



Albion College

2012 Elkin R. Isaac Student Research Symposium

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

Albion College | April 18-19, 2012

SCHEDULE OF EVENTS

Wednesday, April 18, 2012

7:30 p.m. **Elkin R. Isaac Alumni Lecture: Lawrence Schook, '72**
"Individualizing Health and Wellness: Navigating
Your Personal Journey"

Welcome: President Donna M. Randall
Speaker Introduction: Lisa B. Lewis, Professor of Chemistry
Towsley Lecture Hall/Norris Center 101

Reception immediately following the program
Mitchell Museum, Norris Center

Thursday, April 19, 2012

8:30-10:15 a.m. **Student Research Platform Presentations**

Forum #1 <i>Norris Center 100</i>	Forum #3 <i>Norris Center 102</i>
Forum #2 <i>Towsley Lecture Hall/ Norris Center 101</i>	Forum #4 <i>Norris Center 104</i>

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

1:15-4:15 p.m. **Student Research Platform Presentations**
See locations for morning sessions.

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

7 p.m. **Joseph S. Calvaruso Keynote Address: Laurie Garrett**
"The Man-Made Flu Debate: Putting the 'Public' Back
in Public Health"

Welcome: President Donna M. Randall
Speaker Introduction: Lyndsey A. Reynolds, '12
Towsley Lecture Hall/Norris 101

Reception immediately following the program
Mitchell Museum, Norris Center

Elkin R. Isaac Alumni Lecture



LAWRENCE SCHOOK, '72

As vice president for research and senior research officer for the University of Illinois, Lawrence Schook oversees an \$800-million annual sponsored research portfolio covering the university's three campuses. Additionally, he monitors the university's research-related concerns including intellectual property, technology commercialization, and economic development.

Schook is also an active researcher, exploring comparative genomics and translational biomedical models. He is the Edward William and Jane Marr Gutsell Professor in the Department of Animal Sciences on the Urbana campus. He also holds faculty affiliations with the Institute for Genomic Biology and the Beckman Institute for Advanced Science and Technology. He currently directs the international Swine Genome Sequencing Consortium and has served as principal investigator for over \$25-million in sponsored research from the National Institutes of Health, National Science Foundation, U.S. Department of Agriculture, and industry.

Schook has launched two start-up companies focusing on molecular medicine and has served on the boards of multiple biotechnology companies.

Schook earned a Ph.D. from Wayne State University School of Medicine, followed by postdoctoral training at the Institute for Clinical Immunology in Switzerland and the University of Michigan. He has also held faculty positions at the Medical College of Virginia and the University of Minnesota, and was a visiting professor at the Ludwig Cancer Center of the University of Lausanne.

He is a recipient of the Funk Award for Meritorious Achievements in Agriculture and the Pfizer Animal Health Award for Research Excellence, and he is an elected fellow of the American Association for the Advancement of Science. He has written more than 200 published works, edited six books, and is founding editor of *Animal Biotechnology*. Schook was named an Albion College Distinguished Alumnus in 1996.

Joseph S. Calvaruso Keynote Address



LAURIE GARRETT

Bestselling author Laurie Garrett is the only writer ever to have been awarded all three of the Big "Ps" of journalism: The Peabody, The Polk, and The Pulitzer. Turning that talent to international policy, Garrett is currently the senior fellow for global health at the Council on Foreign Relations in New York. In that capacity, she has reported on topics ranging from HIV and

other disease pandemics to global health challenges related to international financial crises. She has particular expertise in newly emerging and re-emerging diseases, bioterrorism, and the intersection of public health, foreign policy, and national security.

Garrett has written several popular and critically-acclaimed books, including *The Coming Plague: Newly Emerging Diseases in a World out of Balance*, *Betrayal of Trust: The Collapse of Global Public Health*, and *I Heard the Sirens Scream: How Americans Responded to the 9/11 and Anthrax Attacks*.

Garrett is a member of the National Association of Science Writers, and served as the organization's president during the 1990s. She currently serves on the advisory board for the Noguchi Prize, François-Xavier Bagnoud Center for Health and Human Rights, and the Health Worker Global Policy Advisory Group, and is a principal member of the Modernizing Foreign Assistance Network. Garrett also chairs the scientific advisory panel to the United Nations High Level Commission on HIV Prevention in collaboration with UNAIDS.

Garrett earned a degree in biology from the University of California, Santa Cruz and did graduate work at the University of California, Berkeley. While writing *The Coming Plague*, Garrett was a graduate fellow in Harvard's School of Public Health. She received an Alumni Achievement Award from the University of California and honorary doctorates from Georgetown University, Illinois Wesleyan University, and the University of Massachusetts, Lowell. In 2011 Garrett was named one of the "45 Greatest Alumni" of the University of California, Santa Cruz, on the 45th anniversary of the school's creation.



Student Presentation Schedule | Thursday, April 19, 2012

FORUM #1 – NORRIS 100

Morning Session	8:30	Anna Miller, Stephanie Sanders (Metz)	Uptake and Impacts of Silver Nanoparticles on <i>Brassica rapa</i>
	8:45	Patrick Underwood (Rohlman)	Activation of Protein Kinase G as a Possible Colon Cancer Therapy
	9:00	Taylor Harding (Saville)	Proteasome and Alpha-Synuclein Interaction in a <i>Drosophila</i> Model of Parkinson's Disease
	9:15	Jessica Koehler (Olapade)	Detection of <i>Escherichia coli</i> 's Beta-glucuronidase Gene from Environmental Samples Using Combinations of Conventional and Real-Time PCR Approaches
	9:30	Nicholas Lessnau (McCaffrey)	Substituent Effects on the Chemistry of Dioxovanadium(V) Complexes
	9:45	Emily Stephens (French)	Synthesis of Chiral Hypervalent Iodine Organocatalysts
	10:00	Jonathan Rennhack (Saville)	Analysis of Dominant Temperature-Sensitive Mutations in <i>Drosophila melanogaster</i>
Afternoon Session	1:15	Nicholas Herrman (McCaffrey)	Synthesis of Diformylated Substituted Phenols and Corresponding Copper and Vanadium Macrocyclic Complexes
	1:30	Kala Mapes (Kennedy, White)	Feeding Calls of House Wrens: Analyses of Call Features and Responses of Nestlings to Playback Experiments
	1:45	Holly Farris (Zellner)	Analyzing Hydrated Salt Solutions at the Phoenix Landing Site on Mars
	2:00	Lyndsey Reynolds (Metz)	Characterization and Optimization of Palladium Nanoparticles on Porous Polycarbonate Membranes as a Catalyst for the Suzuki Coupling Reaction
	2:15	Michael Dix (Metz)	Palladium Nanoparticles on Carbon Planchets as a Catalyst for the Suzuki Coupling Reaction
	2:30	Jeffrey Smith (Harris)	Palladium Nanoparticle Catalyzed Suzuki Reactions: The Effect of Variation in Phenylbromide Substitution
	2:45	Daniel Warshauer (Wilch)	Using Photogrammetry to Analyze Crevasse Morphology in the Juneau Icefield, Alaska
	3:00	Mark Hymes (T. Lincoln)	Nitrate in the Kalamazoo River: Sources and Temporal Variations
	3:15	Kenneth Gibbons (T. Lincoln)	Ground Water-Surface Water Interaction in the Kalamazoo River
	3:30	Monica Davis (Lyons-Sobaski)	The Effect of Microwaves on Plant Germination, Growth, and Reproduction
	3:45	Rebecca Cotteleer (Skean)	Comparison of <i>Calycoconium glabratum</i> and <i>C. rhamnoides</i> (Melastomataceae) on Jamaica
4:00	Courtney Pickworth (Rabquer)	The Role of the Soluble JAM Family of Molecules in Angiogenesis	

FORUM #2 – TOWSLEY LECTURE HALL/NORRIS 101

Morning Session	8:30	Jason Martin (Wickre)	The Threat of "Vice and Folly" in Eighteenth-Century British Satire: The Effeminate Macaroni and the Emergence of a New Masculine Ideal
	8:45	Maria Smith (Dick)	Depictions of Women in American Silent Film: The Influence of Professional Women in Early American Cinema
	9:00	Abbey Jensen (McIlhagga)	Building a Curriculum Framework for Performing Ensembles
	9:15	Lucas Florin (Ball)	Choreographing Beethoven: Conducting the Odd-Numbered Symphonies
	9:30	Gabriella Vezzosi (Wickre)	Native American Artwork: A Glimpse of Acoma Pottery
	9:45	Rebekah Kroesing (Ball, Benner)	"Oh! Quante volte" from <i>I Capuleti e I Montecchi</i> by Vincenzo Bellini and "Chacun le sait" from <i>La fille du régiment</i> by Gaetano Donizetti
	10:00	Jason Martin (Wickre)	"Scarcely Understood by the Minds of Men": Indications of Same-Sex Desire in Michelangelo's Words and Art

Afternoon Session	1:15	Ashley Hull (Brown)	“Tethered: Short Stories”
	1:30	Nathan Masserang (Mesa)	“Suburbane”: A Collection of Poetry
	1:45	Emily Thomson (MacInnes)	Women and Liturgical Drama
	2:00	Emily Hopkins (Mesa)	“Sphygmomanometer”: Poems
	2:15	Elizabeth Heimler (Roberts)	“Between the Stitches”: Stories of Knitting Design
	2:30	Michelle Valentine (Henke)	British Romanticism through Lord Byron and Felicia Hemans
	2:45	Audrey Huggett (Lockyer)	Violent Motherhood as a Recognition of Humanity in Toni Morrison’s Novels
	3:00	Calvin Walds (Dixon)	James Baldwin, Ralph Ellison, and the “Negro’s” Humanity in Twentieth-Century American Literature
	3:15	Chelsea Marsh (Kirby)	The Nature of Music: A Philosophical Analysis
	3:30	Michael Albani (Dick)	“Truly a Crime”: A Novel

FORUM #3 – NORRIS 102

Morning Session	8:30	Cari Drolet (Hill)	Victim Blaming Increases When Sexual Assault Cases Do Not Go to Trial
	8:45	Courtney Pickworth (Keyes)	Philosophies and Success Rates of Anorexia Nervosa Treatment: A Pilot Study
	9:00	Ryan Walker (Wieth)	The Effects of Friendship Level on the Use of the Anchoring Heuristic: Whom Do You Trust?
	9:15	Brian Weiss (Hill)	Moms, Dads, Religion, and Cognition: Authoritarian Parenting Predicts Religious Fundamentalism and Cognitive Style
	9:30	Nicole Ferrara (Wilson)	Escape and Avoidance Learning in the Earthworm
9:45	Alice Coyne (Melzer)	“What Do You Do?” How Unemployed Men and Stay-at-Home Dads Respond to Not Being Breadwinners	
Afternoon Session	1:15	Jessica Berndt (Thiels)	Sex, Blood, and the Living Dead: Sexuality and Vampire Folklore
	1:30	Lauren Roberts (Melzer)	Challenging Binaries: Processing Intersex Identities
	1:45	Katie Broekema (Erlandson)	A Media Content Analysis of Newspaper Coverage of Cystic Fibrosis and Sickle Cell Anemia
	2:00	Courtney Flook (Henke)	An Alternative English Curriculum: Reflecting on Pedagogy and Student-Centered Learning in Semiotic Instruction
	2:15	Heather Nobert (Skean)	A Survey of Parkage Trees in Selected Albion Neighborhoods
	2:30	Carly Colombo (Grossman)	State and Society in Global Perspective: The Case of South Sudan
	2:45	Katie Kirsch (Yewah)	Globalization and Its Discontent: The Case of Batchingou, Cameroon
	3:00	Pryce Hadley (Dick)	Prospects for Sustainable Development in Suriname
	3:15	Sandra Nahra (Kanter)	Marketing to Second-Generation U.S. Latinos: How Culture Impacts Perception

FORUM #4 – NORRIS 104

Morning Session	8:30	Mark Balle, Aaron Croad, Jenna Laur, Adélie Noël, Hamza Oufighou, Thomas Vasnier (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—AirMid
	8:45	Caroline Dobbins, Alex Pierson, Nouara Chemaa, Antoine Corré, Nicolas Lavialle, Benoît Smetko (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—Car Care

(continued on next page)



FORUM #4 (CONTINUED) – NORRIS 104

Morning Session	9:00	Nicole Ferrara, Lauren Levy, Patrick Marques, Boubakar Toure, Bénédicte Vandenbergue, Nadia Zerouali (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—Robot Fish
	9:15	Natalie Hewitt, Amber Myers, Valère Cretaz, Priscilla Moreira, Charles Nastorg, Jean-Philippe Rocher (Baker, Towhill)	Business Plan Development: An International Partnership between the U.S.A. and France—E-Walk
	9:30	Jacob Engel (Bollman)	Spider Craps: Simulation and Statistical Analysis of Casino Game Variations
	9:45	Sophia Potoczak (Mason)	A Probabilistic Model of Large Woody Debris Movement and Distribution in Small Mountain Streams
	10:00	Aaron Croad (Mason, Christiansen)	Optimal Repayment of Student Loans: The Effect of Interest Rates and an Individual's Time Preference
Afternoon Session	1:15	Chelsea Denault (Dick)	"History is Bunk": Henry Ford and Greenfield Village
	1:30	Chloe Collins (Dick, Cocks)	American Housewives and Prescription Drugs, the 1950s and 1960s
	1:45	Heather de Bari (Cocks)	A Comparative Analysis of Soviet Military Strategy in the Siege of Leningrad and the Battle of Stalingrad, 1941-1944
	2:00	Justin DeHondt (Hagerman)	The Visigothic Kingdom of Toulouse: Conflict and Cooperation with the Roman Empire
	2:15	Salaina Catalano (Dick)	The Greatest Generation: The Life of Fran Klix Huegli
	2:30	Chris Blaker (Dick)	The Greatest Generation: Eugene Yehl, from Milwaukee to Iwo Jima and Back
2:45	Casey Monahan (Hagerman)	Spy Fever and British Counter-Espionage Action during the Great War	

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

Erica Bennett, Casey Waun (Zellner, McCaffrey)	Chemistry of Glycolaldehyde and Dihydroxyacetone after High Velocity Impacts: Initial Experiments and Results
Caitlin Bolick (Rohlman)	Transcription Optimization of <i>Anabaena</i> Group I RNA Ribozymes
Xinya Dai, Justin Fragnoli, Heather Rausch, Victoria Slater (Hogg)	Google Online Marketing Challenge
Ryan Dolan, Troy Ferrio, Ben Iwen, Niki Torskiy (Hogg)	Google Online Marketing Challenge
Thomas Fontana (Bartels)	Eocene Turtles from the Distal Deposits of the Cathedral Bluffs Tongue (Wasatch Formation), Red Desert, Wyoming
Aaron Hiday, Abigail Williams (Wilch, T. Lincoln)	Assessment of Diel Cycling in Agricultural Streams in South-Central Michigan—A Focus on Turbidity
Sam Jabara, Tom Newvine, Alex Pierson (Hogg)	Google Online Marketing Challenge
John Jacisin (Bartels)	Fossil Reptiles from the Late Early Eocene (Wasatchian, Lostcabinian) of the Red Desert, Wyoming
Geoffrey Knight (Hill)	Managing Uncertainty: Preference for Predictability and the Relationship between Religiosity and Prejudice
Zachary Kribs (Christopher)	Personality Differences in Time of Day Preference
Nicholas Long (McCaffrey)	Comparative Analysis of Volatile Organic Compounds in Opened Wine
Alyssa Olson (Wilch)	Reconstruction of 200 Years of Anthropogenic Influences on the Upper Kalamazoo River and Rice Creek
Kaitlyn Pospiech (T. Lincoln)	An Investigation of the Behavior of Phosphate in a Surface Water System
Brandon Sams (French)	Synthesis of a C ₂ -Symmetric Chiral Aryl Iodine Organocatalyst
Joshua Sams (Bartels)	A GIS Analysis of the Density Distribution of Epizoans on <i>Mucrospirifer thedfordensis</i> (Brachiopoda, Spiriferida) from the Middle Devonian of Ontario
Carl Wharam (B. Moss)	Progressive Resistance Training in Older Adults

Abstracts of Student Presentations



MICHAEL ALBANI, '13 **"Truly a Crime": A Novel**

Faculty Sponsor: Wesley Dick
Majors: History, English (Creative Writing)
Hometown: Roseville, Mich.

In the United States, coal-fired power plants produce more than half our total electricity which makes coal an integral component

of American life. However, many Americans are unaware that one of the most predominant methods of extracting coal is through a mining technique known as mountaintop removal. This technique involves razing a mountain's foliage and blasting it open for the rich coal seams that lie beneath. It is most prevalent in states bordering the Appalachian Mountains such as Pennsylvania and West Virginia.

In writing *Truly a Crime*, my goal was to articulate not only the environmental, but also the human impacts of mountaintop removal on Appalachia, one of the poorest and most underrepresented regions in the nation. My novel follows several characters ranging from a group of media-labeled "eco-terrorists" to an environmental activist leader to a Pennsylvania coal miner struggling to reconcile his loyalty to his fellow miners and the UMWA with his daughter's decision to protest the actions of the coal company he works for. All plots converge at a mountaintop removal site in the fictional town of Hartford Hollow, West Virginia. My sincerest hope is that this novel will have the power to shock, inspire, and ultimately educate all those who do not know just how much goes into the simple gesture of flipping on a light switch.

MARK BALLE, '13

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

ERICA BENNETT, '13

(See Casey Waun, '13, Erica Bennett, '13)



JESSICA BERNDT, '12 **Sex, Blood, and the Living Dead: Sexuality and Vampire Folklore**

Faculty Sponsor: John Thiels
Majors: Anthropology, History
Hometown: Grand Haven, Mich.

In her book *Natural Symbols*, anthropologist Mary Douglas discusses the importance of the body as universally symbolic. Blood, being more than just a bodily fluid, has symbolic meaning that ranges from life force, to familial connections, eroticism, etc., as well as its symbolic influence on social life. This

concept has particular relevance when observing lore of the many beasts on the spectrum of folklore that hosts vampires, and the transition in understanding them throughout history. Vampires are a small contingency in a larger spectrum of blood-drinking, life-stealing, disease-filled beings in folklore around the world. I will be focusing on the transition from fear-inciting, historical vampirism to the present-day romanticized and sexualized vampire in pop culture. I will also be examining the transformation of bloody, eroticized villains, and their immortalization in history through their rebirth in stories as vampires. Three such cases to be discussed are that of Elizabeth Bathory, the "Blood Countess" of Hungary, whose case is from the early 1600s; Peter Kurten, "Vampire of Düsseldorf," 1883-1931; and Kuno Hoffman, otherwise known as the "Vampire of Nuremberg," from 1972.



CHRIS BLAKER, '14 **The Greatest Generation: Eugene Yehl, from Milwaukee to Iwo Jima and Back**

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

Tom Brokaw has characterized the generation that grew up in the Great

Depression of the 1930s and fought against Germany and Japan during the Second World War as the "greatest generation." Ken Burns, documentary filmmaker, recently was spurred to do a series on World War II because a woeful number of high school students "think we fought *with* the Germans *against* the Russians in the Second World War." The lack of historical literacy in America has been depicted in the phrase: "the United States of amnesia." To counter this trend and to make certain that the memories of the "greatest generation" are not lost, veterans' stories need to be collected.

At last year's Isaac Student Research Symposium, I presented the war stories of my own grandfather, a U.S. Marine fighting in the Pacific Theater. This year, I will be retelling the story of Eugene Yehl, a Marine sergeant who participated in the Battle of Iwo Jima, the bloodiest battle of the Pacific War. Born in January 1924, Yehl grew up in Milwaukee during the Great Depression. When the Japanese attacked Pearl Harbor on December 7, 1941, he immediately enlisted in the Marines. He was made a sergeant by the following year, and served as both a tank commander and an artilleryman in the 5th Marine Division. When he landed at Iwo Jima on February 19, 1945, he was thrown into a kind of hell one can only experience in total war. "It was a massacre," Yehl noted, reflecting on how many American men were killed in just the first few days of the battle.



Yehl never complained about his time in the war, nor has he regretted serving in the Marine Corps. He had enlisted, and had dedicated himself to serving his country. After Iwo Jima was secured, Yehl went on to serve in the early occupation of Japan, eventually returning home to Milwaukee in late 1945. The things he learned during the war far surpassed what he had discovered about himself growing up, and he went on to earn an electrical engineering degree at the University of Wisconsin on the GI Bill, eventually settling in Jackson, Michigan.

This study reminds us of how much one can learn about America and the war through the case study of one Midwestern man. It is also a way of saying “thank you” to Eugene Yehl, and to the “greatest generation.”



KATIE BROEKEMA, '12
A Media Content Analysis of Newspaper Coverage of Cystic Fibrosis and Sickle Cell Anemia

Faculty Sponsor: Karen Erlandson
 Majors: Communication, Computer Science
 Hometown: Schoolcraft, Mich.

Media portrayals influence the way we frame our understanding of many social phenomena. Although the media do not control our opinions, they do control what we think about. Recently, there has been a shift in the health communication field toward examining how the media portray different diseases. The current study takes a critical stance in examining the portrayal of two diseases: cystic fibrosis and sickle cell anemia. These diseases each affect a different population, and therefore there is room for a critical perspective to be taken. Cystic fibrosis mainly affects people of Northern European descent, and sickle cell anemia mainly affects people of African descent. The research presented is a content analysis of four newspapers' coverage of cystic fibrosis and sickle cell anemia. It established there is a disparity in both the amount of coverage and the content of coverage between these two diseases. The results are discussed in the framework of critical theory.



CAITLIN BOLICK, '12
Transcription Optimization of *Anabaena* Group I RNA Ribozymes

Faculty Sponsor: Christopher Rohlman
 Major: Music
 Hometown: Adrian, Mich.

My research is focused on *Anabaena* Group I introns, which are used as a model

to study self-splicing ribozymes. RNA is no longer viewed solely as an intermediate in protein synthesis; there are some RNA molecules that are not translated into proteins but have other functional properties. The discovery of this non-coding RNA has fueled research on ribonucleic acid enzymes called ribozymes. The introns of interest are formed when sections of the RNA sequence are cut out by the ribozyme during the formation of mature mRNA. Understanding the structure and folding patterns within these specific introns is critical to many other techniques. In order to study these properties, DNA must be transcribed into RNA for analysis. *In vitro* transcription is carried out using isolated and purified DNA. Bacteriophage RNA polymerase, a buffer system, and ribonucleotide triphosphates are combined in the lab with the DNA template, which must contain a promoter sequence to recognize the RNA polymerase. Modifying different factors of this process such as time, temperature, and concentration of these components can influence the yield of RNA. Fluorescently tagged substrates allow the specific effects of these variables to be described and compared using a genetic analyzer. Ultimately, obtaining the optimum conditions for transcription provides a guideline for a greater yield of RNA and will be valuable for future research on *Anabaena* Group I ribozyme characteristics and splicing mechanisms.

Supported by: FURSCA



SALAINA CATALANO, '14
The Greatest Generation: The Life of Fran Klix Huegli

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

From a young age, Americans are taught about the heroes of World War II who fought in such epic battles as D-Day, Okinawa, and Iwo Jima. These stories come from history books, Hollywood films, and even veterans themselves. A smaller section in the history books relates to the home front during World War II. We know about the symbol of Rosie the Riveter and the rations and Victory Gardens. But what about the ordinary people who may have not been out buying war bonds on the village green? What about the young mothers whose husbands were somewhere in the South Pacific? This is the life of Fran Klix Huegli: a woman who came of age during the Great Depression and started her family right before Pearl Harbor. What was it like to raise a child, while waiting for your husband to come home from the war? In her own words, Huegli describes that experience and more. Her life during the war was representative of the ordinary people whose stories have often been ignored. World War II was a testing time for those on the home front as well as for those who fought overseas.



CHLOE COLLINS, '12
American Housewives and Prescription Drugs, the 1950s and 1960s

Faculty Sponsors: Wesley Dick,
 Geoffrey Cocks
 Majors: History, Anthropology
 Hometown: Harrison Township, Mich.

The use and abuse of pharmaceutical drugs in the domestic sphere have a long history in the United States, specifically with regard to women. During the middle of the twentieth century, women were socially trapped and unable to express their desires outside of the home. Women became increasingly unhappy about their male-defined social roles, and they were encouraged to think there was something fundamentally wrong with them. These women turned to trusted medical professionals for help. However, this help came in the shape of a pill. The pharmaceutical boom that came about during the mid-twentieth century was fueled, in part, by the effects of women's subjugation in American society. Doctors were encouraged to prescribe tranquilizers, sleeping pills, and diet pills, which today we use as behavioral modification drugs, such as Ritalin. This flood of pharmaceuticals into middle class America has had lasting effects and continues to be a problem. Motherhood was redefined through the use of pharmaceutical drugs, and America has still not recovered from its obsession with the "miracle pill."



CARLY COLOMBO, '12
**State and Society in Global Perspective:
 The Case of South Sudan**

Faculty Sponsor: Andrew Grossman
 Major: Political Science
 Hometown: Auburn Hills, Mich.

South Sudan is the world's newest nation, and, as we all know, it is located in a very unstable region of Africa. As a result, my essay argues that much more international effort is required for South Sudan to survive as an independent and successful nation. Due to the geo-strategic location of South Sudan, there is a vital interest on humanitarian grounds, as well as economic and strategic grounds, that South Sudan have the opportunity to grow as a free and independent nation state. My paper proposes how this process might take place and why I argue it is so important that the international community pay more attention to this potentially vibrant new nation.



REBECCA COTTELEER, '12
**Comparison of *Calycogonium glabratum*
 and *C. rhamnoides* (Melastomataceae)
 on Jamaica**

Faculty Sponsor: Dan Skean
 Major: Biology
 Hometown: Antioch, Ill.

Calycogonium DC. is a polyphyletic genus of ca. 40 named species of shrubs and small trees endemic to the Greater Antillean islands of Cuba, Hispaniola, and Jamaica. *Calycogonium glabratum* (Sw.) DC. and *C. rhamnoides* Naud. are the only two species of the genus reported from Jamaica. They belong to a clade defined by having a calyptra on the flower buds, mite domatia on the leaves, and relatively few hairs. The two species are very similar in appearance, poorly collected, and often confused by botanists. The purpose of this study was to compare the morphology, phenology, geographic distributions, and habitats of these species on Jamaica, as part of a larger study of the genus. Fieldwork was conducted in January 2011. Data from herbarium specimens and field observations were compiled to write a detailed description of each species. Leaf lengths, leaf widths, and petiole lengths of *C. glabratum* were significantly greater than those of *C. rhamnoides*. Both species are reported to occur on Cuba. A comparison of nrITS genes of *C. glabratum* from Jamaica (where it was originally described) and Cuba supports the hypothesis that this species occurs on both islands. The results of my study can be used to more accurately identify these species on Jamaica.

Supported by: National Science Foundation, DEB-0515636



ALICE COYNE, '13
**"What Do You Do?" How Unemployed Men
 and Stay-at-Home Dads Respond to Not
 Being Breadwinners**

Faculty Sponsor: Scott Melzer
 Major: Psychological Science
 Hometown: Cedarville, Mich.

The current paper examines men who either choose to leave or are forced out of the paid labor force, focusing on how they and their family are affected by men's loss of breadwinner identity. Men who do not measure up on this characteristic often experience many psychological consequences, leading some men to compensate by reasserting their masculinity elsewhere, or alternatively, redefining what it means to be a man. We use a modified grounded theory method (Glaser and Straus 1967; Charmaz 2006) to analyze data collected via open-ended interviews with a diverse sample of men, as well as supplementary documents (e.g., weblogs, diaries). Preliminary findings suggest that (a) men's experiences with and feelings of control, (b) support networks, and (c) family finances are key influences in how men



respond to not doing paid work. More than those who planned to leave their work, men who were forced out of their jobs struggled with the transition. Their sense of control, identity, and self-worth became diminished, which led to attempts to control other parts of their lives, deeper depression, weight gain, anger, and more conflict with their families. Men also struggled when they withdrew and/or lacked social support. Both groups struggled more when the family finances were unstable, feeling more guilt and responsibility for not being breadwinners. Another commonality is redefining manhood to recognize other ways they contribute to their families and communities. These findings suggest that, although some men, who receive strong support, broaden their definition of manhood beyond being a breadwinner, it remains a key characteristic of men's identities.

Supported by: FURSCA

AARON CROAD, '12

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

XINYA DAI, '14

(See Google Online Marketing Challenge)



MONICA DAVIS, '12

The Effect of Microwaves on Plant Germination, Growth, and Reproduction

Faculty Sponsor: Sheila Lyons-Sobaski
Majors: Biology, Psychological Science
Hometown: Bay City, Mich.

Microwaves can cause cellular damage. Some research has specifically focused on

how this type of radiation affects plant growth and reproduction. This study focuses on how microwaves affect plant germination, growth, and reproductive strength of fast cycling *Brassica* plants. If increasing doses of microwave radiation negatively impact plant growth and reproduction, then plants exposed to longer periods of microwave exposure will have higher mortality rates, have fewer viable offspring, and will be shorter and have lower overall biomass than those with less exposure. The experimental procedures were carried out using 40 Wisconsin Fast Plants (*Brassica rapa*) in each of four groups. The groups of plants were exposed to microwave radiation for varying lengths of time: 0 (control), 5, 10, and 15 seconds. Measurements of individual plant height and flower number were taken twice per week for 40 days following planting. Biomass measurements and number of seeds produced were recorded at the end of the experiment. The seeds from this first generation were planted to check for viability. A one-way ANOVA indicated no significant differences between number of flowers, final height, biomass, and number of seeds over all treatments. Regression analysis indicated significant differences among groups in survival after treatment. Thus, the amount of microwave radiation had a negative impact on survival following increased exposure to microwave radiation. Plants that survived the treatment did not appear to be negatively impacted based on the growth and reproductive variables measured.

Supported by: Biology Department



AARON CROAD, '12

Optimal Repayment of Student Loans: The Effect of Interest Rates and an Individual's Time Preference

Faculty Sponsors: Darren Mason, Daniel Christiansen
Majors: Mathematics, Economics
Hometown: Novi, Mich.

We consider a nonlinear optimization problem that models student loan obligations with the goal of determining an optimal repayment schedule, where optimality is defined in this work by the achievement of two distinct financial goals: minimization of the discounted sum of interest payments for a collection of loans over the length of the loan and maximization of the discounted sum of individual utility over the length of the loan. Deterministic models are considered. Real-world financial constraints corresponding to minimum repayment requirements and borrower income are implemented to reflect the responsibilities of both the individual and the lender. Karush-Kuhn-Tucker Theory is used to solve the deterministic optimization problem. For the minimization problem, we find that the optimal repayment schedule depends on the relationship between loan interest rates and the alternative rate of return, such as an individual's return on assets. For the maximization problem, optimality depends on the relationship between loan interest rates and how the individual places value on money received in the present versus the future, meaning the individual's subjective rate of time preference. Possible economic applications are discussed.



HEATHER DE BARI, '12
A Comparative Analysis of Soviet Military Strategy in the Siege of Leningrad and the Battle of Stalingrad, 1941-1944

Faculty Sponsor: Geoffrey Cocks
 Major: History
 Hometown: Saginaw, Mich.

When the Germans invaded the Soviet Union on June 22, 1941, the Soviet Red Army reacted with almost complete shock and almost no preparations for war. The three-pronged German attack, code-named Operation Barbarossa, targeted the cities of Leningrad in the north, Moscow in the center, and the oil fields in the south. The Germans surrounded Leningrad and began a siege of the city in September 1941. As a result, the city leaders had not only to defend the city but to maintain a civilian population facing starvation. Since the Soviet army had been unprepared for the ferocity of the German attack, military strategy in the initial months of war, especially at Leningrad, emphasized defense with the hope of halting the German advance toward Moscow. Over a year later, Soviet and German forces collided in the city of Stalingrad after a German defeat at Moscow. The Battle of Stalingrad marked a turning point in the war for Stalin and the Red Army because of the shift from defensive warfare to "urban warfare," or warfare among the ruins of the city. My paper analyzes the strengths and weaknesses of Soviet military strategy at Leningrad and Stalingrad, notably the differences of strategy in defending the two cities and how the change of strategy from Leningrad to Stalingrad helped pave the way for final Soviet victory in 1945.

southern France and Spain. Specifically, relations between the Visigoths and the Romans have been examined to find out exactly how accommodating and/or violent they actually were. Rather than affirm previous overgeneralizations of a complex period, this study points out how and why some Visigoths and Romans cooperated while others fought. The ultimate tendency revealed is that, while the Visigoths almost always had a tense, hostile relationship with the empire itself, their treatment of the provincial Romans living under them was markedly more congenial. Their actions were motivated primarily by the desire of the Visigoths to expand and consolidate their kingdom rather than any desire to either preserve or destroy Roman culture for its own sake.

Supported by: FURSCA



CHELSEA DENAULT, '12
"History is Bunk": Henry Ford and Greenfield Village

Faculty Sponsor: Wesley Dick
 Major: History
 Hometown: Clinton Township, Mich.

In 1929, Henry Ford, one of American history's most complex figures, created Greenfield Village with the intention of "reproducing American life as lived" through hands-on demonstrations, in order for people to gain "a better and truer impression" of the past. In this project, I first investigated the origins of Greenfield Village as a wholly educational venture, which included the support of seven on-site schools. During this time, Greenfield Village was a school first and a museum second.

However, as American culture became increasingly consumerist following World War II, the museum experience across the nation was no longer simply educational. Rather, viewers were transformed into customers who had choices regarding how they would spend their money. In this way, the museum was forced to compete in the market with other possible pastimes, resulting in a push to make history more entertaining and engaging for people. However, an entertaining history does not necessarily result in a wholly accurate or complete history.

With this in mind, I examined the Main Street section of Greenfield Village, focusing on how it presents American history to the average viewer. Overall, the organization of this section of the village presents complications to the viewer that can lead them to arrive at erroneous conclusions about American history. However, interactive museums, such as Greenfield Village, are generally beneficial to advancing museum culture in that they attract viewers who ordinarily would not be interested in history. Though this project focuses specifically on Greenfield Village, the issues discussed are applicable to how we present history in museums across the country.



JUSTIN DEHONDT, '12
The Visigothic Kingdom of Toulouse: Conflict and Cooperation with the Roman Empire

Faculty Sponsor: Christopher Hagerman
 Major: History
 Hometown: Berkley, Mich.

The years surrounding the end of the Western Roman Empire in 476 CE and the rise of its barbarian successor kingdoms are hotly debated. Typically, this era has been seen as a violent, unstable time that saw hordes of fur-clad barbarians invading the empire and destroying civilization. In recent decades, scholars have challenged this picture and replaced it with one that emphasizes ways in which Romans and barbarians accommodated one another and brought about the relatively peaceful transition from the ancient to the medieval world. Despite this paradigm shift, many historians still maintain the view of a violent collapse, and it thus remains uncertain which is the proper interpretation. This study focuses on one of the successor kingdoms, the Visigothic kingdom of Toulouse, which began while the Roman Empire still existed and came to control much of



MICHAEL DIX, '15
**Palladium Nanoparticles on Carbon
Planchets as a Catalyst for the Suzuki
Coupling Reaction**

Faculty Sponsor: Kevin Metz
Majors: Biochemistry, Psychological
Science
Hometown: Rockford, Mich.

The Suzuki reaction is a metal-catalyzed reaction which synthesizes a carbon-carbon bond. This reaction is of significant interest, particularly for industrial applications, because it can be run at room temperature in aqueous media. One difficulty with the Suzuki reaction is the recovery of the metal catalyst. The Suzuki reaction has been catalyzed with soluble catalysts as well as metal nanoparticles. Metal nanoparticles are good catalysts for the Suzuki reaction because they facilitate removal of the catalysts from solution. This allows for better recovery and reuse of the catalyst, which is important when dealing with expensive metals such as palladium. In this study, we are investigating the effectiveness of supported palladium nanoparticles fabricated on top of graphite planchets in catalyzing the Suzuki reaction. Initial testing showed that Suzuki reactions run for short time periods, e.g., two hours, had comparable yields to literature values for Pd/C from longer experiments. Characterization of the nanoparticle-planchet system, catalyst reusability, and results from time and temperature studies will be presented. The effects of treating planchets with UV/Ozone both before and after plating will also be investigated in the same manner.

CAROLINE DOBBINS, '12

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

RYAN DOLAN, '12

(See Google Online Marketing Challenge)



CARI DROLET, '12
**Victim Blaming Increases When Sexual
Assault Cases Do Not Go to Trial**

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

Prosecutors are responsible for deciding if rape cases go to trial, and these decisions are often heavily influenced by victim stereotypes (Frohmann, 1991). This may explain the low rates of prosecution in rape cases (Daly & Bouhours, 2009). These low rates may reinforce victim blaming, consistent with findings that reactions of an individual's peers influence the likelihood that they too will victim blame (Brown & Testa, 2007) and that opinions of authority figures strongly influence decision-making (Cialdini & Goldstein, 2003). These findings suggest that prosecutorial case rejection can reinforce rape myths and promote victim blaming. We hypothesized that participants would be more likely to blame the victim in a case that does not go to trial and that participant gender would moderate this effect. A pilot study was run, followed by two additional experiments. In each experiment, participants were asked to read one of two scenarios that ended in either the prosecutor accepting or rejecting a rape case for trial. Participants then responded to scales measuring victim blame and victim causality, as well as other general attitude measures (e.g., attitudes toward rape victims). Overall, results from the pilot study indicated that lack of prosecution in rape cases increased victim blaming and general negativity toward rape victims. This supports previous research indicating that people react to injustice in ways that protect their just world beliefs (Gaucher et al., 2010). Results from the first experiment did not replicate the pilot results, so a second experiment was conducted to better understand the inconsistency.

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



JACOB ENGEL, '13
**Spider Craps: Simulation and Statistical
Analysis of Casino Game Variations**

Faculty Sponsor: Mark Bollman
Majors: Computer Science, Mathematics
Hometown: Warren, Mich.

Games of chance have been part of culture for many groups of people for over thousands of years. The game of craps was created originally as an Old English game called hazard. Later, French gamblers slightly altered the game and brought it to New Orleans where it began to develop into the popular game played around the world today. Today, there are many different table games and machines with variations of the like, so it is more difficult to introduce a successful new game. However, one of the most recent casino game patents, for Caribbean stud

poker, was sold to a company named Mikohn for over \$30 million. The purpose of this research is to create a slight variation to the original craps by introducing eight-sided dice in order to gain a better knowledge of the practical applications of mathematics and computer science, and to possibly produce a patent. Coding and compiling in Java (by Sun Microsystems) were used to create a trial-based simulation program. Numerical probabilities were recorded using the results of this program. When considering the resulting probabilities, it was found that the eight-sided dice variation (named "Spider Craps") employed similar odds and payoffs to that of the original craps. Both favorable odds and even more favorable payoffs are necessary when creating a casino game.

Supported by: FURSCA-Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship



NICOLE FERRARA, '12 **Escape and Avoidance Learning in the Earthworm**

Faculty Sponsor: W. Jeffrey Wilson
Major: Psychological Science
Hometown: Cadillac, Mich.

Learning must by necessity involve changes in the nervous system. The present study uses a re-visited animal learning model, the earthworm, in order to demonstrate neural plasticity in even the simplest nervous system. Escape/avoidance learning trials were conducted in order to properly pair two stimuli while coding for the appropriate behavioral response. Locomotion was the behavior that was coded for during the learning trials when two stimuli, a vibratory stimulus (conditioned stimulus) and an aversive light stimulus (unconditioned stimulus), were paired. Eleven *E. hortensis* and *E. eugeniae* earthworms were used in experimental trials to demonstrate a higher chance of learning in escape trials in comparison to avoidance trials; however, both escape and avoidance learning yielded results indicating that earthworms are able to learn, and therefore, demonstrate neural plasticity through the pairing of two stimuli. Current research in the lab is examining the role of acetylcholine, a neurotransmitter used in the earthworm nervous system, in escape/avoidance learning. This study could provide researchers a more cost-effective animal learning model, and also subjects with much simpler nervous systems, which would allow students learning about the nervous system to better understand the role of what would normally be more complex neural processes.

Supported by: Faculty Development Committee, Psychological Science Department

NICOLE FERRARA, '12

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

TROY FERRIO, '12

(See Google Online Marketing Challenge)



HOLLY FARRIS, '12 **Analyzing Hydrated Salt Solutions at the Phoenix Landing Site on Mars**

Faculty Sponsor: Nicolle Zellner
Major: Physics
Hometown: Montague, Mich.

In 2008, NASA launched the Phoenix mission to Mars in hopes of uncovering some of the planet's mysteries. The lander performed a complete analysis on the subsurface water ice in the northern arctic plane, characterizing the geology and habitability of our red neighbor. Some salts lower the melting point of ice, an important implication for the stability of liquid water, a necessity for life, on Mars. Our research looked specifically at the temperatures and relative humidities, reported by Phoenix, at which various salts deliquesce or adsorb water vapor from the air and form a solution. Using geochemical modeling and humidity experiments in an atmosphere-controlled chamber, we concluded that perchlorate salts, specifically $Mg(ClO_4)_2$, because of the solubility and abundance on the planet, are the most important salts to study. Deliquescence of $Mg(ClO_4)_2$ occurred at room temperature and ~75% relative humidity (NaCl buffer), but did not occur at room temperature and ~30% relative humidity ($MgCl_2$ buffer). Although deliquescence did not occur at ~30% relative humidity, we confirmed that hexahydrate, $Mg(ClO_4)_2 \cdot 6H_2O$, is the stable phase of the $Mg(ClO_4)_2$ - H_2O system at ~30% relative humidity and temperatures ranging from 295 K to 333 K. Future experiments are planned to run at lower temperatures and which utilize buffers that create relative humidities within the range reported by Phoenix, < 5% relative humidity.

Supported by: National Science Foundation, NASA



COURTNEY FLOOK, '12
**An Alternative English Curriculum:
 Reflecting on Pedagogy and Student-
 Centered Learning in Semiotic Instruction**

Faculty Sponsor: Suellyn Henke
 Major: English
 Hometown: Waterford, Mich.

Semiotics is the study of signs and symbols within a system of communication, including traditional and non-traditional modes of communication such as speech, writing/reading materials, body language, art, architecture, and various forms of media. An understanding of the basic principles of semiotics—especially comprehending that language revolves around a system of codes accepted by a given culture—allows for a deeper appreciation of the language of a culture. Furthermore, it entices learners to think critically about their place in society alongside the texts they are interpreting. By incorporating a designed course on semiotics into a multi-age, multi-grade English classroom, I am supporting the mission of the alternative school by providing a non-traditional look at English language arts while fulfilling the requirements established by both the Michigan High School Content Expectations (HSCE) and the Common Core State Standards (CCSS.)

As an enactment of my personal teaching philosophy, and my views on pedagogy, I have designed a unit which helps to generate a student-centered learning environment: while there is still teacher-directed instruction in semiotics, the students participate in assisting me in designing my lesson plans for the following week, as well as provide an objective way for me to evaluate my teaching via the comments they make on their weekly surveys. The purpose of this research is to strengthen my ability to foster critical thinking skills and classroom engagement among at-risk learners, while demonstrating that the English language arts are relevant and applicable beyond life in the classroom.

and the deafness that crippled and tortured Beethoven during these years.

History is just as important as harmonies and melodies when analyzing a symphony. Specifically analyzing the odd-numbered symphonies, we explore the transition from the Classical to Romantic Periods in music with the First Symphony (C major). We discover the friendship (and eventual repulsion) between Napoleon Bonaparte and Beethoven in the Third Symphony (Eroica). We idolize the explosive and world-renowned excitement of the Fifth Symphony (C minor) and pay homage to what Beethoven called, “one of his best works,” with the Seventh Symphony (A major). Finally, we end with the triumphant and emotional premier of the Ninth Symphony, a work which made Beethoven weep during thunderous applause from the audience.

Exploration through the symphonies from the viewpoint of a conductor includes phrasal analysis, or the “visual architecture of the symphony,” harmonic analysis, the “audible architecture of the symphony,” common performance practices throughout the world, and even some very uncommon interpretations!

Supported by: FURSCA



THOMAS FONTANA, '12
**Eocene Turtles from the Distal Deposits
 of the Cathedral Bluffs Tongue (Wasatch
 Formation), Red Desert, Wyoming**

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

This study describes an unusual assemblage of fossil turtles from Eocene deposits of the Green River Basin in Wyoming. The fossils are recovered from the Cathedral Bluffs Tongue of the Wasatch Formation, deposits that range from conglomerates and coarse sandstones deposited by alluvial fans close to the Wind River mountain source (Basin-Margin), through braided and meandering stream sandstones and mudstones, to lake-margin mudflat and stream fine sandstones and mudstones farthest from the mountains (Basin-Center).

Typical Basin-Center assemblages contain a diverse array of trionychid (soft-shelled), emydid (slider, pond, box, and painted), baenid (extinct snapper-like), and dermatemydid (river) turtles. The upland deposits of the Basin-Margin contain only an undescribed emydid (“Southpassemys”) that was adapted to the faster flowing alluvial fan streams. At Bush Rim, however, “Southpassemys” occurs alongside the common Basin-Center (lowland) turtles. Several other unusual co-occurrences of mixed upland and lowland reptile and mammal groups have also been noted. It appears that during the earliest Bridgerian (Brla), rapid movement on the Wind River Thrust may have caused the alluvial fan (upland) environments to rapidly expand into the Basin-Center lake-margin



LUCAS FLORIN, '12
**Choreographing Beethoven: Conducting
 the Odd-Numbered Symphonies**

Faculty Sponsor: James Ball
 Major: Music
 Hometown: St. Clair Shores, Mich.

Travel back in time to the turn of the nineteenth century as the world is introduced to a powerhouse in orchestral composition. Between the years of 1800 and 1827, Ludwig van Beethoven produced nine symphonies as well as piano concerti, string quartets, trios, sonatas, etc. We enter into the mind of a true genius and begin to unravel his symphonies. Have you ever wondered what went through Beethoven’s mind to inspire such pivotal compositions as his symphonic form? We discover the secrets behind the controversial metronome markings

environment, bringing together what had been geographically distinct upland and lowland vertebrate faunas (“a forced fauna”).

In other vertebrate groups, where upland and lowland forms have been forced together, it has been noted that the most similar animals tend to evolve away from one another morphologically. A morphometric analysis of the emydid turtles (“Southpassemys” and the Basin-Center species of *Echmatemys*) will determine if this is true in turtles as well.

Supported by: FURSCA, Faculty Development Grant, Taylor Fund for Undergraduate Research in Geology, University of Alberta

JUSTIN FRAGNOLI, '14

(See Google Online Marketing Challenge)



PRYCE HADLEY, '12

Prospects for Sustainable Development in Suriname

Faculty Sponsor: Wesley Dick
Major: Environmental Science
Hometown: Marquette, Mich.

This presentation focuses on conservation efforts and prospects for sustainable development in Suriname. Located on the rugged northeast coast of South America, this small nation is home to one of the few remaining intact sections of the Amazon rainforest. Some conservation initiatives have already taken place, including the establishment of the Central Suriname Nature Reserve, which set aside nearly ten percent of the country for ecotourism and research, and three Rapid Assessment Studies, which have identified dozens of new species. However, corruption, lack of domestic oversight, and growing international demand for natural resources threaten to degrade Suriname's forests. Already thousands of hectares of habitat have been lost to hydroelectric damming, artisanal gold fields, and commercial bauxite mining. Drawing on my experiences in Suriname during an internship with a grassroots environmental organization in summer 2011, I will attempt to identify key actors in the local conservation movement, compare Suriname with case studies in other developing nations, and assess barriers to sustainable development. Central to this project will be examination of the country's complex natural and human history and analysis of current sociopolitical trends.

Supported by: Prentiss M. Brown
Honors Program Travel Fellowship



KENNETH GIBBONS, '13

Ground Water-Surface Water Interaction in the Kalamazoo River

Faculty Sponsor: Timothy Lincoln
Major: Biology
Hometown: Toledo, Ohio

My research investigated the rate at which water enters and leaves the Kalamazoo

River through its bed, seeking for evidence of hyporheic exchange, water going temporarily from the stream into sediment and then resurfacing into the stream later downstream. During the time underground such water could encounter reducing conditions (low oxygen) causing the levels of nitrate in the stream to decrease. I investigated potential exchange in zones where there are steps in the river's gradient and in a tight meander bend where water on the upstream side of a bend is higher than water on the downstream side. In pool-riffle systems surveyed, maps of sediment temperature show warm and cool zones with up to a 6° C variation. In cool spots, hydraulic head and permeability indicate a flux of up to .0008 cm/sec of water upward into the river. Warm areas either indicate lower but upward fluxes or no vertical water movement. Wells installed across a meander bend showed a distinct water table maximum up to 100 cm above river level indicating no groundwater flow through the bend. On the 10-100 meter scale investigated, I only saw water entering, not leaving, the stream. However, profiles of the pore water within the upper 10 cm of sediment show a gradient from 5 ppm nitrate in the stream to 0.1 ppm in the sediment. This may indicate mixing of stream and pore water due hyporheic exchange on a smaller scale.

Supported by: FURSCA



TAYLOR HARDING, '12

Proteasome and Alpha-Synuclein Interaction in a *Drosophila* Model of Parkinson's Disease

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

Parkinson's disease is a progressive neurodegenerative disorder which affects 1-2% of the population over the age of 60. Parkinson's is characterized by the death of dopamine-producing neurons in the substantia nigra of the brain, due largely to aggregation of the protein α -synuclein in the cell body of the neurons. One hypothesis for the cause of α -synuclein aggregation is that the proteasome, a large holoenzyme responsible for degrading targeted proteins and maintaining healthy cellular protein levels, may be dysfunctional in some instances of this disease. To test the hypothesis that α -synuclein interacts with a dysfunctional proteasome to cause Parkinson's disease, we designed an experimental model using the established *Drosophila melanogaster* (fruit fly) Parkinson's disease model. The goal of this study was to create stocks of *D. melanogaster* that selectively express genes encoding



for wild type and mutant α -synuclein or proteasome dysfunction in the fruit fly eye under UAS-Gal4 control. These stocks could then be crossed together to create experimental flies co-expressing α -synuclein and proteasome dysfunction in an effort to investigate the interaction of these two genes via an enhanced rough eye phenotype. We have successfully generated balanced fly stocks to be used for an experiment to test the hypothesis of α -synuclein and proteasome dysfunction interaction in a Parkinson's disease model.

Supported by: FURSCA

times and very low yields. In an effort to remedy these issues, the use of a microwave reactor with the reaction was investigated, and this has become the standard method in the McCaffrey Lab due to the dramatically decreased reaction times and increased yields. A series of dicopper macrocyclic complexes was also synthesized using the diformylated substituted phenols to determine the correlation between the Hammett parameter of the substituent and the magnetic coupling of the complex. In addition to the synthesis of copper complexes, preliminary studies were also performed regarding the synthesis of vanadium complexes. Furthermore, crystal structures and variable-temperature magnetic susceptibility measurements for several of the copper complexes were obtained.

Supported by: FURSCA, American Chemical Society Petroleum Research Fund



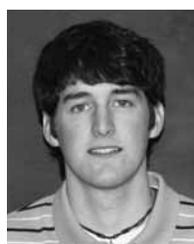
ELIZABETH HEIMLER, '12
"Between the Stitches": Stories of Knitting Design

Faculty Sponsor: Jess Roberts
Majors: Psychological Science, Religious Studies
Hometown: Grosse Pointe, Mich.

While writing "Between the Stitches," I began to think of knitting as having a public story and a private story. The "public stories" tend to be filled with the mundane details we share when someone asks the routine questions about a knitting project. The "private stories" were something quite different: underneath the color, size, and even recipient are the intricacies of human relationships. These are the stories of the friends and family we knit for and the decisions we make to use our minutes to create a piece that provides comfort, expresses love, and keeps them warm. In writing this collection, I unexpectedly found a voice to tell these private stories of inspiration—stories of the passion I feel for people I love, or at least like a whole lot. In "Between the Stitches," I stitch these stories together alongside designer's notes about color, technique, and resources to promote the kind of creativity that has ensnared me over and over again.

NATALIE HEWITT, '13

(See Albion/SDV Business Plan Development: An International Partnership between the U.S.A. and France—E-Walk)



Hiday

AARON HIDAY, '13

Major: Geology
Hometown: Burlington, Mich.

ABIGAIL WILLIAMS, '12

Major: Geology
Hometown: Stillwater, Minn.

Assessment of Diel Cycling in Agricultural Streams in South-Central Michigan—

A Focus on Turbidity

Faculty Sponsors: Thomas Wilch, Timothy Lincoln

This study focuses on diel (24-hour) cycling of turbidity and other water quality parameters at multiple sites in both agricultural drains and natural tributaries of the upper Kalamazoo River watershed, Michigan. Turbidity, the cloudiness of water due to suspended solids, and other water quality parameters (dissolved oxygen (DO), water level, temperature, specific conductivity, pH, and total suspended solids (TSS)) were monitored at mostly 10-minute intervals during summers 2010 and 2011. Two study sites in Rice Creek, an agricultural drain, show large turbidity increases at night with sharply inclined, noisy peaks between 10 p.m. and 6 a.m., and daytime saddles between 10 a.m. and 7 p.m. Measurements taken at 10 and 20 cm above the streambed exhibit in-phase daily cycles with the same periodicity and amplitude, but with higher turbidity closer to the streambed. TSS samples indicate that suspended sediment is composed of about 40% organic and 60% mineral material.

Turbidity cycles are roughly anti-phase with DO and pH, and turbidity levels cease to increase at the time of sunrise, which may indicate plant or animal



NICHOLAS HERRMAN, '12
Synthesis of Diformylated Substituted Phenols and Corresponding Copper and Vanadium Macrocyclic Complexes

Faculty Sponsor: Vanessa McCaffrey
Majors: Chemistry, Biology
Hometown: Baroda, Mich.

Much research has been done in the field of molecular magnetism due to the many potential improvements it can bring to information storage, optoelectronics, and switching devices, among other areas. However, before molecular magnets can be utilized for these applications, a thorough understanding of how both structural and electronic perturbations affect magnetic exchange is needed. A series of different diformylated substituted phenols was first synthesized via the Duff reaction. Initially, this reaction was performed using traditional reflux chemistry. However, this resulted in long reaction

influences on cycling. Turbidity varies in-phase with groundwater levels and specific conductivity, which may indicate that increases in groundwater entering the stream during the night increase turbidity. Groundwater levels in adjacent wetlands were recorded and found to vary cyclically from evapotranspiration of plants. Stream stage cycles were less regular, out-of-phase, and lower amplitude relative to groundwater levels. Continued research on the relationship between turbidity cycles, in-stream water, groundwater, and plant activity could reveal the driving force(s) of diel cycling.

Supported by: FURSCA-Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship (Williams), Taylor Fund for Undergraduate Research in Geology, Herbert H. and Grace A. Dow Trustees' Professorship in the Sciences



EMILY HOPKINS, '12
"Sphygmomanometer": Poems

Faculty Sponsor: Helena Mesa
 Major: English (Creative Writing)
 Hometown: Attleboro, Mass.

Found at the back of almost any CVS pharmacy, a sphygmomanometer is a machine used for measuring blood pressure, sometimes attached to a cuff and used with a stethoscope. In my title poem, and the wider collection, I work to yoke a tone of physical rawness with personal awakening, like a measurable increase in pulse to its corresponding emotional leaps. Throughout the poems, I weave together traditional and experimental form with the stories we tell each other and images of the physical body. Starting as an exploration of the prose poem (poetry without traditional lineation), the collection grew to also include forms such as non-traditional sonnets and the haibun, a hybrid form that combines prose with a concluding terset that follows the syllabic structure of the haiku. Divided into sections by three "Self Portrait" poems, each movement is structured around loose narrative and tone rather than one single form or narrative. Ultimately, what create the connective tissue between these poems are these explorations of the human body's capacity to encompass the physical world, memory, and the stories we tell.

Supported by: FURSCA



AUDREY HUGGETT, '12
Violent Motherhood as a Recognition of Humanity in Toni Morrison's Novels

Faculty Sponsor: Judith Lockyer
 Major: English
 Hometown: Traverse City, Mich.

Toni Morrison's novels challenge historical conceptualizations and stereotypes of African American women. In our culture, mothers are idealized to a level impossible to obtain; forever self-sacrificing, pure, and bottomless wells of love, mothers are seen as a nurturing force. These standards are impossible for any woman to live up to. My project focuses on the mothers in *Sula*, *Beloved*, and *A Mercy* who resort to emotional or physical violence against their children as a way to assert the humanity of their children. Each mother's act is an attempt to control the future of and protect her child from being deprived of basic respect by white society, using the means of action available to a black mother within her social status and role; the violent action of the mother is one of fundamental protection in response to the threatened humanity of her child. Comparing the mothers portrayed in Morrison's novels to the sanctified cultural version of a mother reveals the impossible standard which all mothers are expected to emulate, regardless of their social position. The violence the mothers exhibit in Morrison's novels is a result of their struggle to assert their children's humanity within restraints created by their social and historical context.

Supported by: FURSCA



ASHLEY HULL, '12
"Tethered: Short Stories"

Faculty Sponsor: Danit Brown
 Majors: English, History
 Hometown: Royal Oak, Mich.

"Tethered" is a collection of five short stories that explore the lives of Michigan teens tethered to their Michigan suburbs, their first loves, their circumstances. Taking place in different decades, these stories focus on the universal moment of transition between adolescence and adulthood, and on the way this transition can alter friendships and first love.

I have always been interested in the ways people connect, lose touch, and reconnect. These stories have enabled me to try on relationships from multiple perspectives and to enter alternate worlds and other time periods. This ability is also the reason I love reading and learning about history. This project has allowed me to imagine the past and develop empathy in ways I didn't expect.



MARK HYMES, '12
Nitrate in the Kalamazoo River: Sources and Temporal Variations

Faculty Sponsor: Timothy Lincoln
 Major: Geology
 Hometown: Ann Arbor, Mich.

This study describes the nitrate levels in seeps, streams, agricultural drains, and urban storm drains that provide input to the north and south branches of the Kalamazoo River. In June through September 2011, near the confluence of the branches in Albion, north branch nitrate levels of 4.1 to 5.9 ppm, averaging 5.5, were consistently lower than south branch levels of 5.4 to 11 ppm, averaging 8.3. Seeps from broad wetlands surrounding the north branch between King Road and 29 1/2 mile road and the south branch just above the Albion Mill Pond were low in nitrate, averaging 0.9 ppm. Seeps along the south branch between J Drive and D Drive had nitrate levels averaging 1 ppm. This reach of the river has narrower wetlands, 0-30 m. Pore water in riverbed sediment had nitrate levels consistently below 1 ppm. The streams and drains were highly variable. Springs along both the north and south branches were high, ranging from 10 to 50 ppm, averaging 20. River nitrate levels can be modeled as a mixture of low-nitrate wetland and pore-water seeps and high-nitrate springs and upland seeps. Mass balance calculations suggest north branch nitrate levels were a mixture of 75% pore water and wetland seeps, 25% springs and upland seeps; the south branch nitrate levels were a mixture of 60% and 40%. This is consistent with the greater abundance of wetlands surrounding the north branch.

Supported by: FURSCA

BEN IWEN, '12

(See Google Online Marketing Challenge)

SAM JABARA, '12

(See Google Online Marketing Challenge)



JOHN JACISIN, '12
Fossil Reptiles from the Late Early Eocene (Wasatchian, Lostcabinian) of the Red Desert, Wyoming

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

This study describes and compares a large collection of fossil reptiles from the latest early Eocene of Wyoming. Abundant fossil vertebrates from the Lostcabinian Subage (latest Wasatchian, Wa7, *Lambdotherium* Zone) are known from the type area in the southeastern Wind River Basin and from newly developed localities at The Pinnacles in the northeastern Green River Basin. The Pinnacles localities represent

ancient river deposits of the main body of the Wasatch Formation, which underlies the Tipton Shale of the Green River Formation, a major lake deposit. The channel sandstones bodies at The Pinnacles contain abundant small vertebrate remains including many lizard and snake vertebrae, jaws, and boney plates (osteoderms) and are some of the most fossiliferous latest Wasatchian (Wa7) localities of microvertebrate reptiles and mammals in the world. Specimens were collected through prospecting, screen sorting, and microscope analysis of anthill concentrations of isolated remains that are then identified and described.

The Pinnacles Wa7 assemblage contains six families representing 11 genera of lizards as well as one burrowing lizard-like amphisbaenian and two families of snakes representing as many as five genera. Anguimorph lizards and boid snakes dominate the fauna, but iguanians and xantusiid lizards are also common. Primitive snakes and varanid lizards are rare. This assemblage is generally similar to previously described Lostcabinian faunas, but differs from the type area at the species level. This is probably a reflection of different microhabitats present in the lake-margin preserved at The Pinnacles and different methods of collecting the two areas.

Supported by: FURSCA-James W. Hyde Endowed Student Research Fellowship, Faculty Development Grant, Taylor Fund for Undergraduate Research in Geology, University of Alberta



ABBEY JENSEN, '12
Building a Curriculum Framework for Performing Ensembles

Faculty Sponsor: Samuel McIlhagga
 Major: Music Education
 Hometown: St. Joseph, Mich.

Curricula are devices to organize all the resources a teacher needs to put together lesson plans: materials, goals, and the students' schemata. In music education, there is no one standard practice for how to build and implement curricula. By examining general education curriculum models, reading about music teacher's repertoire selection practices, and making my own observations, I have designed my own music curriculum development tool. The center of this tool is a music assessment designed to objectively examine the quality of a musical text. To evaluate this tool, I tested it on music intended for the British Eighth Marching Band's 2011 season. Additionally, I designed a guide for writing drill, which also was then used this fall. The music assessment and drill guide, when implemented with the students' capabilities and goals for the class, form a curriculum both useful for designing lessons and for justifying the program's existence to peers and administrators outside of music.

Supported by: FURSCA



KATIE KIRSCH, '12
Globalization and Its Discontent: The Case of Batchingou, Cameroon

Faculty Sponsor: Emmanuel Yewah
 Majors: French, English
 Hometown: Schoolcraft, Mich.

As an incredibly diverse African country, Cameroon continues to be dominated by both old and new forces of Euro-American cultures. The French and English languages as European colonial legacies remain imbedded in the country's institutions as well as in its administrative structures. Though both languages do indeed facilitate and widen intercultural communication among Cameroonians, their use leads to the neglect of distinct Cameroonian languages and cultures. Past cultural interactions have left this multicultural space open to uninhibited cultural ingressions including globalization, described as "an intensification of social relations and consciousness." Cameroon's openness to current globalization through these post-colonial institutions also deters a national unity among the many diverse ethnic and cultural groups. My thesis examines the impact of globalization not so much at the national or macro-level, but more creatively and innovatively, at the micro-level with a specific focus on Batchingou, a small village in the western region of Cameroon. Interviews and surveys of the Batchingou community reveal that globalization has exacerbated the tension between the local and received cultures, tension that further complicates the quest for a collective national consciousness within Cameroon.

Supported by: School for International Training



GEOFFREY KNIGHT, '14
Managing Uncertainty: Preference for Predictability and the Relationship between Religiosity and Prejudice

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

Theoretical perspectives on intergroup relations have suggested that managing general uncertainty (Gudykunst, 1995) and uncertainty about death in particular (Greenberg et al., 1997) may play a role in intergroup prejudice. Moreover, many studies have shown that prejudice can stem from religiousness (see Batson et al., 1993 for a review). Religious fundamentalism, a strict following of one's religious beliefs, has been consistently linked with racism, sexism, and homonegativity (Hunsberger & Jackson, 2005). We argue that religious fundamentalism itself may provide a buffer against uncertainty, and that groups that challenge one's beliefs may pose symbolic threats to that buffer. The present study sought to test this perspective by looking at the extent to which preference for predictability may explain the relationships between religious fundamentalism and measures of prejudice.

We hypothesized that religious fundamentalism would be positively related to homonegativity, racism, and sexism. We also expected that the relationships between religious fundamentalism and each prejudice outcome would be mediated by preference for predictability. Albion College students (N = 78) completed measures of religious fundamentalism, preference for predictability, homonegativity (in this case, negative attitudes toward gay men), hostile sexism (negative attitudes toward women), benevolent sexism (endorsement of confined, traditional roles of women), prejudice toward African Americans, and prejudice toward Native Americans. Religious fundamentalism was significantly positively related to all of these prejudice outcomes. Preference for predictability partially mediated the relationships between religious fundamentalism and both benevolent sexism and prejudice toward Native Americans.



JESSICA KOEHLER, '14
Detection of *Escherichia coli*'s Beta-glucuronidase Gene from Environmental Samples Using Combinations of Conventional and Real-Time PCR Approaches

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

The rapid detection of coliform bacteria is essential for several environmental and public health reasons. Currently, among known indicator organisms, *Escherichia coli* is the most reliable indicator of fecal contamination in aquatic systems. *E. coli* is a reliable indicator because its gene (*uidA*) and product (beta-glucuronidase) are specific only to the bacteria, while culture-based techniques for determining water quality are too time-consuming. Therefore, this study was designed to examine the potential of polymerase chain reaction (PCR) application for detecting *E. coli* contamination in aquatic systems. Triplicate water samples were collected periodically from three locations along the Kalamazoo River and examined with conventional and quantitative PCR (qPCR) assays as well as viable bacterial counts. The DNA from one sample at each site was diluted to 10^{-2} and 10^{-4} to determine detection limits based on the three methods. Dilution standards were established between 10^0 and 10^8 /mL of *E. coli* cells, and used to establish a standard curve to normalize the qPCR and compare to the viable counts and conventional PCR results. In general, the conventional PCR appeared more sensitive than the viable count method, although there were some discrepancies that may point to the presence of impurities in the DNA samples. While the results from several of the qPCR assays were inconclusive, with only a few indicating acceptable r^2 values, the approach has been comparatively effective in detecting *E. coli* presence at lower concentration in most samples analyzed.

Supported by: FURSCA



ZACHARY KRIBS, '15
Personality Differences in Time of Day Preference

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

Research that has examined personality differences in time of day preference has produced inconsistent results. For example, Soehner, Kennedy, and Monk (2007) found that different dimensions of personality were unrelated to a variety of sleep-related variables (e.g., duration of sleep, bedtime preference, time of awakening). In other studies (e.g., Randler, 2008), certain personality dimensions, such as conscientiousness and agreeableness, appear to be related to certain sleep-wake variables. The purpose of my study was to examine the relationships between the Big Five Personality Factors, their smaller facets, and time of day preference. The Big Five Personality Factors are agreeableness, extraversion, openness to experience, neuroticism, and conscientiousness. These five broad factors are each comprised of six smaller, more specific facets. For example, the broad factor of conscientiousness is composed of the facets of competency, order, dutifulness, achievement-striving, self-discipline, and deliberation. Such facets can operate independently of factors (Zabel, Christopher, Marek, Wieth, & Carlson, 2009), and measuring them has been shown to increase predictive accuracy and create a better understanding of how personality is related to behaviors and cognitive processes (Akrami & Ekehammar, 2006).

Our sample consisted of students in an introductory psychology class over two semesters. Each participant completed a survey composed of Costa and McCrae's 240-item NEO-PI-R (1992) inventory of the Big Five Personality Factors, and Horne and Ostburg's (1976) 19-item Morning Eveningness Questionnaire (MEQ). The MEQ evaluates time of day preference by asking questions such as, "At what time of day do you think that you reach your 'feeling best' peak?" Results will be discussed.



REBEKAH KROESING, '12
"Oh! Quante volte" from *I Capuleti e I Montecchi* by Vincenzo Bellini and "Chacun le sait" from *La fille du régiment* by Gaetano Donizetti

Faculty Sponsors: James Ball, Emily Benner
 Major: Music (Vocal Performance)
 Hometown: Waterford, Mich.

The two opera arias that will be performed, "Oh! Quante volte" and "Chacun le sait" are both not only beautiful pieces to sing, but also very similar in the perspective on childhood.

The first aria, "Oh! Quante volte," is from *I Capuleti e I Montecchi* written by Vincenzo Bellini. This opera is based on the story of Romeo and Juliet, but leans away from the Shakespearean version and more

toward different Italian sources. In this scene, Juliet is actually betrothed to Tybalt, and sings about how she is in love with Romeo and yearns for him. This aria is especially beautiful and has a sense of longing in it, just as Juliet longs for Romeo.

The second aria, "Chacun le sait," is from *La fille du régiment* written by Gaetano Donizetti. This opera is about a girl named Marie who was adopted by the 21st regiment of the French army. She is a feisty little girl, who was raised by these rough men her whole life. In this particular aria, she is singing about how great the 21st regiment is and also rejoicing that she has been able to convince her "fathers" to spare her young love, Tonio.

The connection between these two arias is two different perspectives on how their respective upbringings have influenced their ability to find and succeed in young love. In the former aria, it is a tale of how controlled and unloved Juliet is. Her life has already been made for her, and she is forced to marry someone she doesn't love. In the latter aria, Marie is much loved, and is supported in whatever she does.



NICHOLAS LESSNAU, '12
Substituent Effects on the Chemistry of Dioxovanadium(V) Complexes

Faculty Sponsor: Vanessa McCaffrey
 Majors: Biochemistry, Religious Studies
 Hometown: Clinton Township, Mich.

Oxovanadium complexes formed from the reaction of Schiff-base ligands and vanadium ions are of interest because of their applicability and usefulness in a wide range of biological and industrial processes. Schiff-base ligands are versatile ligands because of their ease of synthesis and purification. In addition, they are easily functionalized with a wide range of substituents. In this work, substituted salicylaldehydes were reacted with semicarbazide to make Schiff-base ligands that were coordinated with vanadium to form dioxo(semicarbazone)vanadium(V) complexes. These complexes with varying functional groups [Figure 1] were characterized through ¹H NMR, FTIR-ATR spectroscopy, UV/Vis spectroscopy, and cyclic voltammetry. Reduction rates of the dioxovanadium complexes were monitored through UV/Vis spectroscopy in the presence of organic compounds possessing antioxidant properties (ascorbic acid or resveratrol). Correlations between electrochemical properties and reduction rates of these compounds will be described.

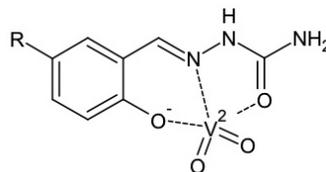


Figure 1. Structure of dioxo(semicarbazone)vanadium(V) complexes (R= OMe, Me, H, Br, Cl, NO₂).

LAUREN LEVY, '12

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

NICHOLAS LONG, '12**Comparative Analysis of Volatile Organic Compounds in Opened Wine**

Faculty Sponsor: Vanessa McCaffrey
Majors: Biochemistry, German
Hometown: Rochester Hills, Mich.

Red wine is known (infamously by oenophiles) to deteriorate in quality days after the bottle is opened. Thought to be due primarily to oxidation, the chemical composition of wine changes, turning the once pleasant bouquet into an unfavorable smell. These chemical odorants, named volatile organic compounds (VOCs), are present in different varieties and concentrations, giving each type of wine unique characteristics. To test if the decreasing quality of opened wine is correlated to VOC concentration changes over time, GC/MS was used to quantify each VOC extracted from red wine over a four-day period. Using sorbent extraction, the VOCs were analyzed from bottles of wine stored and re-sealed in different conditions and methods. Changes in pH and UV/Vis absorption were noted, and results on the interdependence of these variables will be presented. The resulting VOC data showed consistent concentrations of different VOCs, but no connection between wine aging and changes in these concentrations.

Supported by: FURSCA

male songs (1-2 sec); however, males rarely sing in actual feeding visits. These results suggest that feeding calls have evolved as an efficient form of communication with blind nestlings.

Supported by: FURSCA-Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship

**CHELSEA MARSH, '12****The Nature of Music: A Philosophical Analysis**

Faculty Sponsor: Jeremy Kirby
Majors: Philosophy, Political Science
Hometown: Elk Rapids, Mich.

Using experimental philosophy, I created a survey to reveal the general public's intuitions about the definition of music. I found participants at music festivals in Northern Michigan and analyzed the data in light of contemporary philosopher Gordon Graham's 2007 article, "Music and Electro-Sonic Art." Based on these preliminary responses, I argue that Graham's definition or distinction is flawed. My objection may be summarized as follows: the piece that Graham cites as a paradigmatic piece of sonic art seems to be widely thought of as a musical piece. Either his account of music is incorrect or the distinction he relies upon therein appears unhelpful. Since this summer, I have continued researching the definition of music and have made progress on my senior honors thesis.

Supported by: FURSCA

**JASON MARTIN, '12****The Threat of "Vice and Folly" in Eighteenth-Century British Satire: The Effeminate Macaroni and the Emergence of a New Masculine Ideal**

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

The term "macaroni" was a derogatory label used by late-eighteenth-century Britons to denote a group of people who had returned from their Grand Tour of Europe. Modern scholars have long noted the connection between the macaroni's threat as a manifestation of Britain and France's enmity in the late eighteenth century. However, until recently, with the research of scholars such as Shearer West, Amelia Rauser, and Rictor Norton, the underlying contextual motivations and larger implications of "vice and folly" that the macaroni represented to Britain have been largely ignored. This essay analyzes a wide range of contemporary prints of the macaroni to show that, despite the improvements in recent analyses by historians and art historians, this multi-faceted and contradictory figure has still been oversimplified. In contemporary literary and visual satire, accusations of

**KALA MAPES, '12****Feeding Calls of House Wrens: Analyses of Call Features and Responses of Nestlings to Playback Experiments**

Faculty Sponsors: Dale Kennedy, Douglas White
Major: Biology
Hometown: Wixom, Mich.

Previous research has shown that adult house wrens arriving at nests with food gave calls to young nestlings. Such calls were not given when adults arrived at nests without food, suggesting these calls were feeding calls. In 2011, I characterized feeding calls using Avisoft SASLab Pro (sound analysis software) for frequency (pitch), note length, and internote interval. Calls have relatively short notes (mean \pm SD = 0.04 \pm 0.015 sec, n = 7880) and intervals between notes (0.10 \pm 0.051, n = 6632). To test for nestling response to feeding calls, I carried out playback experiments at 25 different nests. I used male song and scolding calls as control vocalizations. Nestlings responded positively by gaping to feeding calls more frequently than to short scolding calls (96% vs. 8% of nests, respectively). Nestlings also always responded to the much longer



the macaroni's effeminacy are ubiquitous. It is only when one unpacks this term as a placeholder for perceived excessive consumption, gender convergence, and ungoverned sexuality (including heterosexual lechery and homosexual sodomy) that one begins to understand the role the macaroni played in the emergence of a new British masculine ideal. This ideal was based on what E. J. Hobsbawm and T. O. Ranger have called an "invented tradition," and can be seen in the popularity of the idea that the country needed to "return" to a new "Old England," which, ultimately, manifested itself in the John Bull figure and a glorification of roast beef, in an era Linda Colley has shown to be a period of growing British nationalism.

JASON MARTIN, '12
"Scarcely Understood by the Minds of Men":
Indications of Same-Sex Desire in Michelangelo's
Words and Art

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

To our modern sensibilities, it is hard to deny that Michelangelo's art appears to have explicit sexual connotations. But would contemporary eyes have seen the same underlying meanings in his art? The answer is complex and multifaceted. Most scholars take one of three positions regarding Michelangelo's sexual proclivities. The first group cites Michelangelo as a closeted homosexual, the second denies the existence of any evidence suggesting his interest in males, and the third ignores any mention of his sexual desires altogether. This paper explores the extant evidence, and argues that our current heteronormative social assumptions have blinded us to the social role of same-sex acts in Renaissance Florence. Using Michael Rocke's research, which shows that same-sex relationships were a statistically common occurrence in a Florentine male's sexual history, Michelangelo's experiences and associations during his youth in Florence are examined. Building on this contextual foundation, an iconographic analysis of a number of Michelangelo's visual artworks, accompanied by some of his written words in the form of poetry and letters, provides evidence of his changing responses toward his own consciously repressed same-sex desires, either exclusively or in addition to desire for females. This essay uses an interdisciplinary approach to question our current obsession with physical interactions as the only validation of proof for same-sex relationships, and suggests that our assumptions have caused us to ignore substantial evidence to what Michelangelo himself defined as a "chaste" love for certain males during his adult life.



NATHAN MASSERANG, '12
"Suburbane": A Collection of Poetry

Faculty Sponsor: Helena Mesa
 Major: English (Creative Writing)
 Hometown: Grosse Pointe Woods, Mich.

"Suburbane" is a collection of poetry that explores the cultural disconnect between the gentrified suburb of Grosse Pointe and the deteriorating urban landscape of Detroit, two areas that are geographically close, yet radically different. The collection follows a speaker who struggles with concepts of race, sexuality, and social class, moving in and out of, and between, these two spaces. Predominately it focuses on the physicality of the movement between not only the cities, but also the people within the space that ultimately create the speaker's frustration or contentment. Ultimately, the collection asks of the reader: can anyone ever find a sense of place in their home?



Miller

ANNA MILLER, '13
 Major: Biology
 Hometown: Grand Haven, Mich.

STEPHANIE SANDERS, '15
 Majors: Chemistry, Mathematics
 Hometown: Farmington Hills, Mich.

Uptake and Impacts of Silver
Nanoparticles on Brassica rapa

Faculty Sponsor: Kevin Metz



Sanders

Nanoscience is a constantly growing field that has led to many groundbreaking discoveries. These advancements in nanotechnology have influenced the production of many consumer products. According to the Woodrow Wilson Institute's Inventory of Nanotechnology, there were 1,317 products that claimed to use nanotechnology in 2010, including 313 products containing silver nanoparticles. Insufficient research has been done pertaining to the impacts of silver nanoparticles on our environment. A study on the impacts that silver nanoparticles pose to Wisconsin Fast Plants, *Brassica rapa*, was conducted. Silver nanoparticles were synthesized using various coffee and tea extracts as reductants. *Brassica* plants were watered with the silver nanoparticle solutions over a growing period. Nanoparticle presence was measured in the roots, stem and leaves, and flowers of the fully grown plants. To determine whether or not the nanoparticles altered plant growth, plant height was measured over time. The results will be presented.



CASEY MONAHAN, '12
Spy Fever and British Counter-Espionage Action during the Great War

Faculty Sponsor: Christopher Hagerman
 Major: History
 Hometown: Bloomfield Hills, Mich.

During this project I explored the links between the formation of the British counter-intelligence unit, MI5, and its actions in conjunction with the spy fever that gripped England before and during the Great War. I studied extensively the pressure put onto the government by the public through articles and letters published by the *London Times*. Additionally, I made use of MI5's official history, *Defend the Realm*, and the only complete account of espionage during the First World War, *German Spies at Bay*, which was published shortly after the conclusion of the war. Through these avenues, I found that the pressure exhibited by the public on the government forced the accelerated creation and growth of MI5 in order to quell popular dissent.

AMBER MYERS, '13

(See Albion/SDV Business Plan Development: An International Partnership between the U.S.A. and France—E-Walk)



SANDRA NAHRA, '12
Marketing to Second-Generation U.S. Latinos: How Culture Impacts Perception

Faculty Sponsor: Deborah Kanter
 Major: Spanish
 Hometown: Plymouth, Mich.

My research examines how second-generation Latinos (individuals born in the U.S. to at least one foreign-born parent) perceive and react to advertisements directed at Hispanic consumers. The study analyzes how to utilize Hispanic culture to attract Latinos to an advertisement, while still respecting Latino heritage. The concept of using culture in advertising stems from the works of professionals within the field of Hispanic marketing. Experts claim that many advertising campaigns appeal to Hispanics through broad generalizations and offensive stereotypes. Others claim that utilizing Hispanic culture within an advertisement increases its appeal to the targeted demographic.

Using focus groups, I surveyed second-generation Latinos about their perceptions of Hispanic advertisements. The participants appreciate advertisements that incorporate components of their culture, but feel that many advertisements are offensive, racist, and unrealistic. Physical types do not greatly influence purchasing decisions, and the participants did not prefer any particular physical type. I argue that advertisements that use a limited number of cultural components more effectively appeal to Latinos and in a more appropriate manner.

Marketers struggle to advertise to this diverse and rapidly growing population. When marketers limit the number of cultural components used within an advertisement, more members of the Latino population are able to appreciate the message.

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TOM NEWVINE, '13

(See Google Online Marketing Challenge)



HEATHER NOBERT, '12
A Survey of Parkage Trees in Selected Albion Neighborhoods

Faculty Sponsor: Dan Skean
 Major: Biology
 Hometown: Marquette, Mich.

Trees play vital roles in urban ecosystems, and an understanding of urban trees is crucial because of the benefits they provide to humans. Parkage trees (trees occurring between the sidewalk and the curb) can serve as a representative sample of the urban forest. Albion, Michigan is considered an urban area with a population density of 1,954 persons/square mile. During summer 2011, I surveyed 2,059 trees in seven different economic neighborhoods as defined by the city tax assessor's office. Data collected included species, diameter at breast height (d.b.h.), overall condition (scaled 1-5), and location. I hypothesized that there would be measurable relationships between property values and these data. My prediction was that neighborhoods with higher property values would have greater species richness, higher species diversity, larger trees, and better overall tree condition. A total of 66 different species were encountered. Three species of maples appeared in one of the top five spots for importance values in all seven neighborhoods: *Acer saccharum* Marshall, *Acer saccharinum* L., and *Acer platanoides* L. There was no statistically significant support for my hypothesis or predictions. The information from this survey may prove useful to the City of Albion in future tree planting and maintenance.

Supported by: FURSCA



ALYSSA OLSON, '13
Reconstruction of 200 Years of Anthropogenic Influences on the Upper Kalamazoo River and Rice Creek

Faculty Sponsor: Thomas Wilch
 Majors: Geology, English
 Hometown: Clarkston, Mich.

This research focuses on understanding the history of damming and alteration of the upper Kalamazoo River in Albion and surrounding river communities, in order to understand the magnitude of anthropogenic influence on the stream system. Extensive damming and other alterations of small streams to larger rivers since the early 1800s throughout the eastern United States have profoundly changed the hydrology of these water systems. These dams affect the river's gradient and sediment movement, which impact the overall channel morphology. Baseline research establishing the number, distribution, and size of dams is critical for stream assessment work.

Research was conducted at local libraries, historical organizations, and government offices, and by interviewing residents near dam sites. A total of twelve dams on the upper Kalamazoo River are recognizable today and dozens of other dams existed in the past. For example, in Albion at least a dozen saw and grain mills operated in the past. Only the Marshall hydroelectric dam is still being used to generate power. About half of the dams are at or very near their original height, typically 1-2 m above downstream river levels. Ongoing research is focused on creating maps and a database using GIS. These GIS data will be useful in documenting elevation and gradient changes, analyzing stream flow rate and competency, and characterizing morphological changes in channel geometry.

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COURTNEY PICKWORTH, '13
Philosophies and Success Rates of Anorexia Nervosa Treatment: A Pilot Study

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

One of the greatest challenges of anorexia nervosa is effective treatment. There is no standard course for treatment, and, as such, approaches vary a great deal. While treatment centers typically boast of quality assurance approval from The Joint Commission, there appears to be little other regulation of the quality of these programs (The Joint Commission, 2011). The purpose of this study is to compare treatment centers based on several characteristics, including success rate, treatment philosophy, and alternative approaches.

This pilot study was intended to evaluate the success of a treatment protocol in the form of a series of

questions to be asked of a clinical director and an administrative director. Examples of questions include "What makes a good treatment center?" and "What is the treatment philosophy for your facility?"

The interviews were conducted at a mental hospital and research facility in the Midwest during December 2011. The treatment facility represented a focused biological approach to eating disorders; both individuals stressed the perception of anorexia nervosa as a biological disease with genetic components. The goal of the unit was to effectively prepare patients for the outside world by not separating them behaviorally or mentally from their everyday lives. Future interviews will include the same questions, but with only one individual. In future research, 10 more treatment facilities will be approached in hopes of compiling a comprehensive account of the similarities and differences that exist among them.

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COURTNEY PICKWORTH, '13
The Role of the Soluble JAM Family of Molecules in Angiogenesis

Faculty Sponsor: Bradley Rabquer
 Majors: Psychological Science, Biology
 Hometown: Columbus, Ohio

Angiogenesis is the growth of new blood vessels from existing blood vessels (Goodwin, 2007). It is an important component of many diseases such as rheumatoid arthritis and cancer. Junctional adhesion molecules, or JAMs, are molecules expressed at tight junctions between cells. Here they regulate cell migration and inflammation. Several JAMs have also been identified in a soluble form and are denoted as soluble JAMs (sJAMs). The proposed model for production of these sJAMs is that they are portions of the membrane-bound JAMs that have been cleaved from the cell surface.

Currently, the exact role of the soluble sJAMs in angiogenesis is being examined. The sJAM-C and sJAM-A variants have both been identified as pro-angiogenic (increasing the rate of angiogenesis). In contrast, sJAM-B has recently been found to reduce the rate of angiogenesis. The current study aims to identify how soluble JAM-B acts as an anti-angiogenic molecule. The proposed model for inhibition is that the sJAM-B acts against the role of sJAM-A and sJAM-C. Matrigel tube formation assays will be used to identify differences in angiogenic properties among the conditions. It is expected that samples with sJAM-B in addition to both sJAM-A and sJAM-C will yield tube formation rates similar to that of the control.

Identifying sJAM-B as an anti-angiogenic factor has significant consequences for the treatment of autoimmune angiogenic diseases like rheumatoid arthritis. Pharmaceuticals could be developed that could target the sJAMs and to prevent angiogenesis and decrease inflammation in patients.

ALEX PIERSON, '12

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

ALEX PIERSON, '12

(See Google Online Marketing Challenge)

**KAITLYN POSPIECH, '13****An Investigation of the Behavior of Phosphate in a Surface Water System**

Faculty Sponsor: Timothy Lincoln
Major: Geology
Hometown: Grand Rapids, Mich.

Downstream from Albion, the Kalamazoo River is impaired by phosphate which leads to the eutrophication of downstream lakes. The project's main goal is to assess the roles of in-stream storage of phosphate and of sediment-water exchange of phosphate on the behavior of phosphate in the whole-river system. In the study we analyzed the relationship between phosphate and the materials that it travels with. Dissolved "orthophosphate" was below our limit for detection, .05 mg/L, in all water samples we collected. In sediment, levels are much higher and average .29% P_2O_5 . In this sediment, phosphate showed a positive correlation with both loss on ignition at 500° C (a proxy for organic carbon) and iron. We interpret this to indicate phosphate is adsorbed on the surfaces of both organic material and fine-grained iron oxides in the sediment. Mapping of the 20.5 km of the north and south branches of the river shows 1.8×10^5 m² of area underlain by organic rich sediment. Assuming a 1-meter average thickness and the average P levels measured in this study, this sediment represents a reservoir containing roughly 6×10^8 gm of phosphate, greater than the annual dissolved load by a factor of at least 25. This finding shows the importance of further investigating any exchange between this large phosphate reservoir and the overlying water, and the implications any exchange has on the residence time of phosphate in the river system.

Supported by: FURSCA

**SOPHIA POTOCZAK, '12****A Probabilistic Model of Large Woody Debris Movement and Distribution in Small Mountain Streams**

Faculty Sponsor: Darren Mason
Major: Applied Mathematics
Hometown: Birmingham, Mich.

Large woody debris (LWD) enters mountain streams by means of wind throw, logging operations, and, most commonly, through woody discharge from surrounding mountain slopes. Such wood accumulations can persist in the streams for up to

200 years, dramatically impacting the fluid flow properties of a stream before and after a flood. To study this phenomenon we examined the movement of LWD and the change in wood volume in the Lower Lookout Creek of the H.J. Andrews Experimental Forest near Blue River, Oregon, a mountain stream that experienced a flood with a five-year return interval in January 2011. By comparing the fluvial, wood, and stream cross-sectional data before and after this flooding event, we developed a probabilistic model based on an integro-differential equation to understand the distribution and change of the wood volume per unit length of the stream. Analysis of the model resulted in a mathematical relationship between the mean travel distance of LWD and the input rate of floated and fallen wood that can be compared with field observation. Due to the numerous model assumptions necessary for analysis of this complex problem, corresponding sensitivity analysis was also conducted. Model strengths, weaknesses, and future generalizations are also discussed.

Supported by: National Science Foundation Research Experiences for Undergraduates and LTER6 Grant, U.S. Forest Service Pacific Northwest Research Station

HEATHER RAUSCH, '14

(See Google Online Marketing Challenge)

**JONATHAN RENNHACK, '12****Analysis of Dominant Temperature-Sensitive Mutations in *Drosophila melanogaster***

Faculty Sponsor: Kenneth Saville
Majors: Biology, Philosophy
Hometown: Stevensville, Mich.

Drosophila melanogaster, the common fruit fly, has long been used as a tool for basic scientific research in order to learn more about human conditions. A number of genetic conditions in *Drosophila* have been identified that mirror conditions in humans. One set of mutations in the fruit fly, known as dominant temperature-sensitive (DTS) mutations, cause a temperature-sensitive period in the life span of the organism. This study looks specifically at the DTS5 and DTS7 mutations. These are dominant temperature-sensitive mutations which cause a late pupal stage lethality. Previous studies have shown that the DTS5 and DTS7 genes each code for a protein subunit of an important cellular structure called the proteasome. The proteasome is a complex of proteins responsible for the degradation of proteins in the cell. The DTS mutations cause the proteasome to be unable to function properly. In humans, the proteasome malfunctions in a number of diseases such as cancer and Parkinson's disease. This study hopes to understand better the actions of the proteasome in the DTS mutations and the specific cell types in which this action is taking place. This is done through the



use of the UAS/Gal4 system to selectively express mutant DTS proteins in cell types of interest, namely the histoblast cells, the larval epidermal cells, and the prothoracic gland. The results of this experiment seem to suggest that the proteasomes in the prothoracic gland malfunction in a model similar to cancer and cause the death of the organism.

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



LAUREN ROBERTS, '12
Challenging Binaries: Processing Intersex Identities

Faculty Sponsor: Scott Melzer
Majors: Sociology, Music
Hometown: Saline, Mich.

This project examines people who could or do classify themselves as intersex. This research is looking into the formation of identities for these persons and how sex and gender play a role in their lives. Sex and gender have sweeping impacts from socializing children to defining gender roles in adult relationships. After reviewing the literature surrounding intersex, including the struggle their parents face to raise them in a gendered society, how they deal with doctors and medical procedures, and the growth in activism and awareness for intersex individuals, I have taken a sociological approach to looking into intersex persons and their identity formation. I examine the competing identities in the recent split between disorders of sex development and intersex by looking at the differences between medicalization and identity. Through a grounded theory approach consisting of interviews of intersex adults and document analysis of letters, memoirs, videos, and other documents, my research looks at the identities and relationships of these persons. This presentation will focus on my findings about autonomy and personal awareness of gender identity. My project aims to help understand intersex identities through a sociological lens as well as carefully examine and critique the gendering process and binaries ever present in society. The construction of gender in our society plays a large role in the life of an intersex person, and my research illuminates what this means for those with that identity. Through my qualitative interviews I was able to understand how those who identify as intersex become aware of their gender identity and how this has differed depending on their age. Using these interviews, I am able to bring their experiences to life.

Supported by: FURSCA, Earhart Emerging Scholar Award



LYNDSEY REYNOLDS, '12
Characterization and Optimization of Palladium Nanoparticles on Porous Polycarbonate Membranes as a Catalyst for the Suzuki Coupling Reaction

Faculty Sponsor: Kevin Metz
Majors: Biochemistry, Biology
Hometown: Waterford, Mich.

The Suzuki coupling reaction produces carbon-carbon bonds between substituted phenyls in aqueous media and is beneficial for many reasons. While it has made significant impacts in the synthetic chemistry and chemical industries, it still has some shortcomings. Most notable are the need to remove palladium from the products and to clean palladium out of the reaction vessels at the plant scale. This research focuses on resolving these issues by developing and optimizing a new flow-through reactor method utilizing palladium nanoparticles on membranes. The optimization of the method can be scaled to the industrial level and will be more efficient than current methods for running the Suzuki reaction. This method involves a flow-through reactor pushing the reactants through the membrane, exposing them to palladium nanoparticles, while not directly mixing the nanoparticles in the solution. To date we have found that there is no statistical difference in percent yield from membranes with different pore sizes and from membranes that are in the plating solution for different amounts of time. However, we did find statistical differences in the variables of rate and temperature. Additionally, we found that, with the optimized slow rate and higher temperature, two of the pore size membranes are statistically better than the third pore size membrane.

Supported by: FURSCA-Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship

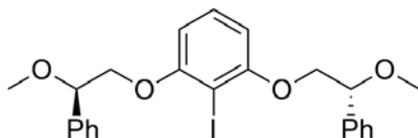


BRANDON SAMS, '14
Synthesis of a C₂-Symmetric Chiral Aryl Iodine Organocatalyst

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

For the last 15 years the French research group has been focused on developing new classes of chiral hypervalent iodine reagents, in which the chiral moiety is attached to the aryl ring itself and is fixed in a pseudo-cyclic system with the iodine atom. Chiral aryl iodides serve as organocatalysts in oxidation reactions of enolizable ketones. We report our exploration into the synthesis of a new class of chiral aryl iodine reagents herein. The starting

materials for these reagents are resorcinol and a chiral epoxide, both of which are commercially available reagents. Methylation and iodination via ortho metallation complete the synthesis.



Supported by: FURSCA

STEPHANIE SANDERS, '15

(See Anna Miller, '13, Stephanie Sanders, '15)

VICTORIA SLATER, '14

(See Google Online Marketing Challenge)



JOSHUA SAMS, '12

A GIS Analysis of the Density Distribution of Epizoans on *Mucrospirifer thedfordensis* (Brachiopoda, Spiriferida) from the Middle Devonian of Ontario

Faculty Sponsor: William Bartels
Majors: Geology, Anthropology
Hometown: Vermontville, Mich.

Epizoans are animals that grow on other organisms for a variety of reasons. In settings with muddy substrates, it is common to find benthic animals encrusted with filter feeders such as bryozoans and corals. These animals grow on the shells for a variety of reasons including: to maximize their distance above anoxic or turbid bottom waters, to have a hard substrate to anchor upon, and/or to augment their filter feeding with the currents created by the animals they grow on. The distribution of these epizoans can give important clues as to which of these behaviors is most critical.

Brachiopods were common hosts to epizoans during the Paleozoic. The Devonian brachiopod *Mucrospirifer* was used in this study. Over 200 specimens from Ontario were analyzed. The most common epizoans were the bryozoan *Hederella*, the coral *Aulopora*, and the problematic "*Spirorbis*." GIS analysis was used to determine the density distributions of these epizoans.

Results indicate that *Hederella* positioned itself near the highest point on the *Mucrospirifer* shell. No specimens were recorded near the shell opening indicating a strategy that maximized its height above the bottom for either oxygen or turbidity reasons. "*Spirorbis*" was more evenly distributed across the brachial valve, but had a clear preference for the area near the opening, suggesting that currents created by the brachiopod were an important factor in their positioning. Finally, *Aulopora*'s distribution suggests that it colonized near the opening, but then expanded randomly. Since "*Spirorbis*" and *Hederella* preferred different locations on the shell, they commonly occur together.

Supported by: FURSCA



JEFFREY SMITH, '12

Palladium Nanoparticle Catalyzed Suzuki Reactions: The Effect of Variation in Phenylbromide Substitution

Faculty Sponsor: Cliff Harris
Major: Biochemistry
Hometown: Trenton, Mich.

Akira Suzuki shared the 2010 Nobel Prize for chemistry honoring his contributions to palladium-catalyzed coupling reactions. Many others have improved and expanded upon the original discovery. Much work has focused on improving and adjusting the catalyst. Recently, many researchers have evaluated palladium nanoparticles (PdNPs) for their utility in this reaction. The Harris and Metz research groups are collaborating on this project. Currently, the Harris group evaluates Metz PdNPs for use in the Suzuki reaction: a coupling reaction between an arylbromide and an arylboronic acid. For this specific project, a series of phenyl bromides were reacted with phenylboronic acid. The phenyl bromides evaluated were: 2, 3, and 4 substituted bromotoluene, 4-bromoanisole, and 2-bromonaphthalene. The relative percent yield and conversion for each reaction were compared.

Supported by: FURSCA



MARIA SMITH, '12

Depictions of Women in American Silent Film: The Influence of Professional Women in Early American Cinema

Faculty Sponsor: Wesley Dick
Major: History
Hometown: Royal Oak, Mich.

This research explores the depiction of women in the first movies on the American silver screen: silent films. The project includes the discussion of several silent film actresses, their on-screen personas and appearances and the social and cultural implications that were established based on their silent film characters. This research focuses on the effects that silent film female imagery had on the American public's understanding of the role of women in the country's culture, first, by reviewing the strong influence that early films had on American people and society. It asserts that there was a significant amount of acceptance and investment made by early twentieth-century society in the silent film industry, and thus the films being produced had a lasting effect on the American people's perception of the



country in which they lived. As a result, the images of women in silent films affected the role of women in American society and shaped the position of American women during the 1920s and beyond. This research aims to prove that through images of women early silent films were helping to liberate American women in terms of their ability to freely express themselves because of the efforts and influences of the actresses and female professionals in the silent film industry. Although the films were created with the restrictions implemented by a male-dominated society, women in silent films were able to generate a progressive image of women in American society.



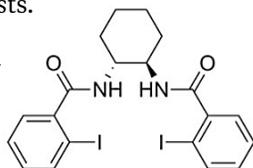
EMILY STEPHENS, '12 **Synthesis of Chiral Hypervalent Iodine Organocatalysts**

Faculty Sponsor: Andrew French
Major: Biochemistry
Hometown: Birmingham, Mich.

The synthesis of organocatalysts is an extremely important realm of organic chemistry. Organocatalysts are used in areas of chemistry ranging from nanotechnology and green chemical engineering to biological chemistry, including reactions synthesizing anti-cancer drugs and oxidation catalysts. An important aspect in all areas of organic chemistry is chirality. Chirality is a property of molecules based on the arrangement of four different groups around a central atom. Chiral molecules exist in two forms, called enantiomers, with differing arrangements of groups around a central atom. Different enantiomers of molecules can have differing reactivities. These differences can result in toxic effects in biological systems, undesired side reactions, or simply no reaction at all.

Our research aims to synthesize a chiral organocatalyst containing an aryl iodine atom that may be used in oxidation reactions. Previously, polyvalent iodine has been successfully incorporated into organocatalysts for use in oxidation reactions. Oxidation reactions are common organic reactions that involve the loss of electrons from a system either by the introduction of a heteroatom or the removal of a hydrogen atom into an organic molecule. In the past, oxidation reactions have been carried out using environmentally harmful heavy metals like manganese and chromium. Currently, research in oxidation chemistry is exploring less environmentally harmful alternative compounds that may be used as catalysts for oxidation reactions. Our synthetic work aims to combine the knowledge of green oxidation chemistry, iodine chemistry, and chirality to create useful oxidation catalysts.

Supported by: FURSCA



EMILY THOMSON, '12 **Women and Liturgical Drama**

Faculty Sponsor: Ian MacInnes
Majors: English, Theatre
Hometown: Southfield, Mich.

This project examines the effect the gender role of women in Christianity had on the portrayal of women in medieval drama. By examining medieval liturgical drama, I hope to expose the gender roles assigned to both women and men in the fourteenth century and to put them on display. My project involves two staged performances of *The Woman Taken in Adultery* from the N-Town Pageant Plays. In the second of these performances I reverse the genders of the main characters in order to examine how the writing and the embedded beliefs of the time affect the characterizations of common tropes. The two performances provide a comparison for the audience and for me, allowing us to examine more closely the gender roles assigned through both religion and literature of the time.

NIKI TORSKIY, '14

(See Google Online Marketing Challenge)



PATRICK UNDERWOOD, '12 **Activation of Protein Kinase G as a Possible Colon Cancer Therapy**

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

The enzyme cGMP-dependent protein kinase also known as protein kinase G (PKG) has been reported to have anti-tumor effects in the colon and may be a target for cancer therapy. As the name suggests, PKG is activated by cGMP. The enzyme phosphodiesterase 5 (PDE5) reduces levels of cGMP within a cell by converting it to GMP. This reduces activation of PKG. If the activity of PDE5 in the colon can be inhibited, it could possibly be used as a cancer therapy. Fortunately, there are already three FDA-approved PDE5 inhibitors that are commercially sold with a prescription. Sildenafil, vardenafil, and tadalafil are sold as erectile dysfunction treatments. In this study, the effectiveness of the three different PDE5 inhibitors was tested in colon cancer cells and in the mouse colon mucosa. It was found that both sildenafil and vardenafil significantly increased intracellular cGMP levels in colon cancer cell lines. The increase in cGMP in the cancer cells corresponded with activation of PKG as measured by western blotting techniques. In contrast, in mouse colon explants only vardenafil was able to significantly increase cGMP levels. Injection of vardenafil in vivo also resulted in a significant increase in intracellular cGMP levels in mouse colon mucosa. PKG has recently been shown to activate the expression of anti-oxidant genes in colon cancer cells, and this was verified here in mouse colon explants. Intraperitoneal injection of vardenafil was able to reduce oxidative stress in the colon, but further studies are necessary to confirm this

finding. The data suggest that clinically relevant PDE5 inhibitors may have therapeutic potential for colon cancer treatment and prevention.

Supported by: Georgia Health Sciences University College of Graduate Studies



MICHELLE VALENTINE, '12
British Romanticism through Lord Byron and Felicia Hemans

Faculty Sponsor: Suellyn Henke
Major: English (Secondary Education)
Hometown: Clark Lake, Mich.

When attempting to understand a literary movement, sometimes it is helpful to consider those facets commonly thought of as outliers. Common themes found in the literature of British Romanticism are memory and nature, but the poetry of Byron and Hemans focuses on other notions including gender, sexuality, and love. Despite this, both authors are still canonized as British Romantics. So, I began to research Byron and Hemans in order to gain a fuller understanding of Romanticism as a whole.

In addition to researching the canonization process, I developed an educational unit for high school students. Thinking about how to teach my research findings was very beneficial to me. Indeed, one learns something best when thinking about how to effectively teach the concept to another person.

Throughout this process, I gained valuable analytical skills that will assist me in understanding and teaching other complex literature in my future classroom.



GABRIELLA VEZZOSI, '12
Native American Artwork: A Glimpse of Acoma Pottery

Faculty Sponsor: Bille Wickre
Majors: Art, Political Science
Hometown: Livonia, Mich.

Through research I discovered a piece of pottery in the Albion College art collection was catalogued as a Zuni work when it is actually an Acoma work. Although the piece shares some similarities with Zuni pottery, the shape of the pot, colors depicted, and motifs represented are characteristic of Acoma pottery. Through traveling to New Mexico, speaking with an Acoma representative, interviewing an Acoma potter, and contacting scholars, I confirmed the pot was Acoma. My presentation will provide a brief overview of the pottery process, designs incorporated, pottery trading, and new techniques in the pottery process. I will also go into detail about Acoma work in the Albion College art collection. This new insight allowed me to correct the Albion College art catalog as well as make recommendations for the care and maintenance of the pottery.

Supported by: FURSCA

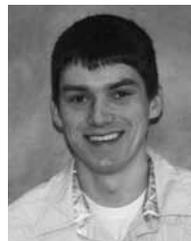
CALVIN WALDS, '12

James Baldwin, Ralph Ellison, and the "Negro's" Humanity in Twentieth-Century American Literature

Faculty Sponsor: Michael Dixon
Majors: Political Science, Ethnic Studies
Hometown: Detroit, Mich.

My research explores James Baldwin and Ralph Ellison's criticism of stereotypical, inauthentic representations of African-Americans found in naturalistic and social realist "protest novels." My thesis traces how the non-fiction essays of James Baldwin and Ralph Ellison call for a complex, 'human,' representation of African-American identity, one that I find is "authentic." I explore how Baldwin and Ellison's personal, literary, and intellectual background developed their commitment to reflexive artistry and complexity. Their ability to uncover the diversity and individuality of African-Americans, and prove problematic stereotypes as false, was very much tied to who they were as individuals, writers, and activists.

This project was born from my larger interest in black "authenticity" and how different African-American writers and intellectuals use claims of authenticity as a political tool. This project employs several disciplines, including American literature and literary theory, philosophy, cultural studies, and black political philosophy, to venture into the difficult, unanswerable question: What is blackness?



RYAN WALKER, '12
The Effects of Friendship Level on the Use of the Anchoring Heuristic: Whom Do You Trust?

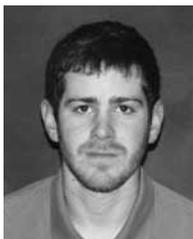
Faculty Sponsor: Mareike Wieth
Major: Psychological Science
Hometown: Portage, Mich.

Previous research has shown that individuals are more persuaded by statements from people they have come to like and therefore trust more. In this study we looked at the effect of friendship level on the use of the anchoring heuristic. The anchoring heuristic is a decision-making shortcut used when individuals refer to previous information (the anchor) to help them with a current decision. For example, participants may be asked a question such as "Is the Mississippi River shorter or longer than 1,200 miles?" After they make their decision, the next question they are asked is: "How long do you think the Mississippi River is?" The closer their answers are to the number 1,200, the more influenced the participants were by the given anchor.

Pairs of participants were individually asked to answer five questions similar to the example above. However, each participant was led to believe that the anchors were generated by the other participant in the study who was either a friend, acquaintance, or stranger. The degree of impact the participants had on each other was measured by looking at how far from the



given anchor their answers to the five questions were. Answers that were closer to the anchors indicated a higher level of trust. As predicted, participants who perceived a greater level of friendship with the other participant used the anchoring heuristic more than the participants who perceived a lesser level of friendship. These results indicate that perceived friendship levels lead individuals to trust statements differently.



DANIEL WARSHAUER, '13
Using Photogrammetry to Analyze
Crevasse Morphology in the Juneau
Icefield, Alaska

Faculty Sponsor: Thomas Wilch
Major: Geology
Hometown: Indianapolis, Ind.

Glaciers can lose large volumes of ice by calving (releasing) icebergs to lakes or oceans. Iceberg calving requires the formation of glacier crevasses, which are large tension fractures. Photogrammetric analysis of crevasse volume changes offers the potential of application in studying glacier calving zones and calculating the rate and amount of ice lost due to calving. This pilot study used photogrammetry to characterize crevasse morphology as part of the Juneau Icefield Research Program. During a 10-day interval in summer 2011, work was done on a crevasse above the Vaughan Lewis Icefall on the Juneau Icefield.

A Go-Pro camera with a 1650 angle lens positioned at a 450 dip angle on a gondola guided by two heavy-duty fishing lines was used to photograph the crevasse. A third line was used to move the camera at one-foot increments. The rig was set up across the crevasse and several passes were made. With the use of ArcGIS in the field, a digital depth map was made. It was concluded that this method worked after the use of Leica Photogrammetry suite was used to produce 3D models. A lack of a spatial reference made it impossible to quantitatively compare the 3D models through time. A suggested future refinement is to change the way the camera is positioned and mounted to allow for accurate GPS positioning of the camera. Photogrammetry, combined with GPS and GIS, has great potential to improve our understanding of the breakup and calving of ice.

Supported by: NASA Alaska Space Grant Scholarship, Juneau Icefield Research Program



Bennett

CASEY WAUN, '13

Major: Biochemistry
Hometown: Allen Park, Mich.

ERICA BENNETT, '13

Major: Chemistry
Hometown: Rockford, Mich.

Chemistry of Glycoaldehyde and
Dihydroxyacetone after High Velocity
Impacts: Initial Experiments and Results

Faculty Sponsors: Vanessa McCaffrey,
Nicolle Zellner

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 160 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.

Glycoaldehyde (GLA) and (DHA) dihydroxyacetone are two simple sugars that have been detected in space and in two meteorites, pieces of space rock that have fallen to Earth. These discoveries provide evidence that suggests that these simple sugars may have been involved in the creation of biologically complex molecules in early Earth. Using vertical guns at the NASA Ames Research Center and the NASA Johnson Space Center, preliminary experiments involving simulated terrestrial impacts were performed on these sugars. Here we specifically discuss the results from analysis with gas chromatography-mass spectrometry of impacted DHA, as well as the infrared spectra and elemental analysis of the impacted GLA samples.

Supported by: FURSCA, NASA



BRIAN WEISS, '13

Moms, Dads, Religion, and Cognition:
Authoritarian Parenting Predicts Religious
Fundamentalism and Cognitive Style

Faculty Sponsor: Eric Hill
Majors: Psychological Science, Philosophy
Hometown: Livonia, Mich.

This study sought to examine religious fundamentalism and authoritarian parenting as predictors of cognitive style. Religious fundamentalism involves strict adherence to the precepts of one's religion, and authoritarian parents tend to value strict and unquestioning obedience from their children. Recent research has demonstrated that religious fundamentalism predicts cognitive style (Brandt & Reyna, 2010). Moreover, Duriez and colleagues (2008) found that parental right-wing authoritarianism predicts right-wing authoritarianism among college students.

Given the well-established connection between right-wing authoritarianism and religious fundamentalism (see Laythe et al., 2002), the present study connects these two lines of research to examine the role of authoritarian parenting in the relationships between religious fundamentalism and measures of cognitive style. We expected that authoritarian parenting would be positively related to both religious fundamentalism and rigid cognitive styles. Albion College students (N = 78) and Arizona State University students (N = 298) completed measures of religious fundamentalism, close-mindedness (the extent to which one remains closed off to new ideas), need for cognition (the extent to which one enjoys thinking and deliberation), and measures of mother's and father's authoritarian parenting styles. In both samples of participants, there was a positive correlation between authoritarian fathering and religious fundamentalism. In the Arizona State sample, there was a negative relationship between authoritarian fathering and need for cognition. The interaction between authoritarian parenting and religious fundamentalism was significantly predictive of need for cognition in both samples.

ABIGAIL WILLIAMS, '12

(See Aaron Hiday, '13, Abigail Williams, '12)

ALBION/ECOLE SUPERIEUR DE VENTE ENTREPRENEURIAL EXCHANGE

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

We are pleased to announce the first international exchange composed of Gerstacker Institute students interested in international business paired with students from France for the purpose of creating 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. Albion College recently engaged with Ecole superieur de Vente (SDV, a business school) located in St. 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 2011, eight Albion College students (juniors and seniors) and sixteen SDV students were chosen to take part in the pilot program. Participants, along with their advisors, spent one week in St. Germain, France (January 7-14, 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 following three criteria: B2B 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: 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.



CARL WHARAM, '12

Progressive Resistance Training in Older Adults

Faculty Sponsor: Robert Moss
Major: Exercise Science
Hometown: Manchester, Mich.

The average age of the population in the United States is increasing, and as the average age increases, more and more people are likely to suffer from sarcopenia, the loss of muscle mass. Loss of muscle mass can be caused by many things such as a lack of activity or the aging process. Sarcopenia can lead to many problems ranging from difficulty performing everyday tasks to a loss of independence. Resistance training has been shown to help improve muscle mass and help reverse sarcopenia. This study looked at the difference in the rates of muscle strength gain between older adults (55 or older) and young adults (18-25) after engaging in an eight-week resistance training program. Results of the study showed that there was not a significant difference in the rates of muscle strength gain between older and younger adults in lower limb exercises such as the leg press ($p=0.858$). However, in upper body exercises, such as the chest press, there was a significant difference in the rate of gain ($p=0.0037$), with a higher rate in young adults. This finding means that while both groups will still see muscle strength gains in the upper body, young adults will see more gains than older adults. However, in lower limb exercises, there is not a significant difference in the rate of muscle strength gain.

Supported by: FURSCA



Albion/Ecole superieur de Vente Entrepreneurial Exchange team members: (front row, left to right) Vicki Baker (Albion faculty), Hamza Oufighou, Antoine Corré, Jean-Philippe Rocher; (second row) Amber Meyers, Lauren Levy, Natalie Hewitt, Adélie Noël, Thomas Vasnier, Charles Nastorg, Aaron Croad, Valère Crétaç, Nouara Chemaa, Caroline Dobbins; (third row) Nicole Ferrara, Bénédicte Vandenbergue, Nicolas Lavialle, Nadia Zerouali, Patrick Marques, Boubakar Toure, Alex Pierson, Mark Balle, Jenna Laur, Karen Erlandson (Albion faculty), Priscilla Moreira. Not pictured: Benoît Smetko

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

MARK BALLE, '13

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

AARON CROAD, '12

Major: Mathematics-Economics
Hometown: Novi, Mich.

JENNA LAUR

Major: Business
Hometown: Surenes, France

ADÉLIE NOËL

Major: Business
Hometown: Saint Nicolas du Tertre, France

HAMZA OUFIGHOU

Major: Business
Hometown: Choisy-le-Roi, France

THOMAS VASNIER

Major: Business
Hometown: Houdan, France

The AirMid project is based on an observation: indoor air has become more and more polluted, potentially causing a wide range of diseases. Different American and French consumer associations have published reports about these problems, especially in offices and public spaces. With this in mind, we questioned how we could integrate health protection in indoor decoration, and we defined our concept as shown below.

Our solution integrates two services: indoor landscaping and depolluting plants. Our company will have its own indoor designers and landscapers, and we will provide depolluting plants to our clients. For now, we decided to begin our activities in California and Paris. We have chosen these places because of the “green” spirit of California and because of the concentration of the headquarters close to Paris.

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

CAROLINE DOBBINS, '12

Major: Economics and Management
Hometown: Albion, Mich.

ALEX PIERSON, '12

Majors: Economics and Management, Communication Studies
Hometown: Ann Arbor, Mich.

NOUARA CHEMAA

Major: Sales Engineering
Hometown: Gonesse, France

ANTOINE CORRÉ

Major: Sales Engineering
Hometown: Saint Germain en Laye, France

NICOLAS LAVIALLE

Major: Business Engineering
Hometown: Versailles, France

BENOÎT SMETKO

Hometown: Paris, France
Major: Sales Engineering

Car Care is a new company, specializing in mobile automotive services. We offer the maintenance of vehicles in the workplace. A common loss of work time is due to employees performing car maintenance or missing work because of a poorly maintained car. Car Care seeks to eliminate this loss of time by bringing maintenance to the workplace.

This new company will send a mobile mechanic shop to the businesses. When on site, the experienced Car Care team will perform the necessary maintenance on the employee’s vehicle. Services will include oil change, tire change and rotation, brake check, and detailing among other basic services.

We plan to partner with any business that has employees who drive to work. We also plan to work with those who are partners with individual vehicle owners, such as car insurance agencies, small communities, and car dealers. There is potential to also be hired directly by individual vehicle owners for long-term service contracts.

Car Care will compile a talented sales team to sell our service to the variety of customers we have chosen to target. We will set up a Web site to promote our services and allow online purchase of our services as well as creating advertisements for magazines read by both business professionals and car enthusiasts.

Car Care is a unique service provider in the car maintenance industry. Our business model is creative and well thought out with the idea of eliminating the hassle and worry of maintaining your car. The advantage for businesses is that employees will not miss time because of a car that does not work. This service allows the employee to be efficient and focused while at work.

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

NATALIE HEWITT, '13

Major: Economics and Management
Hometown: Lowell, Mich.

AMBER MYERS, '13

Major: Economics and Management
Hometown: Midland, Mich.

VALÈRE CRETAZ

Major: Business
Hometown: Moulinaux (France)

PRISCILLA MOREIRA

Major: Business
Hometown: Voisins-le-Bretonneux, France

CHARLES NASTORG

Major: Business
Hometown: Boulogne-Billancourt, France

JEAN-PHILIPPE ROCHER

Major: Business
Hometown: Boissy Saint Leger, France

E-Walk is focused on marketing, popularizing, and subsequently retailing a new form of alternative energy that generates power from pedestrian foot traffic using specially designed flooring systems capable of capturing kinetic energy. This technology is currently being developed by select companies in Europe and the United States, and we feel that we can offer these companies a successful partnership that will allow this type of energy to become prevalent across the globe.

We believe that the energy created by the simple and regular act of walking is innovative and has great promise—it decreases dependence on fossil fuels and does not rely on nature's whim to provide sunshine or wind, essential for other forms of alternative energy. This type of energy has the potential to transform the alternative energy market, and we plan to be the company to get it there.

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

NICOLE FERRARA, '12

Major: Psychological Science/Neuroscience
Hometown: Cadillac, Mich.

LAUREN LEVY, '12

Major: Political Science
Hometown: Amherst, Mass.

PATRICK MARQUES

Major: Sales engineering
Hometown: Chatou, France

BOUBAKAR TOURE

Major: Sales engineering
Hometown: Epinay sur Seine

BÉNÉDICTE VANDEMBERGUE

Major: Sales engineering
Hometown: Limay, France

NADIA ZEROUALI

Major: Sales engineering
Hometown: Trappes, France

Robot Fish is an innovative company that seeks to perform high-end entertainment. The entertainment includes light shows, pictures, and, potentially, underwater music. With the focus differentiation strategy, Robot Fish entertainment is designed to appeal to a narrow audience, which includes high-end casinos, hotels/resorts, night clubs, and select private owners. Our superior design delivers unique entertainment from the ability to swim and simulate real fish behaviors. Robot fish will not only provide an excellent product but will also provide installation, demounting, and an optional pool filtration system. Robot Fish will provide entertainment needs for any event.



GOOGLE ONLINE MARKETING CHALLENGE

Faculty Sponsor: Sam Hogg

Team 1



Jabara

Newvine

Pierson

SAM JABARA, '12

Major: Economics and Management
Hometown: Boyne City, Mich.

TOM NEWVINE, '13

Major: Communication Studies
Hometown: Clio, Mich.

ALEX PIERSON, '12

Majors: Economics and Management, Communication Studies
Hometown: Ann Arbor, Mich.

Team 2



Dolan

Ferrio

Iwen

Torskiy

RYAN DOLAN, '12

Majors: Economics and Management, Philosophy
Hometown: Livonia, Mich.

TROY FERRIO, '12

Major: Economics and Management
Hometown: Flint, Mich.

BEN IWEN, '12

Major: Economics and Management
Hometown: Saginaw, Mich.

NIKI TORSKIY, '14

Major: Economics and Management
Hometown: Buffalo Grove, Ill.

Team 3



Dai

Fragnoli

Rausch

Slater

XINYA DAI, '14

Majors: Economics and Management, Music
Hometown: Kuming, China

JUSTIN FRAGNOLI, '14

Major: Economics and Management
Hometown: Troy, Mich.

HEATHER RAUSCH, '14

Major: Communication Studies
Hometown: Buchanan, Mich.

VICTORIA SLATER, '14

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

The Google Online Marketing Challenge is an exciting opportunity for students to experience online marketing and create online marketing campaigns using Google AdWords. With a \$250 budget provided by Google, students develop an online advertising strategy for a real business or non-profit organization that has not used AdWords in the last six months. The global winners and their professor receive a trip to the Google headquarters in Mountain View, California to meet with the AdWords team. Regional winners and their professor receive a trip to a regional Google office.

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 are used to bring a noted scholar or public figure to campus each year to offer the Isaac Lecture and to visit with classes. In 1997, the Isaac 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)

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)

The 2012 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)
Sarah Briggs (Marketing and Communications Office)
Chelsea Denault, ’12
E. Dale Kennedy (Biology/Brown Honors Program)
Lisa Lewis (Chemistry)
Beth Lincoln (Geology/Academic Affairs)
Vanessa McCaffrey (Chemistry/FURSCA)
Anne McCauley (Art and Art History)
Dean McCurdy (Biology/Brown Honors Program)
Michael Van Houten (Stockwell-Mudd Libraries)