using the five significant personality facet correlates with PWE as predictors. Three of the facets were significantly ($p < .01$) predictive of PWE; specifically, achievement-striving ($\beta = .29$, $B = .21$, $SE = .05$), excitement seeking ($\beta = .19$, $B = .12$, $SE = .04$), and values ($\beta = -.34$, $B = -.24$, $SE = .04$) were predictive of PWE scores.

Given that we found PWE is rooted in three of the Big Five personality dimensions, perhaps PWE serves as a mediator between these basic personality dimensions and their documented correlates.

Supported by: FURSCA, Faculty Development Committee



will show that it is best to say that fictional characters do, in fact, exist (as abstract objects), that they are not created by authors, and that their nature is not unlike that of another rather-familiar sort of entity: abstract mathematical objects.



ERIN SOVANSKY, '13
Creativity in Musicians: Creativity Requires More Than Simply Playing Music

Faculty Sponsor: Mareike Wieth
 Majors: Psychological Science, Music
 Hometown: Saginaw, Mich.

Research has shown a connection between creativity and musicianship (e.g., Gibson, Folly, and Park, 2009). While previous research found musicians in general to be more creative than non-musicians, this study investigated whether there are aspects of being a musician that lead to more creativity, such as being involved in the creation of music through composition, arrangement, or improvisation. Limb and Braun (2008) found that during improvisation jazz pianists showed increased activity in the medial prefrontal cortex, a brain area related to creativity and reduction of inhibition. Given these findings, we predicted that musicians who are involved in the creation of music will be more creative than musicians who simply read music and non-musicians.

Sixty participants completed a musicianship questionnaire that assessed expertise in music, and involvement in creating music. Participants then completed a version of the Guilford's Alternative Uses Task (1967) by listing as many creative uses as possible for two music items: a metronome and a trumpet mute; and two non-music items: a newspaper and a brick. Participants' responses were scored for number of uses and categories. As predicted, musicians who create music listed more creative uses for the music items compared to non-creating musicians and non-musicians. This shows that being a musician in general does not lead to increased creativity, but participation in the creation of music does. This effect, however, was not present with the non-music items, which is consistent with previous research showing that expertise effects are domain specific (e.g., Simon and Chase, 1973).

ERIN SOVANSKY, '13
Morceau Symphonique, Op. 88,
Alexandre Guilmant (1837-1911)

Faculty Sponsor: James Ball
 Majors: Psychological Science, Music
 Hometown: Saginaw, Mich.

Félix-Alexandre Guilmant was an accomplished French organist, composer, and instructor during the late nineteenth century. Guilmant was born on March 12, 1837 in Boulogne-sur-Mer and received his first

instruction on the organ by his father, Jean-Baptiste Guilmant. In 1860, he moved to Brussels where received further training in organ and music composition under the instruction of Jaak-Nicolaas Lemmens. Guilmant became a very famous organist, and performed in several different countries, including the United States. He eventually moved to Paris in 1871 where he became the organist for the church of Saint-Trinité. Guilmant lived in Paris for the rest of his life and became a teacher at the Paris Conservatory in 1896.

Morceau Symphonique was written by Guilmant in 1902 as a contest piece at the Paris Conservatory. Contest pieces were musical works that were made to challenge conservatory students and to examine their skill level. The beautiful opening challenges the trombonist to play slowly and lyrically, while the allegro section involves quick scales that require the trombonist to be both rhythmic and technical. These contrasting themes make *Morceau Symphonique* an exciting and entertaining work for performer and audience alike.

BRITTNEY STANTON, '14

(See Genomics Education Partnership)



ALESHA STEENBERGH, '13
Gender Differences in Attachment and Parenting Styles: Psychological and Sociological Perspectives

Faculty Sponsor: Edward Bujdos
 Major: Human Services
 Hometown: Birch Run, Mich.

The purpose of this literature review is to integrate psychological and sociological views on attachment and parenting styles and to find out what human service interventions are best to use in case problems occur for children and/or adults. The literature review will look at adults with attachment disorders and will focus on gender differences, for both children and adults, in attachment and parenting styles. No methodology is warranted for this study. When adults have problems with attachment in their relationships, it often stems from problems with attachment in their childhood. According to Freudian psychoanalytic theory, women with attachment disorders frequently have an insecure attachment history with their father. By identifying attachment disorders and interventions for children and/or adults with attachment disorders, we may be able to eliminate further psychological damage to the individual.



WILLIAM STURDAVANT, '13
Optimization of the Acetoxylation of (+)-limonene in the Presence of Zeolite H- β

Faculty Sponsor: Vanessa McCaffrey
 Majors: Chemistry, Mathematics
 Hometown: South Lyon, Mich.

Zeolites are naturally occurring minerals that have found various uses as catalysts via activation with Lewis and Bronsted acids. Zeolite H- β is a proton-activated zeolite that has found particular use in the catalysis of organic syntheses. Limonene, a common terpene that can be easily extracted from a variety of natural sources, has found use in the medical and cosmetic industries and is frequently used as a precursor in many organic syntheses. In this study, the use of zeolite H- β as an acid catalyst in the acetoxylation of limonene using acetic acid and trifluoroacetic acid was explored. The effect of microwave irradiation, reaction temperature, and time were studied in an attempt to optimize the yield and selectivity of the acetoxylation reaction. These results were compared to reactions carried out under traditional reflux methods.

Supported by: FURSCA

THOMAS STRAUTZ, '13

(See Genomics Education Partnership)



ANNE SUTHERLAND, '13
Pedagogical Aids in College Textbooks: Aids Do Not Significantly Facilitate Learning

Faculty Sponsor: Jacquie Carlson
 Major: Psychological Science
 Hometown: Royal Oak, Mich.

Today's college textbooks contain numerous features known as pedagogical aids (e.g., bolded-key words, running glossaries, and call-out boxes) allowing readers to follow numerous paths while reading the text (Cush and Buskist, 1997). The presentation style of this type of text is referred to as non-linear. Traditional textbooks (known as linear texts) lack these aids and provide one sequential reading path through the text. Research exploring the efficacy of these text types has mixed findings. Because it is not well understood whether textbook pedagogical aids truly facilitate students' learning, Marek et al. (1999) have called for further research in the field.

The current research compared linear and non-linear texts to determine which most benefited college students' learning. It was predicted that pedagogical aids would facilitate learning, manifesting in higher scores on a learning assessment. Sixty-eight undergraduate students (ages 18-23 years) were provided either a linear or non-linear textbook chapter

and then completed a learning assessment on the material immediately following the reading and again one week later. Results from this study found students' recall, inference, and comprehension scores did not significantly differ. However, learning was affected by the use of call-out boxes, with those who received the linear text scoring significantly higher than those who received the non-linear text.

These results indicate pedagogical aids commonly found in college textbooks do not significantly facilitate learning. Future research should examine how reading speed may interact with type of text in order to assess whether more proficient readers excel with the linear or non-linear text.

Supported by: FURSCA



CLAUDIA TORO, '13
The Community or the Non-Profit Business: Culture in Communication

Faculty Sponsor: Andrew Boyan
 Major: Communication Studies
 Hometown: Lake Leelanau, Mich.

Culture can define the way we talk, interact, and choose partners, friends, and enemies, but what happens when culture defines how people work? After a semester-long internship through The Philadelphia Center off-campus program, I was able to experience new types of interactions, conversations, and projects.

As the oldest Latino non-profit in Philadelphia, Concilio (Council of Spanish Speaking Organizations) has to work within an ever-changing community and provide immunizations, foster care, an adoption program, and cultural events that are open to the public. Founded by Puerto Rican business owners in order to deal with police brutality and intolerant behavior throughout the city, the original Concilio was a place to gather and band together. In 2012 the non-profit celebrated 50 years of advocacy, and while the location and people in charge have changed, the message is still the same: protect the people they serve.

The question after 50 years becomes not only about how to best serve the community that now includes Puerto Ricans, Dominicans, Vietnamese, and African Americans but about how to stay afloat financially. How do you cut a budget and maintain the same quality of service? Can you release a historical public parade to the masses and not have a negative public image effect on the organization? These questions and more will be discussed and explored to try and answer if culture and community overcome smart business decisions.

ISAAC VEYSEY-WHITE, '13

(See Genomics Education Partnership)



ISAAC VEYSEY-WHITE, '13
An Analysis of the Virulence of the
***Wolbachia* Bacterium in Wild Michigan**
Populations of *Drosophila melanogaster*

Faculty Sponsor: Roger Albertson
 Majors: Biology, Spanish
 Hometown: Quincy, Mich.

Wolbachia, a virulent bacteria that infects all known arthropod species and some nematodes, is linked to very interesting animal behavior patterns in the infected and has been extensively studied in model organisms in order to learn how to best combat its role in diseases such as river blindness. In this study, the infection rate of *Wolbachia* in wild *Drosophila melanogaster* fruit flies was analyzed by capturing wild flies and establishing lineages, testing flies for *Wolbachia* DNA, and examining fly tissues via fluorescent microscopy. We found unusually high infection rates in local *D. melanogaster* populations, which could suggest some mechanisms taking place that don't normally exist in this species of fly, and, in the broader sense, could potentially suggest a more commensalistic relationship than a parasite-host relationship. We have also produced some interesting preliminary data via fluorescent microscopy of the intercellular localization of the bacteria.

Supported by: FURSCA



EMILY WALKER, '14
Sex Trafficking

Faculty Sponsor: Carrie Booth-Walling
 Majors: International Studies, Spanish
 Hometown: Dansville, Mich.

Sex trafficking, one of the largest subsets of human trafficking and modern-day slavery, occurs every day around the globe and within the United States. It is an industry that has rapidly expanded over the past several decades. My research examines what sex trafficking looks like in various parts of the world today and analyzes the different roles of key players involved. I examine the roles of perpetrators, victims, and consumers of sex trafficking, as well as how non-governmental organizations, nation-states, and the United Nations are reacting, if at all, to the booming sex trade industry. Analyzing such things helps to reveal how sex trafficking is a human rights violation and understand what is being done to combat this sector of modern-day slavery on both a national and international level. I have used my research to create a website that exposes the reality of sex slavery in the hopes of better informing the Albion community about this human rights problem.

BIAN WANG, '14

(See Marissa Messenger, '14, Bian Wang, '14)



Ward

ANNA WARD, '14

Majors: Biology, Psychological Science
 Hometown: Traverse City, Mich.

HALEY PLASMAN, '13

Major: Biology
 Hometown: Comstock Park, Mich.



Plasman

Using Macroinvertebrates as Bioindicators of Water Quality in Rice Creek, Michigan

Faculty Sponsor: Dean McCurdy

Localized macroinvertebrate populations can provide valuable insight to overall stream health. This is possible by quantifying diversity and abundance of organisms that have varying pollution tolerances. In order to assess the current biological health of Rice Creek, we conducted an eight-week

macroinvertebrate survey in summer 2012. We took samples from 14 sites along Rice Creek, and site scores were calculated based on the standardized scoring method found in GLEAS Procedure #51. Using data from a similar study conducted in 2002, we were able to empirically compare the present state of the stream to its state 10 years prior. Results indicate that invertebrate populations have remained stable over the last decade, both with respect to individual sites and to the creek overall.

Supported by: FURSCA—Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship (Plasman), FURSCA—Robson Family Fellowship (Ward), Biology Department



CASSANDRA WAUN, '13
Analysis of Glycolaldehyde After Simulated Terrestrial Impact Experiments

Faculty Sponsors: Vanessa McCaffrey, Nicolle Zellner
 Major: Biochemistry
 Hometown: Allen Park, Mich.

Detections of biologically-relevant compounds in molecular clouds have shown that organic molecules can form easily in space, with subsequent delivery to Earth, or other planets, by comets, meteorites, asteroids, and interplanetary dust particles. Over 200 of these molecules have been detected *in situ* by various investigators, and others have modeled how these materials are formed and incorporated into interstellar ice, grain mantles, and comets.

Glycolaldehyde (GLA) and dihydroxyacetone (DHA) are simple sugars that have been detected *in situ* and

in the Murchison and Murray meteorites. Experiments involving simulated terrestrial impacts were performed on GLA and DHA using the NASA Johnson Space Center flat plate accelerator. Results from analyses of impacted GLA and DHA in the presence of catalytically active Montmorillonite clay using gas chromatography-mass spectrometry will be presented. Subsequently, conclusions about the nature of reactions occurring under these conditions will be discussed.

Supported by: FURSCA, NASA Astrobiology Institute

CARL WEEDMAN, '14

(See Management Consulting Projects—Ericka's Wonderland)



BRIAN WEISS, '13 **Openness and Divergent Thinking: Testing Three Possible Mediators**

Faculty Sponsor: Andrew Christopher
Majors: Psychological Science, Philosophy
Hometown: Livonia, Mich.

This study sought to examine possible mediators of the relationship between openness and divergent thinking. Openness to experience is a preference to try new things and a disdain for routine. Divergent thinking is the ability to produce a variety of solutions to a problem. Recent research has demonstrated that openness to experience reliably predicts divergent thinking (e.g., Lin, Hsu, Chen, and Wang, 2011).

Given the well-established connection between openness to experience and divergent thinking, the present study sought to investigate possible mediators of this relationship. Specifically, we examined authoritarianism, need for cognition, and cognitive ability as potential mediators of the relationship between openness and divergent thinking. Students from one small college (N = 90) and one regional university (N = 58) completed measures of openness, need for cognition (the extent to which one enjoys thinking and deliberation), cognitive ability (the ability to solve problems quickly), and authoritarianism (a need for a rigid authority to preserve cultural norms). There was a positive correlation between openness to experience and divergent thinking. Additionally, there were correlations with all of the potential mediating variables and both openness and divergent thinking. Subsequent analyses examined if openness would still predict divergent thinking when controlling for the variation attributable to each of the mediating variables. A Sobel test revealed that need for cognition mediated the relationship between openness and divergent thinking.

Supported by: FURSCA

ZACHARY WELLS, '13

(See Genomics Education Partnership)



LAURA WENDT, '13 **Academic Burnout over the Course of a Collegiate Career: A Cross-Sectional Analysis of First-Year and Senior Students**

Faculty Sponsor: Andrew Christopher
Major: Psychological Science
Hometown: Sylvania, Ohio

Research about burnout has traditionally focused on occupational settings, but the study of burnout in college students has gone largely unexplored. To discover more about predictors of burnout in college



JESSICA WEILER, '13 **How Is Change in Knowledge and Attitudes toward Gay/Lesbian Parenting Affected by Presentation of Research Findings?**

Faculty Sponsor: Holger Elischberger
Majors: Biology, Psychological Science
Hometown: Matteson, Ill.

Despite the fact that research shows gay and lesbian couples to be just as competent as heterosexual parents, negative attitudes persist (Avery, 2007). Some people think that children will not develop properly without a traditional family including a mother and father. Lesbian women and gay men face prejudices from the legal standpoint especially when it comes to parenting and adoption (Camilleri and Ryan, 2007). Research has shown that information can change people's attitudes on a range of controversial issues. Also, a positive relationship between education and support for the rights of various out-groups has continued through time (Gibson and Tedin, 1988). Education may increase tolerance toward homosexuality and increase one's capacity to have compassion and tolerance for others who are different (Warshay, 1962). Therefore, the focus of the current research was whether teaching students about the key findings on gay and lesbian parents and their children will affect their knowledge, personal beliefs, and emotional reactions concerning the issue. In order to assess these questions participants were given educational materials on the research about gay and lesbian parenting in either a personal story version or textbook version. Since the present study also wanted to see if knowledge on the research had a lasting effect, a delayed assessment for knowledge, personal beliefs, and emotions was taken as well.

Supported by: FURSCA



students and how feelings associated with burnout change during a semester, the present study examined academic burnout (prolonged stress in an educational setting) as it evolves during college. Two groups, first-years and seniors, were examined in a cross-sectional, longitudinal study during a collegiate semester. Four variables were analyzed for their potential to predict burnout: role overload, self-efficacy, and two forms of perfectionism, functional and dysfunctional. A survey was administered to first-year and senior-year participants, once at the beginning of the semester and again toward the end, immediately before the final examination period.

Results of analyses of variance revealed that burnout increased significantly for both groups over the course of the semester, with seniors experiencing significantly higher levels of burnout at both points in time; first-year students became more cynical from the beginning to the end of the semester; and seniors' perceived levels of self-efficacy decreased over the semester. Furthermore, perceived role overload and self-efficacy contributed to participants' sentiments of academic burnout, whereas perfectionism did not. It appears that certain personal characteristics and situational factors predispose students to experiencing burnout. By addressing the trends that have become apparent throughout a collegiate career, researchers hope that students may be able to more effectively account for and manage future stressors.

LAURA WENDT, '13

(See Management Consulting Projects—In-School Marketing)

SARAH WOJCIK, '13

(See Management Consulting Projects—Mental Space Manager)

LOGAN WOODS, '14

(See Paxton Mueller, '15, Logan Woods, '14)



BRIAN WU, '14
Franz Liszt: Piano Concerto No. 1 in E-flat Major, S.124

Faculty Sponsor: David Abbott
 Majors: Music, Mathematics
 Hometown: Troy, Mich.

Franz Liszt (1811-1886) spent a long time writing the Piano Concerto No. 1 in E-flat major, S.124, which was completed in 1849. A famous and virtuosic concerto for piano and orchestra, it is different from concertos by Beethoven and Brahms, where the movements are played without a break in between. The orchestra sets up the main theme in the allegro maestoso section with a powerful motif, which Liszt meant to write, "This none of you understands." The piano plays a powerful octave passage before the main theme reoccurs with tranquility. Then, the piano introduces a second subject, where the clarinet and the piano have a rather serene duet before the main theme reoccurs. The strings set up the cantabile theme in the quasi-adagio section, and then the piano extends it further. The piano then builds up tension and reaches a climax before taking a chromatically descending scale. As the orchestra comes back in, the cellos play a dramatic theme with the piano answering quickly. After that, everything becomes calm, and as the tempo increases, the woodwinds play a new theme while the piano plays the trills, ending this section.

LAUREN WYSOCKI, '13

(See Albion/SDV Entrepreneurial Exchange: Business Plan Development: An International Partnership between the U.S.A. and France—World Wide Cardio)



ANDREW ZIMMER, '15
Crito Withholds His Best Cock

Faculty Sponsor: Jeremy Kirby
 Major: Philosophy
 Hometown: Orchard Lake, Mich.

Socrates, on his deathbed, uses his final minutes to deliver one last philosophical message. Comrades at his side, whilst death begins to run through his veins, Socrates denounces corporeal life with an argument for the immortality of the soul. His final words—"Crito, we owe a cock to Asclepius; make this offering to him and do not forget"—presuppose that the reasoning heretofore is sound. The idea that death is not the end of one's existence is no doubt enticing. I will, however, argue that Socrates' argument for this claim is not persuasive. Crito should withhold his best cock.



The Genomics Education Partnership team members included: (front row, left to right) Victoria Sochor, Emily Morlock; (second row) Thomas Strautz, Zach Wells, Allison McClish, Isaac Veysey-White, Brittney Stanton, Ken Saville, faculty; (not shown) Alyssa Kulczycki, Megan Moore

GENOMICS EDUCATION PARTNERSHIP

Comparative Genomics in *Drosophila*

Faculty Sponsor: Kenneth Saville

ALYSSA KULCZYCKI, '14

Major: Biology

Hometown: Clinton Township, Mich.

ALLISON MCCLISH, '15

Major: Biology

Hometown: Bronson, Mich.

MEGAN MOORE, '13

Majors: Biology, Chemistry

Hometown: Hillsdale, Mich.

EMILY MORLOCK, '15

Majors: Biology, Psychology

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VICTORIA SOCHOR, '15

Major: Biochemistry

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BRITTNEY STANTON, '14

Major: Biology

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THOMAS STRAUTZ, '13

Majors: Biology, Anthropology/Sociology

Hometown: Whitmore Lake, Mich.

ISAAC VEYSEY-WHITE, '13

Majors: Biology, Spanish

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ZACHARY WELLS, '13

Major: Economics and Management

Hometown: Novi, Mich.

A genome is the complete DNA sequence of an organism. Obtaining the complete genome sequence of an organism can be considered the ultimate genetic map, in the sense that once a genome is sequenced the heritable characteristics encoded within the DNA can be determined. However, simply determining the DNA sequence of a genome is only the first step in understanding the biology of the organism. The fields of genomics and bioinformatics use DNA sequencing and computer science methods to assemble and analyze the structure and function of genomes. Comparative analysis of genome sequences allows us to study conserved features (those shared by a common ancestor) preserved in contemporary genome sequences, helping to more fully understand the importance of specific genes.

In 2003 the first human genome was sequenced, as part of the Human Genome Project. Today, genomes of several other organisms have been sequenced including many of the common fruit fly family, *Drosophila*. The goal of this project is to investigate specific regions of various *Drosophila* genomes in order to be able to perform comparative genomic analyses. This project, administered by the Genomics Education Partnership (GEP) at Washington University in St. Louis, is centered around characteristics of a chromosome referred to as the "dot chromosome." This chromosome exhibits properties similar to that of heterochromatin, by remaining largely inactive in transcription, while maintaining the loosely bound appearance of euchromatin. Comparative analysis of several *Drosophila* species allows us to examine the characteristics, overall organization, and evolutionary changes within this unique type of chromosome.

Through a collaborative effort with the GEP, we are carrying out an annotation project describing the *Drosophila* dot chromosome as part of an advanced genetics lab course in the Biology Department. Genome annotation involves obtaining all the collective evidence to make gene models and attaching biological information to these elements. Through the GEP, we analyze raw DNA sequence through the use of bioinformatics programs to annotate genes and other features. Annotation was performed using online genomic databases such as BLAST, flybase, Gene Model Checker and Gene Record Finder, and a Genome Browser (available from the University of California, Santa Cruz). We started with easier genes to learn the tools involved and then progressed to more complex genomic regions.

The overall purpose of this study is to help complete the assembly of a genome by taking a large number of short DNA sequences and putting them back together to create a representation of the original chromosomes from which the DNA originated. We will compile our results with those of other undergraduate students across the country for a common database, which can be used for further comparative analyses of *Drosophila* genomes. A series of posters will be presented describing the results of this research.



MANAGEMENT CONSULTING PROJECTS

Faculty Sponsors: Vicki Baker, Emily Nolan

Mental Space Manager



Lauren Scott, Katie Meeth, Sarah Wojcik, Rachel Gates

RACHEL GATES, '13

Major: Sociology
Hometown: Shelby Township, Mich.

KATIE MEETH, '13

Major: Economics and Management (Accounting)
Hometown: Bay City, Mich.

LAUREN SCOTT, '13

Majors: Economics and Management,
Communication Studies
Hometown: Canton, Mich.

SARAH WOJCIK, '13

Major: Business Marketing and Management
Hometown: Northville, Mich.

The “Mental Space Manager” technology allows people to manage their time online and block websites which have a negative impact on productivity and emotional well-being. We are really looking to promote ways to create healthy relationships with technology and the Internet specifically. We are focused on equipping students with resources to help manage their time better while getting acclimated to college. We had these specific objectives:

- Create marketing strategies around product launch.
- Create a marketing campaign around “The Facebook Challenge.”
- Determine price points for product.
- Conduct outreach/research to colleges and employers on best ways to roll our product out to the market.
- Identify ways for students to spread the word on our product challenge.

Ericka’s Wonderland



Carl Weedman, Brad Melpolder, Mitchell Jeffery (not shown: Brian Fiorillo)

BRIAN FIORILLO, '14

Major: Economics and Management
Hometown: Southgate, Mich.

MITCHELL JEFFERY, '14

Major: Communication Studies
Hometown: Marshall, Mich.

BRAD MELPOLDER, '14

Major: Economics and Management
Hometown: Hamilton, Mich.

CARL WEEDMAN, '14

Major: Business and Organizations (International Management)

Hometown: Cincinnati, Ohio

Every Child Included, a Michigan nonprofit corporation, is set up to build and operate an ultra-inclusive wonderland (park/playground). The wonderland will include things like wheelchair-accessible miniature golf, a fishing wharf, riding stables, and much more. The Board of Directors is looking for assistance with completing the business plan that has been started, including all of the needed research, and a marketing plan to launch the fundraising initiatives for the \$20 million price tag.

In-School Marketing



Dorothy Cheng, Sophia Khan, Wangyili Huang, Laura Wendt

DOROTHY CHENG, '14

Major: Economics and Management
Hometown: Ann Arbor, Mich.

WANGYILI HUANG, '13

Majors: Economics and Management,
Psychological Science
Hometown: Wuhan, China

SOPHIA KHAN, '14

Major: Business Communications
Hometown: Canton, Mich.

LAURA WENDT, '13

Major: Psychological Science
Hometown: Toledo, Ohio

In conjunction with an area school, the Office of Marketing and Communications would like to establish in-school programming that would provide value (academic or recreational) to the area schools, yet at the same time raise awareness of Albion College. This project should not be limited to elementary school or high school, but involve students of all ages. It is preferred that the programming is created in a mobile format so it is able to be continued in other districts once proven successful.

Running Race Promotions



Jace Garcia, Sarah Morris, Tom Newvine, Kyle Formanczyk

KYLE FORMANCZYK, '15

Major: Communication Studies
Hometown: Macomb, Mich.

JACE GARCIA, '13

Major: Communication Studies
Hometown: Kentwood, Mich.

SARAH MORRIS, '13

Major: Economics and Management (Accounting)
Hometown: South Lyon, Mich.

TOM NEWVINE, '13

Major: Communication Studies
Hometown: Clio, Mich.

Running Race Promotions has a new website, www.race-find.com, designed to provide runners around the country with information on upcoming races based on their criteria. The site needs a business plan for growth and expansion, along with a detailed marketing plan to position it as the most complete and up-to-date listing of events in the nation. We had these specific objectives:

- Analyze competition strengths and weaknesses.
- Create a business and marketing plan for the next two years.
- Present ideas to make the website more intuitive and easy to use.



Torrance Learning



Peter Brunotte, Diana Schultz, Megan Prister, Christina Henry

PETER BRUNOTTE, '13

Major: Economics and Management
Hometown: Rochester Hills, Mich.

CHRISTINA HENRY, '13

Major: Anthropology
Hometown: Jackson, Mich.

MEGAN PRISTER, '13

Major: Business Communications
Hometown: Naperville, Ill.

DIANA SCHULTZ, '13

Major: Business Communications
Hometown: Kalamazoo, Mich.

The Torrance Learning consulting team addressed this challenge from the Torrance staff: We are all dressed up with no clear direction on where to go! In 2012, we took on 2800 square feet of fabulous, open, sunny space in our office building, in addition to what we actually need and use for day-to-day operations. At the time, we had a plan for using that space, but by the time we signed the lease and completed the build-out, we no longer had a need for it. Now we have an awesome, underused and rather expensive space . . . a rough concept for a workshop business line and/or renting it out . . . and we need an inspiring and actionable plan to make something fabulous happen. Our idea of an inspiring and actionable plan includes a vision, research on competitive offerings, research on potential customers, a pricing strategy, and an understanding of what we will operationally need to pull it off. Our idea of “something fabulous” includes alignment with our core business and our core values. Ideally, your solution will not only generate revenue in excess of its costs, but contribute to the marketing and sales of the core business.

ALBION/ ECOLE SUPERIEURE DE VENTE (SDV) ENTREPRENEURIAL EXCHANGE



The Albion/Ecole supérieure de Vente Entrepreneurial Exchange team members.

Faculty Sponsors: Vicki Baker (Economics and Management) and Annie Towhill (SDV)

We are pleased to announce the second international exchange of students from the Gerstacker Institute interested in international business paired with students from France to create an international and intercultural business plan. The Student Entrepreneurial Exchange (SEE) partnership, started in 2008 by founding institution ESCIA, brings together students from around the globe for the development of business plans and cultural exchange. We recently engaged with Ecole supérieure de Vente (SDV—a business school) located in Saint Germain en Laye near Paris. The goal was simple—create a partnership and student exchange for advanced students (juniors and seniors) around experiential learning opportunities dealing with entrepreneurship, innovation and change, and business plan development and implementation.

In fall 2012, eight Albion College students (juniors and seniors) and 16 SDV students were chosen to take part in the program. Participants, along with their advisors, spent one week in St. Germain, France (October 2012), during which time students worked in four teams developing business plans and market surveys, and creating a marketing strategy for their chosen venture. The business plans were required to address two of the three following criteria: B-2-B relationships, international emphasis, and/or technological aspects of business. Student teams were coached by French and American experts in business plan and marketing strategy topics, and at the end of the week students presented their preliminary business plans to peers and members of the SDV community. The French students will pay a visit to their American counterparts to put the final touches on the plan and to make a final presentation, including at the Isaac Student Research Symposium. Four business plans were developed and are described below.

SEE, a name coined by the students participating in the first seminar, is driven by values those students identified and defined: discover, create, share, and empower. The partnership provides a unique

opportunity to grow as an individual, a student, and an entrepreneur. The most valuable aspect of SEE is the opportunity to become familiar with cultures from around the globe and to make lasting friendships. The goal of the partners is to expand to include more schools from more regions around the world.

Supported by: The Gerstacker Institute for Business and Management, SDV, and Albion College alumni donors: Eric, '79, and Claudia Sweringen Bacon, '80; Frank and Margaret Touborg Klapperich, '57; Betsy Sue Burnham Shannon, '80, and Martin Shannon; and Mark Newell, '77.

Business Plan Development: An International Partnership between the U.S.A. and France—World Wide Cardio

ADAM COLLINS, '14

Major: Economics and Management
Hometown: Lakeland, Fla.

LAUREN WYSOCKI, '13

Major: Biology
Hometown: Northville, Mich.

THIBAUT ANDRE

Ecole supérieure de Vente
Major: Business

ROMAIN DUGAL

Ecole supérieure de Vente
Major: Business

NADEGE JAOUAHDOU

Ecole supérieure de Vente
Major: Business

DAMIEN LABASLE

Ecole supérieure de Vente
Major: Business

Have you ever wanted to travel to different cities around the world? Are you an avid runner or want to exercise more? Through a dual exchange program with the Sup de V in Saint Germain en Laye, France, our group designed a product to revolutionize your workout and travel experience. Our product allows our customers to run through the city of their choice and learn about different destinations through virtual technology. The product is not limited to the fitness industry, but could also be used in health care for therapy locations and by travel agencies for tourist information. The user will have a chance to see sights and learn valuable travel information without even stepping on a plane.

Business Plan Development: An International Partnership between the U.S.A. and France—SmartMart

DAVID BUDKA, '13

Major: Economics and Management
Hometown: Clinton Township, Mich.

TREVOR PETERSON, '13

Major: Biochemistry
Hometown: Grand Ledge, Mich.

ANNE-SOPHIE LAVRARD

Ecole supérieure de Vente
Major: Business

JULIE LE PERU

Ecole supérieure de Vente
Major: Business

ROMAN MOREAU

Ecole supérieure de Vente
Major: Business

ROMAIN TIMSIT

Ecole supérieure de Vente
Major: Business

The SmartMart project is designed with the intent of streamlining an individual's shopping experience at brick-and-mortar retail establishments. Studies of worldwide consumer behavior indicate there is a desire for additional, timely information relating to in-store products that is available on-demand. SmartMart is a mobile application that leverages the rapid development, continued success, and proliferation of smartphone technology to satisfy and expedite a consumer's need for real-time information regarding product availability and physical location within a store. Using the geolocation properties of smartphones, SmartMart is able to synchronize with retailer databases to provide efficient routes through stores to purchase all of the items located in one's shopping list, while also being informed of related sales and other items in which the consumer may be interested.



Business Plan Development: An International Partnership between the U.S.A. and France—The Swish: A Revolutionary Diaper Washing Machine

KIMMY LEVERENZ, '13

Major: Biochemistry
Hometown: Grosse Pointe Park, Mich.

RYAN MORETTI, '14

Major: Economics and Management
Hometown: Grosse Ile, Mich.

BENJAMIN BABIZ

Ecole supérieure de Vente
Major: Business

JULIE DOUALLE

Ecole supérieure de Vente
Major: Business

MAXIME FONTENEAU

Ecole supérieure de Vente
Major: Business

MARIE LY

Ecole supérieure de Vente
Major: Business

During the past eight months, our group has been working on designing a business plan for the Swish washing machine. The project began in August with a simple idea and has progressed into a completed business model. The Albion students travelled to France in October to continue work on the market survey and have been working with the students in France through e-mail conversations. The key features of this product include that the Swish is portable, ecologically friendly, easy to use, and has a major advantage economically. This opportunity has been extremely interesting and a great learning experience. It has definitely opened our eyes to the international business world.

Business Plan Development: An International Partnership between the U.S.A. and France—Premium Online Wines

TSIPORAH DAVIS, '14

Major: Communication Studies
Hometown: Macomb, Mich.

JARED MINOR, '14

Majors: German, Economics and Management
Hometown: Birmingham, Mich.

JORDANE BONAVENTURE

Ecole supérieure de Vente
Major: Business

FRANCK FERREIRA

Ecole supérieure de Vente
Major: Business

RAJ KANIAH

Ecole supérieure de Vente
Major: Business

Our project, Premium Online Wines, is an intermediary company which supplies U.S. restaurants, bars, retailers, and some individual consumers with high-quality French wine. Our goal is to simplify the international wine purchasing process by handling logistical issues for our suppliers and consumers. Some of the aspects that we handle include delivery, taxation, import and export regulations, etc. We help develop relationships between our suppliers and consumers as well as provide them with helpful information about French wine. Overall, we make the process of ordering and supplying wine more simple for all parties involved. We allow both sides of the supply chain to focus on what they do best, making wines or serving them to customers, while we handle the complex laws and transportation issues.

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.



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 now lives in Florida.

Reflecting Elkin Isaac’s lifelong interests in higher education and research, proceeds from the endowment have been used to bring a noted scholar or public figure to campus each year to speak and to visit with classes. In 1997, the lectureship was expanded and is now associated with Albion College’s annual Student Research Symposium, featuring presentations by students recommended by their faculty sponsors for outstanding independent study and research. The symposium now bears Isaac’s name.

The Isaac Endowment Committee

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

The Joseph S. Calvaruso Keynote Address Endowment

Joseph S. Calvaruso, ’78, and his wife, Donna, established an endowment fund in 2005 to support the annual Elkin R. Isaac Symposium keynote address. The keynote address now bears Calvaruso’s name.

An Albion native, he currently serves as executive director of the Gerald R. Ford Presidential Foundation in Grand Rapids. Before joining the foundation, he was senior vice president and director of risk management for Mercantile Bank in Grand Rapids.

Active in the Republican Party on the state and national levels, Calvaruso is a member of the Albion College Board of Trustees.

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

Past Isaac Symposium Speakers

Elkin R. Isaac Alumni Lecture

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

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)

The 2013 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)
Sarah Briggs (Communications Office)
E. Dale Kennedy (Biology/Brown Honors Program)
Lisa Lewis (Chemistry)
Ian MacInnes (English/FURSCA)
Anne McCauley (Art and Art History)
Michael Van Houten (Stockwell-Mudd Libraries)
John Woell (Academic Affairs)



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