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ALBION COLLEGE

2011

THE TWENTY-SECOND ANNUAL ELKIN R. ISAAC STUDENT RESEARCH SYMPOSIUM

ALBION COLLEGE

APRIL 13-14, 2011

SCHEDULE OF EVENTS

Wednesday, April 13, 2011

7:30 p.m. **Elkin R. Isaac Alumni Lecture: John R. Ferris, '89**
"Recharging the Auto Industry: The Story of the Chevrolet Volt"

Welcome: Provost Susan P. Conner
Speaker Introduction: Larry Steinhauer, Professor Emeritus of Economics and Management
Towsley Lecture Hall/Norris Center 101

Reception immediately following the program
Science Complex Atrium

Thursday, April 14, 2011

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

Forum #1
Norris Center 100

Forum #2
Towsley Lecture Hall/Norris Center 101

Forum #3
Norris Center 102

Forum #4
Norris Center 104

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

1:15-4 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: Annie Leonard**
"The Story of Stuff"

Welcome: President Donna M. Randall
Speaker Introduction: Pryce T. Hadley, '12
Goodrich Chapel

Reception immediately following the program
Bobbitt Visual Arts Center Lobby

ELKIN R. ISAAC ALUMNI LECTURE

John Ferris, ’89

John Ferris, ’89, has over 20 years of experience in the automotive industry, including multi-year assignments in corporate finance, corporate strategy, product planning, and advanced vehicle development. He is currently a program planning manager at General Motors with responsibilities in the areas of electric vehicles and infrastructure as well as energy and environmental policy and commercialization. A member of the concept team for the Chevrolet Volt, Ferris was the program planning lead for the Volt’s production program and now manages electric infrastructure development and home-charging installation for the Volt and future General Motors plug-in electric vehicle programs. The Volt was named 2011 Car of the Year at the North American International Auto Show in Detroit.

Ferris’ General Motors career started at Saturn Corporation and has included assignments in Japan, South Korea, China, and the United Arab Emirates. A computational mathematics and economics and management major at Albion College, he was a member of the Liberal Arts Program in Professional Management (now the Carl A. Gerstacker Institute for Business and Management), the Honors Program, and Delta Sigma Phi. A member of Phi Beta Kappa, he graduated summa cum laude and with Albion College honors. He holds an M.B.A. from the University of Chicago’s Booth School of Business, where he was one of only eight students selected to participate in the 1994 Business Fellowships in Japan Program.

JOSEPH S. CALVARUSO KEYNOTE ADDRESS

Annie Leonard

Annie Leonard created *The Story of Stuff* documentary, which has had more than 12 million online views since its December 2007 release. The movie led in turn to a fan-requested companion book with the same title and The Story of Stuff Project, which supports education and awareness initiatives for environmental and social justice issues. Leonard serves as director of The Story of Stuff Project.

She has spent nearly two decades investigating and organizing on environmental health and justice issues. She has traveled to 40 countries, visiting hundreds of manufacturing and disposal sites. With her firsthand knowledge of the impacts of both over- and under-consumption around the world, Leonard is fiercely dedicated to transforming industrial and economic systems to promote ecological sustainability and social equity.

Leonard is the former coordinator of the Funders Workgroup for Sustainable Production and Consumption and has worked with Global Alliance for Incinerator Alternatives (GAIA), Health Care Without Harm, Essential Action, and Greenpeace International. She currently serves on the boards of International Forum for Globalization and GAIA and has previously served on the boards of the Grassroots Recycling Network, the Environmental Health Fund, Global Greengrants India, and Greenpeace India. She is an alumna of Barnard College and did graduate work in city and regional planning at Cornell University. She is currently based in the San Francisco Bay Area.

STUDENT PRESENTATION SCHEDULE—THURSDAY, APRIL 14, 2011

FORUM #1 – Norris Center 100

8:30	Jacob Rinkinen (Rohlman)	Cytotoxic Effects of Combinational Therapy of Ascorbic Acid and 3PO on Breast and Non-Small Cell Lung Cancer Cells
8:45	Aaron Bender (French)	Synthesis and Evaluation of a Novel Class of Salen-Derived Hypervalent Iodine Reagents
9:00	Matthew Mahony (Bartels)	A Comparison of Eocene Basin-Margin and Basin-Center Crocodiles from the Bridger Formation, Green River Basin, Wyoming
9:15	Lyndsey Reynolds (Metz)	Palladium Nanoparticles on Porous Polycarbonate Membranes as a Catalyst for the Suzuki Coupling Reaction
9:30	Chris Omerza (McCaffrey)	The Duff Formylation of Substituted Phenols: A Regiochemical Study
9:45	Christopher Creighton (Mason, Seely)	Comparison of Quantization Results from Two-Dimensional Cosmologies Quantized with Different Factor Orderings
10:00	Jeremy Covell (Metz)	Polymeric Membrane-Supported Palladium Nanoparticles for the Remediation of Trichloroethene
1:15	Jacob Stoneburner (French)	Synthesis and Evaluation of Chiral Iodophenyl Oxazolines as Organocatalysts
1:30	Angela Johnston (McCurdy)	Tanaid Crustaceans from Suriname, South America as Bioindicators of Environmental Mercury Levels
1:45	Catherine Castelli (Van de Ven, Wilch)	Shifting Elevational Distributions of Three Subalpine and Alpine Plant Species in the White Mountains, California
2:00	Matthew Zaborowicz (Rohlman)	Classification and Characterization of *Tetrahymena* and *Twort* Group I Introns and Fluorescently Labeled Group I Intron Substrates
2:15	Cynthia Hanson (McCurdy)	Description of Mudflat Animals from Intertidal Mudflats along the Coast of Suriname, South America
2:30	William Ward (Van de Ven, Wilch)	Cold Air Pools in Crooked Creek Valley, White Mountains, California
2:45	Philip Conrad (McCurdy)	Retention of Various Metals through Metamorphism in Grey Tree Frog (*Hyla Versicolor*) Larvae
3:00	Nicholas Herrman (McCaffrey)	Photolytic Cleavage of Leader Peptides
3:15	Kelly McNear (Metz)	Stability of Nanomaterials in an Electro-Fenton Reactor as a Model for Advanced Oxidation Reactions in Wastewater Processes
3:30	Dana Koenig (Lyons-Sobaski)	Development of Microsatellite Genetic Markers for *Sabatia angularis*
3:45	Michael Albano, Heather de Bari, Kimmy Leverenz, Emilee Studley, Michelle Valentine (McCurdy)	The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems

FORUM #2 – Towsley Lecture Hall/Norris Center 101

8:30	Lindsay Way (Guenin-Lelle)	La Ferme de Gally: Reflections from a Month on a French Farm
8:45	Jessica Baird (Franzen)	Food, Farming, and the Liberal Arts: An Exploration of Multi-Disciplinary Campus Gardens
9:00	Kristen Dawes (Stotz-Ghosh)	Mouthful of Feathers: A Poetic Study of Form
9:15	Daniel Merritt (Cook)	A Concerto in Economics: Finding Art in the Study of Market Trends
9:30	Megan Borgeling (Ball)	*Fantaisie Pastorale Hongroise, Op. 26,* Albert Franz Doppler (1821-1883)
9:45	Jacob Trapp (Balke, Ball)	Mozart Arias with the Albion Orchestra
1:15	Emily Foster, Katherine Kirsch, Courtney Meyer, Katie Stephens (McCurdy)	The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest
1:30	Kjirsten Sneed (Guenin-Lelle)	La Culture Équestre Française

1:45	Kelly Rose Voigt (Brown)	"The Still Point of the Turning World": A Fiction Collection
2:00	Benjamin Alger (Roberts)	The Transformation of Self and Identity in *The Count of Monte Cristo* and the Dehumanization of Revenge
2:15	Stephanie Vance (Wahl)	Frames of Mind
2:30	Audrey Huggett (Christensen)	Animals in Graphic Novels: A Comparative Analysis of *We3* and *The Pride of Baghdad*
2:45	Chris Amos (Wahl)	Driven by Light
3:00	Steve Dudas (Hendrix)	"Ambient Noise"
3:15	Helen Craig (Henke)	Expectations of Cultural and Linguistic Assimilation: Two Case Studies on American and French Policies Influencing Immigration and Education

FORUM #3 – Norris Center 102

8:30	Stephanie Blocker (Saville)	The Potential Antiangiogenic and Genetic Effects of Long-Liposomal Encapsulated LGD5552 in Cancerous Cells While Targeting the Glucocorticoid Receptor
8:45	Alexandra Beach (Olapade)	Microbial Abundance and Diversity within the Human Oral Cavity in Relation to Hygiene Practices
9:00	Jack Kronner (French)	An Evaluation of Supracondylar Humerus Fractures: Is There a Correlation between Delayed Treatment and a Need for Open Surgical Intervention?
9:15	Mark Feger (C. Moss, R. Moss)	The Relationship between Cardiovascular Fitness and Mental Fatigue
9:30	Rachel Leads (Albertson)	Behavioral Variation in *Drosophila* Due to *Wolbachia* Localization in Specific Adult Brain Regions
9:45	Chelsea Barberi (McCurdy)	A Social Ethogram of a Captive Troupe of Eastern Black-and-White Colobus Monkeys (*Colobus guereza kikuyuensis*) Examining Intraspecies, Interspecies, and Colobus-Guest Relationships
10:00	Nicole Johnson (Lyons-Sobaski)	Genetic Diversity between Central and Peripheral Populations of *Sabatia angularis*
1:15	Charlotte Spencer (Hill, Christopher)	The Effects of Priming Religious Concepts with a Christian Symbol, the Cross, on Perceptions of Self and Others
1:30	Monica Davis (Hill, Christopher)	The Effect of Religious Priming on Self-Control
1:45	Emily Sullivan (Schmitter)	Conversion Disorders and Their Neurological Implications
2:00	Katie Pickworth (Francis)	How Do Working Memory and Sentence Length Influence Syntactic Flexibility?
2:15	Lindsey Peterson (Wieth)	Finding Your Way Home Again: Reverse Culture Shock and the Reentry Process
2:30	Maria Kaisler (Carlson)	A Social Skills Board Game for Children with Autism: A Case Study
2:45	Anthony McCoy (Wieth)	Time of Day Effects on the Use of the Anchoring Heuristic
3:00	Kristen Dawes (Christopher)	The Effect of Expressive Autobiographical Composition on Self-Efficacy
3:15	Erica Ahlich (Carlson)	Emotional Intelligence Moderates the Relationship between Shyness and Feelings of Inadequacy
3:30	Alex Parker (Wilson)	Biochemical Responses to Darkness with and without Circadian Clock Input

FORUM #4 – Norris Center 104

8:30	Conor Fitzpatrick (Pheley)	Examining the Role of the CIA and U.S. State Department in the Political Fall and Eventual Assassination of Congolese Prime Minister Patrice Lumumba
8:45	Alan Williams (Rose)	Congressional Earmarks: Alternative Approaches to the Concept of Representation
9:00	Adam Enders (Dabney)	Crisis and Coverage: An Examination of News Media Reporting of the Deepwater Horizon Oil Spill

(continued on next page)

9:15	Sarah Christian (Baker)	Influential Campaigning: Evaluating the Effects and Results of Barack Obama's Speech Techniques throughout His Presidential Campaign
9:30	Christin Spoolstra (Dabney)	Term Limits and Minority Voter Turnout: A Study of the Michigan State Legislature
9:45	Rachel Keener (Franzen)	Our World, Our Health: Girls Club Garden
10:00	Courtney Flook (Henke)	Breaking Down the Foundation: How School Structure Affects Opinions toward Education
1:15	Robby Clark (Yoshida)	Zombie Lending in the United States
1:30	Courtney Meyer (McCarley)	Is Foreign Aid Aiding the Poor? An Analysis of the Motivations Fueling the Allocation of Official Development Assistance to and in Developing Countries
1:45	Abby Schonfeld (Mullin)	Nwagni Friction: An Anthropological Look at International Service and Education
2:00	Lauren Roberts (Melzer)	Challenging Binaries: Understanding Intersexed Identities
2:15	Chelsea Denault (Hagerman)	"The Spirited Will Act": Josiah Quincy, Jr. and the Mob Culture of Pre-Revolutionary Boston
2:30	Erin Bradt (Mullin)	Not Your Typical Battered Spouse: Intimate Violence in the LGBTQ Community and Michigan's Criminal Justice Response
2:45	Johanna Dart (Togunde)	Prevalence and Determinants of Sexual Violence among College Students in Nigeria
3:00	Tom Dukes (Hagerman)	The Life and Writings of Josiah Harlan, the First American in Afghanistan
3:15	Claire Kaisler (Pheley)	Examining How Intersex Track Athletes Are Unfairly Treated at the Elite Level
3:30	Christopher Blaker (Dick)	Let the Greatest Generation Speak: A Case Study
3:45	Rachel Francis (Dick)	Carlton VanMeter and the Greatest Generation: A Case Study

POSTER PRESENTATIONS – Science Complex Atrium, 4-5 p.m.

Erica Bennett (Zellner, McCaffrey)	Silylation of Dihydroxyacetone Glycoaldehyde
MacKenzie Burger (Schmitter)	Epigenetic Principles and Mechanisms Underlying Nervous System Function: Cognition and Neuronal Plasticity
Erin Goldman (Olapade)	Comparison of Autotrophic and Heterotrophic Microbial Assemblages along Nutrient Gradient in Rice Creek, Michigan
Zane Havens, Abigail Williams (Wilch)	Diel Turbidity Cycles in the Upper Kalamazoo Watershed, South-central Michigan
Katie Jonatzke (R. Moss)	The Effects of Physical Rehabilitation on Coping with Injury in Division III College Athletics
Nick Katcher (Saville)	The Effects of Alpha-Synuclein and Proteasome Function in a *Drosophila* Parkinson's Disease Model
Hannah Koaches (Rohlman)	Catalytic Folding Patterns of the *Anabaena* Group I Intron
Anthony McCoy (Wieth)	The Effect of Within- and Across-Hemisphere Processing on the Use of the Anchoring Heuristic
Drew Miller (Christopher)	Personality Facets and Sexism: The Mediating Roles of Right-Wing Authoritarianism and Social Dominance Orientation
Kayleigh Pung (Olapade)	Assessment of Source, Transport, and Fate of Fecal Indicator Bacterial Populations along the Watershed of the Kalamazoo River
Nicki Rockentine (Menold)	P-T Paths of the Luliang Shan UHP Locality, Western China
Katie Tennant (Carlson, Keyes)	Perceptions of Educational Attainment by Pregnant Teens as Affected by Race and Status
William Ward (Menold)	Whole-Rock Geochemistry of Ultra High Pressure Rocks in North Qaidam, China
Juliana Wurzler (Bieler)	The UV-Visible Absorption Properties of Benzoic Acid Derivatives

ABSTRACTS OF STUDENT PRESENTATIONS

ERICA AHLICH, '11

Emotional Intelligence Moderates the Relationship between Shyness and Feelings of Inadequacy

Faculty Sponsor: Jacque Carlson

Major: Psychological Science
Hometown: St. Ignace, Mich.

Shyness has been found to predict an array of maladjustment indices, such as loneliness, peer rejection, depression, and feelings of being a failure (Coplan & Arbeau, 2008; Fordham & Stevenson-Hinde, 1999). Due to the stability of shyness, some research has begun to focus on the possible buffers in the relationship between shyness and maladjustment. The current study examined the role of emotional intelligence.

It was hypothesized that emotional intelligence would moderate the relationship, such that individuals with high levels of shyness and high levels of emotional intelligence would report lower levels of feelings of inadequacy, whereas individuals with high levels of shyness and low levels of emotional intelligence would report higher levels of feelings of inadequacy.

Forty residents of a small Midwestern city and 93 students, ranging in age from 18 to 72, completed three surveys. The results of a multiple hierarchical regression supported the hypothesis. After controlling for shyness, emotional intelligence emerged as a significant moderator of this relationship, as indicated by the significant interaction between emotional intelligence and shyness, ß = -.16, $\triangle R2 = .026$, $F(1, 129) = 5.04$, $p = .027$.

The findings of this study suggest that a shy individual's emotional intelligence may play a role in mitigating the negative outcomes associated with being shy in our society. Provided that this study receives further support, clinicians attempting to alleviate the consequences associated with shyness should consider developing interventions that enhance an individual's emotional intelligence; this may prove to be a viable approach to aiding shy individuals.

Supported by: FURSCA

MICHAEL ALBANO, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems)

BEN ALGER, '11

The Transformation of Self and Identity in *The Count of Monte Cristo* and the Dehumanization of Revenge

Faculty Sponsor: Jessica Roberts

Majors: English, Exercise Science
Hometown: Grass Lake, Mich.

Throughout Alexandre Dumas' *The Count of Monte Cristo,* the main character, Edmund Dantes, comes to represent the transformation of a recognizable self to an identity as a result of his pursuit for revenge. Dantes undergoes the transformation from a recognizable self to an identity and plot device as he assumes the guise of the Count of Monte Cristo. This transformation has many implications, among the most significant being that the count becomes more of an authorial figure, allowing Dumas to commentate on the nature of authorial power and reveal his writing style in the novel. Also, the examination of the analogy that forms the basis of Thomas Sutpen's design within William Faulkner's *Absalom, Absalom!* allows the basic structure and organization of Edmund Dantes' revenge to become clearer. In an extenuation of this analogy, Dumas associates Dantes' transformation into an identity with limitlessness. The limitlessness of the Count of Monte Cristo serves as the primary difference between an identity and a self, since the self presented by both Sutpen's analogy and the life of Edmund Dantes is characterized by limitation. In an extended document, I examine the power of revenge in transforming a self to an identity and the implications that the limitlessness of identity has both upon the writing style of the novel and on the overall revenge plot of the novel.

CHRIS AMOS, '11

Driven by Light

Faculty Sponsor: Gary Wahl

Major: Geology
Hometown: Ypsilanti, Mich.

My photography business has been a platform for experimentation, testing, and learning for the past six years of my life. In this presentation I share some of the practices I've implemented as a professional photographer, young artist, and entrepreneur. I will also be discussing advanced photography techniques that I've learned and improved upon while at Albion. Right now I specialize in automotive, portrait, and wedding photography and will continue with my passion and business after I graduate in May.

JESSICA BAIRD, '11

Food, Farming, and the Liberal Arts: An Exploration of Multi-Disciplinary Campus Gardens

Faculty Sponsor: Trisha Franzen

Major: Psychological Science
Hometown: Palatine, Ill.

Although the inception of student farms on some college and university campuses dates back to the mid-1800s, surprisingly little scholarly research focuses on the current and potential roles of these farms in higher education. Such research is becoming increasingly important, however, as recent years mark an unprecedented surge of student-initiated farms and gardens across the United States, characterized by a unique, yet familiar set of principles. These include, for example, environmental sovereignty and food justice above profit. The present study acts as a kind of narrative that incorporates the processes, missions, purposes, and values of student farms at a variety of post-secondary educational institutions, including Albion College, where a group of students, faculty, and staff worked together to establish a farm in 2010. Data were collected via interviews with farm personnel and other students, faculty, and staff from a variety of college farming operations, with a particular focus on those in the Midwest. From the insights I gained on the functions and philosophies of these farms, I conclude that experiential learning about agriculture and food systems fits the tenets of a liberal arts ideology. Furthermore, I argue that this kind of scholarship ought to become a cornerstone of Albion College's curriculum and propose ways to meet such an end.

Supported by: FURSCA

CHELSEA BARBERI, '11

A Social Ethogram of a Captive Troupe of Eastern Black-and-White Colobus Monkeys (*Colobus guereza kikuyuensis*) Examining Intraspecies, Interspecies, and Colobus-Guest Relationships

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Troy, Mich.

The welfare of primates in zoos has become a forefront issue due to the intelligence of these animals and their complex social systems. Monitoring captive primate behavior helps ensure primate welfare by detecting behavioral differences from the norm which might be associated with stress, medical issues, or inadequate opportunities for enrichment. I conducted a study of Binder Park Zoo's five Eastern black-and-white colobus monkeys to identify their social patterns using a behavioral catalog which divided behaviors into affiliative, agonistic, and neutral categories. I then observed the colobus, and analyzed my data with a focus on intraspecies (colobus-colobus), interspecies (colobus-mangabey), and colobus-guest interactions. I created density diagrams to depict these relationships. Agonistic behaviors accounted for less than one percent of my observation time. This multispecies environment appears to provide positive enrichment for the two juvenile colobus and the juvenile mangabey, as well as species-appropriate enrichment for the adults of both species. The colobus were more agonistic as guest size increased, especially when the groups were larger than 30 individuals. However, the amount of time spent participating in affiliative behaviors was always significantly larger than the amount of time participating in agonistic behaviors.

Supported by: Binder Park Zoo

ALEXANDRA BEACH, '11

Microbial Abundance and Diversity within the Human Oral Cavity in Relation to Hygiene Practices

Faculty Sponsor: Ola Olapade

Major: Biology
Hometown: Sturgis, Mich.

The human oral cavity is a complex ecosystem, full of diverse bacterial populations within microbial communities that thrive on and around teeth, tongue, and saliva. These microbes tend to colonize several crevices of the oral cavity, primarily on the tongue and teeth, where they accumulate to form biofilms and/or plaque. Most importantly, the saliva serves as that medium where important stages of biofilm formation, i.e., colonization and growth, regularly occur, while also playing a significant role in regulating bacterial metabolism and their adherence to a host's dental surfaces. While several studies have examined microbial abundance within human oral cavities, to the best of our understanding, potential relationships between indigenous microflora and associated hygiene practices have not yet been adequately explored. Therefore, this study attempted to closely examine potential relationships between temporal changes in microbial abundance in various oral milieus and respective hygiene practices, using combinations of standard microbiological approaches. Overall, the results obtained from this study presumptively implicated the dominance of *Streptococcus pyogenes* and *Streptococcus salivarius* among the oral cavities examined. They also further corroborated earlier studies that have documented the relative abundance of *Streptococci* among other bacterial populations in response to high sugar-containing diets. Additionally, this study also revealed the constant periodic variations in bacterial abundance within the human oral cavity, irrespective of variations in hygiene practices.

Supported by: FURSCA

AARON BENDER, '11

Synthesis and Evaluation of a Novel Class of Salen-Derived Hypervalent Iodine Reagents

Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Shelby Township, Mich.

The synthesis and evaluation of chiral aryl iodine reagents as organocatalysts, and their capability to specifically transfer chirality in oxidation reactions, have been of interest to the French research group. French and his collaborators have shown that chiral aryl iodides can act as organocatalysts in alpha-oxytosylations of enolizable ketones with modest enantioselectivity. Current research has focused on a chiral, salen-derived, di-iodide as a potential new class of reagents. A one-step substitution reaction using two equivalents of a benzyl bromide compound with one equivalent of (1R, 2R, 3S, 5R)-(-)-Pinanediol and the evaluation of the resulting reagents as organocatalysts will be presented.

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

ERICA BENNETT, '13

Silylation of Dihydroxyacetone Glycoaldehyde

Faculty Sponsors: Nicolle Zellner, Vanessa McCaffrey

Majors: Chemistry, Spanish
Hometown: Rockford, Mich.

Scientists have discovered over 160 different compounds in the interstellar medium, and others have modeled how these materials could be formed and then incorporated into interstellar ice and grain mantles. These compounds, when combined with the heat and pressure of entrance into the Earth's atmosphere, potentially have the ability to change their molecular makeup to become more complex molecules. Glycolaldehyde (GLA) and dihydroxyacetone (DHA), simple sugars containing two and three carbon atoms respectively, are two such molecules that have been found in the interstellar medium and meteorites. This presentation describes how these simple sugars react under cometary impact conditions. These sugars were subjected to high temperature and pressure conditions at the NASA Ames Vertical Gun Range.

Supported by: FURSCA, American Astronomical Society, U.S. National Aeronautics and Space Administration

CHRISTOPHER BLAKER, '14

Let the Greatest Generation Speak: A Case Study

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 who fought in Europe and Asia 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 stories of "the greatest generation" are not lost, "America in Crisis: Great Depression, World War II, and Cold War," a history class at Albion College, invites students to resurrect their family connection to World War II and to the greatest generation.

This study remembers my grandfather, Eugene E. Parker, Jr. Born in late 1919, Gene grew up in Detroit during the Great Depression, desperately helping to support a large family with an unemployed father. Gene learned many things about himself during the Depression. He learned to take care of himself and his siblings. When the Japanese attacked Pearl Harbor on December 7, 1941, Gene immediately enlisted in the Marines. He spent the next three years on a series of cruisers, battleships, and aircraft carriers with the Navy as a Marine NCO, eventually serving directly under Admiral William Halsey. Gene was involved in a number of battles, including Midway, where he was wounded. He was present at the signing of the surrender documents between the Americans and the Japanese on the USS *Missouri*.

The things he learned during the war far surpassed what he had discovered about himself growing up, and he became a successful father and family man. One of his three children would join the Marines during the Vietnam War. Because of the lessons Gene learned while growing up during the Great Depression and World War II, he, like thousands of other men and women in his generation, was able to make something out of a life that had originally presented mainly obstacles. Gene died in 1981.

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

STEPHANIE BLOCKER, '11

The Potential Antiangiogenic and Genetic Effects of Long-Liposomal Encapsulated LGD5552 in Cancerous Cells While Targeting the Glucocorticoid Receptor

Faculty Sponsor: Kenneth Saville

Major: Biology
Hometown: Sterling Heights, Mich.

There has been some basic research on the effects of glucocorticoids (GCs) such as cortisol or prednisolone on cancer cells. The action of these molecules is targeting the glucocorticoid receptor (GR), which then dimerizes and translocates to the nucleus in order to initiate genetic effects. However, the use of GCs in human trials has led to numerous detrimental side effects such as bone loss, diabetes, immunodeficiency, and weight gain. Cancer researchers soon acknowledged that the potential therapeutic effects of GCs when treating cancer were highly outweighed by the negative side effects.

Through intensive literature review, I propose the use of a novel ligand that targets the glucocorticoid receptor and elicits similar therapeutic responses in order to treat cancer. Developed for use in arthritis research, LGD5552 causes dimerization of the GR allowing it to translocate to the nucleus. The genetic and therapeutic implications of LGD5552 include induction of cancer cell apoptosis (programmed cell death), reduction of inflammation that promotes cancer, and a reduction in cancer cell angiogenesis (derived blood supply). By encapsulating LGD5552 in long-circulating liposomes, the chemical may be limited to invading cancer tissue. Additionally, LGD5552 has a reduced negative side effect profile and may prove beneficial in the therapeutic sense. From the research gathered on the subject, I propose the use of liposomal-encapsulated LGD5552 *in vitro* as the first stages of drug development for a potentially new and effective chemotherapeutic agent.

MEGAN BORGELING, '13

Fantaisie Pastorale Hongroise, Op. 26, Albert Franz Doppler (1821-1883)

Faculty Sponsor: James Ball

Major: Music Performance
Hometown: Ludington, Mich.

Albert Franz Doppler was a composer as well as a flute virtuoso during the late Romantic Period (1850-1900). He is best known for his orchestration of six of Franz Liszt's Hungarian Rhapsodies. Doppler has also composed many German and Hungarian operas and ballets, but is best known for his work in flute repertoire. Doppler composed the *Hungarian Pastoral Fantasy* for flute after moving to Vienna in 1858, where he composed most of his ballet music and taught flute at the Vienna Conservatory. The themes of this piece are inspired by his touring days with his brother Karl, also a flautist, as a flute duo. He ended up in Hungary where he established the Hungarian Philharmonic Orchestra and gained experience with Hungarian folk themes.

Fantaisie Pastorale Hongroise is standard in a flautist's repertoire. It challenges musicians to be technical and rhythmical, while at the same time performing lyrically, and to take risks by adding their own personal interpretation to the piece. This piece is also dazzling and exciting for the audience with its three contrasting sections. This is why I have chosen this piece to perform for the Concerto Competition and this symposium. As a performance major I am expected to enjoy performing, and having a thrilling piece to play makes it all the more satisfying. I want to enrapture and dazzle my audience with my technical ability as a flautist as well as display my lyrical ability as a musician. With Doppler's *Fantaisie* I am able to create the best of both worlds by "playing one for the performer" and "one for the audience."

ERIN BRADT, '11

Not Your Typical Battered Spouse: Intimate Violence in the LGBTQ Community and Michigan's Criminal Justice Response

Faculty Sponsor: Molly Mullin

Major: Anthropology and Sociology
Hometown: Holt, Mich.

Over the past century, research on domestic violence in the United States has often shifted focus to consider populations that had previously been unrecognized. The first research focused on child abuse which was soon followed by research into spousal abuse and then elder abuse. Today, while problems in all populations remain and require further research, a new community has become a focus of research. Domestic violence in the LGBTQ community is equally prevalent to that of heterosexual households and partnerships; however, the acknowledgment of this abuse is recent. Because the recognition of this abuse is so recent, the availability of victim services for this population is inadequate. I set out to investigate Michigan's criminal justice response to same-sex domestic violence. What funding is available for victim services for the LGBTQ community? What is being

done to create an open and welcoming atmosphere for victims of this population to come forward? What obstacles are standing in the way of government and nonprofit organizations that are trying to assist this population? Through answering these questions I hoped to create original suggestions for policy makers and organizations to implement in order to help LGBTQ victims of intimate violence.

MACKENZIE BURGER, '11

Epigenetic Principles and Mechanisms Underlying Nervous System Function: Cognition and Neuronal Plasticity

Faculty Sponsor: Ruth Schmitter

Major: Biology
Hometown: Bay City, Mich.

Environmental factors including toxins and chemicals are widely known to cause genetic mutations in sequences of human DNA. In addition, these factors and other influences such as behavior and nutrition can affect gene expression via alterations in chromatin condensation at the epigenetic level. While a gene is not mutated, its difference in shape can functionally prevent it from being activated, still resulting in null protein production and a mutant phenotype. The objective of this study was to review and analyze primary literature from the past decade that has focused on epigenetic modalities in a neurological context at the molecular and systems levels.

In addition, ongoing research protocols were observed at the Environmental Epigenetics and Nutrition lab at the University of Michigan School of Public Health. Correlations between several forms of cancer and aberrant epigenetic organization have been hypothesized and supported since the 1990s. Recent studies have also suggested numerous and varied roles of epigenetic mechanisms in the central nervous system. Memory retention, cognitive slowing and degradation associated with aging organisms, diseases including Alzheimer's, and learning behaviors are all neurological topics of interest that have been identified as targets of epigenetic control. By understanding molecular epigenetic characteristics of normal and aberrant function, scientists can begin to investigate both methods of disease prevention and potential therapies to treat existing pathophysiological states.

CATHERINE CASTELLI, '12

Shifting Elevational Distributions of Three Subalpine and Alpine Plant Species in the White Mountains, California

Faculty Sponsors: Christopher Van de Ven, Thomas Wilch

Major: Geology
Hometown: St. Clair Shores, Mich.

This study investigates recent changes in distribution of dwarf sagebrush (*Artesmia arbuscula*), bristlecone pine (*Pinus longaeva*), and limber pine (*P. flexilis*) at their uppermost limits in the White Mountains, eastern California. Dwarf sagebrush was examined by ground survey around Mt. Barcroft in the central White Mountains in the alpine zone which is defined by elevations above 11,500 feet. Changes in the distributions of limber and bristlecone pines were examined in the subalpine zone at elevations between 9,500-1,500 feet on Sage Hen Flat and along upper Crooked Creek by comparisons of air photos from 1947 and 2005. Anthropogenic climate change is suspected to be changing the elevational distributions of these three species. The dwarf sagebrush field survey located individual plants around Mt. Barcroft and compared the numbers, sizes, and distributions to an identical survey conducted in 2005-06. The analysis showed that more sagebrush were found at higher elevations in 2010 compared to the 2005-06 survey, but the size distribution has not changed significantly. The highest elevation in which sagebrush was found in 2010 was 12,739 feet. The trees were surveyed over a larger area in the subalpine woodland centered on Sage Hen Flat by comparing air photos taken over the area from 1947 and 2005. The air photo survey analysis showed that ≈85 percent of the new pine growth is ≥ 50 feet from the established tree line in 1947. These trees are expanding in all directions—upslope, around aspects, and downvalley, depending on local topographic and microclimatic conditions. This research implies that climate change is having an effect on the elevational distributions of these ecosystem-defining alpine and subalpine plants.

Supported by: FURSCA, Taylor Fund for Undergraduate Research in Geology

SARAH CHRISTIAN, '11

Influential Campaigning: Evaluating the Effects and Results of Barack Obama's Speech Techniques throughout His Presidential Campaign

Faculty Sponsor: Vicki Baker

Major: Communication Studies
Hometown: Dexter, Mich.

The presidential campaign has become a marketing and advertising campaign for individuals seeking to lead America, consisting of verbal and nonverbal techniques to 'purchase' votes from the American voters. The issue is, how many of these techniques portray just how the candidate will lead, and how many are simply 'ploys' to ensure a win? With a large population of Americans basing their votes on the speeches that they see on television or read on the Internet, how can they be sure that these speeches will indeed portray how the candidate will act in office?

This paper first takes an evaluative look at a series of Barack Obama's speeches while petitioning for office, considering key techniques that are seen as successful forms of speech presenting. The second section evaluates the current status of President Barack Obama's agenda in terms of the promises he made throughout his campaign. The last section will tie the first two sections together,

as well as look at the other options voters can pursue in order to become more educated with their vote. The purpose of this project is to evaluate how speech presenting techniques can persuade a large population toward a monumental decision, which in this case is voting for the future president of the United States.

ROBBY CLARK, '12

Zombie Lending in the United States

Faculty Sponsor: Kotaro Yoshida

Majors: Mathematics, Economics and Management
Hometown: Bridgman, Mich.

Bank lending plays a vital part in allocating funds to where they are most productively used. When a company goes bankrupt, however, banks can let the company fail and collect residual assets or keep the company alive by lending to them at low rates. In the late 1990s and early 2000s, Japanese banks chose the latter and kept afloat these "dead" companies, hoping that they would recover and pay back. This kind of lending became known as zombie lending, which makes the economy inefficient as it slows the exit of less productive companies and distorts resource allocation.

My work focuses on whether zombie lending exists in the aftermath of the financial crisis in the United States and, if so, characterizes the profile of such borrowers. Following earlier studies in the literature, I have constructed a zombie lending index for thousands of U.S. companies and run a multivariate panel regression. The findings suggest that the zombie index, unlike in the case of Japan, is negatively associated with the financial health of the companies. It implies that banks in the United States have indeed offered lower interest rates to healthy borrowers and higher interest rates to troubled ones.

Supported by: FURSCA

PHILIP CONRAD, '11

Retention of Various Metals through Metamorphism in Grey Tree Frog (*Hyla Versicolor*) Larvae

Faculty Sponsor: Dean McCurdy

Major: Environmental Geology
Hometown: Grand Rapids, Mich.

I tested the ability of *Hyla Versicolor* (grey tree frog) to depurate Ag, Cu, Zn, As, Cd, Se, Hg, V, Cr, and Pb, introduced in two dosing levels through food, during various stages of metamorphosis. We also looked for biological consequences or stress in individuals, by measuring the metabolic rates of individuals at various stages along with growth rates. The control, low, and high dose treatments were conducted in quadruplicate, with each enclosure having 15 animals at the beginning of the experiment. Individuals were taken from each enclosure before the onset of metamorphosis, after hind leg emergence, after front leg emergence, and after complete metamorphosis. Analysis of trace elements in tissue was performed using ICP-MS after microwave digestion. Respiratory rates of individuals were tested before metamorphosis and after metamorphosis, using a closed-circuit microrespirometer. Among the elements tested, Ni, Cu, and Zn showed decreases in concentrations between the tadpole stage and premetamorphosis in low and high dose treatments, which suggests that *Hyla Versicolor* larvae are able to depurate these metals in the early stages of metamorphosis. However, concentrations of these elements increased during the final stage of metamorphosis, indicating that element mass loss exceeded depuration.

Supported by: Maryland Sea Grant

JEREMY COVELL, '11

Polymeric Membrane-Supported Palladium Nanoparticles for the Remediation of Trichloroethene

Faculty Sponsor: Kevin Metz

Major: Biology
Hometown: Brooklyn, Mich.

The persistence and increasing abundance of trichloroethene (TCE) within the environment, particularly ground water, is of great concern. This has prompted the development of several remediation technologies that utilize the catalytic properties of metal nanoparticles. *Ex-situ* approaches have been proposed that combine the catalytic properties of nanoparticles with the ease of use offered by membrane supports. In this study we present a method for the fabrication of membrane-supported palladium nanoparticles (PdNPs). Furthermore, we will present results from the characterization of PdNPs on membrane supports and the analysis of their catalytic hydrogenation of TCE.

Supported by: FURSCA, American Chemical Society Petroleum Research Fund

HELEN CRAIG, '12

Expectations of Cultural and Linguistic Assimilation: Two Case Studies on American and French Policies Influencing Immigration and Education

Faculty Sponsor: Suellyn Henke

Major: History (Elementary Education Concentration)
Hometown: Grand Rapids, Mich.

Policies in the United States and France regarding the cultural and linguistic assimilation of immigrants through public education assume that in French and American society, immigrants, upon arrival, are expected to begin transforming their identity to fit the expectations of the dominant society. I studied two cases to examine the effect of educative policies toward immigrants. I approached this issue by first examining historic attitudes toward immigration in France and the United States, and then narrowed my research to two policies implemented in the last ten years that severely limit cultural and linguistic expression. The first considers *Loi N°2004-228 du 15 mars 2004*, the French Headscarf Ban of 2004, which prohibited the physical expression of religious affiliation through clothing or symbols, such as the Muslim headscarf, in public primary and elementary schools. The majority of the immigrant North African (Maghreb) population of France is Muslim and concentrated in poor suburbs of the rich cities, thereby limiting alternate opportunities for private school education where the display of religious artifacts would be permitted. The second examines Arizona Proposition 203 (2000) which replaced bilingual education initiatives with a program of English Immersion. This program, although ineffective, remains in place today, limiting the resources available to English Language Learners (ELLs). The French Headscarf Ban and Arizona Proposition 203 mandate culturally homogeneous educational environments that alienate immigrant students in the classroom and devalue their linguistic and cultural heritage. These and similar policies must be reexamined for effectiveness in integrating immigrant students in public schools.

CHRISTOPHER CREIGHTON, '11

Comparison of Quantization Results from Two-Dimensional Cosmologies Quantized with Different Factor Orderings

Faculty Sponsors: Darren Mason, David Seely

Majors: Mathematics, Physics
Hometown: Grosse Pointe Park, Mich.

During the Big Bang, a point of infinite spacetime curvature, the basic rules for how the universe behaves break down. While general relativity accurately describes the universe and the effects of gravity on the larger scale, it struggles with points of singularity such as the Big Bang. It needs to be infused with quantum mechanics, the rules of behavior for the very small, to explain the likes of the Big Bang and black holes. With quantum mechanics applied to general relativity, there arise ambiguities in the ordering of factors in the definitive equation for the state of the universe. To find out the proper ordering of factors, we turn to a computer model of the universe that has arguably made a good choice using a completely different methodology, simplified to the toy model of one space and one time dimension. We do this by comparing our varied possibilities to the computer model to try and ascertain hints about how our universe behaves in the realm of the very small.

JOHANNA DART, '12

Prevalence and Determinants of Sexual Violence among College Students in Nigeria

Faculty Sponsor: 'Dimeji Togunde

Major: Sociology
Hometown: Commerce Township, Mich.

A total of 2,006 Nigerian college students were surveyed regarding experiences and exposure to dating violence. The frequency of sexual violence among the sexes was measured with a variable termed "combovio," which was created from a combination of two questions in order to target both the attempts and actual acts of sexual violence. Results show a higher perpetration rate for males. Attitudes (traditional versus modern) toward dating and status of women in society were also assessed through independent variables such as "who should pay for a date?" along with Westernization variables. Findings for males and for females differ and are discussed.

Supported by: FURSCA

MONICA DAVIS, '12

The Effect of Religious Priming on Self-Control

Faculty Sponsors: Eric Hill, Andrew Christopher

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

Previous research has shown that religious beliefs can influence cognitions, including aspects of self-control and even attitudes toward others. Some studies have found that religion is related to greater prejudice toward out-groups such as women (Maltby et al., 2010) and gay men (Malcomnson et al., 2006). Other studies have related religion to increased racial prejudice (Rowatt, LaBouff, Johnson, Froese, & Tsung, 2009). The current study focused on the effects of religion on self-control and attitudes toward others using an experimental paradigm. It was hypothesized that the experimental group, which was primed with religious concepts, would report higher levels of self-control than the comparison group, which was primed with neutral concepts. The second hypothesis was that participants who receive the religious prime and report being inherently religious will have increased negative attitudes toward gay men, women, and African-Americans. Half of the participants were randomly assigned to be primed with God concepts using a word scramble task, and the other half were primed with neutral concepts using the same task. The neutral prime contained words that were unrelated to religious concepts. After the participants completed the word scramble task, they completed eight different measures, including religious fundamentalism, self-regulation (a broader form of self-control), homonegativity, ambivalent sexism, and symbolic racism.

KRISTEN DAWES, '11

Mouthful of Feathers: A Poetic Study of Form

Faculty Sponsor: Julie Stotz-Ghosh

Majors: English (Creative Writing), Psychological Science
Hometown: Bloomfield Hills, Mich.

To demonstrate the metamorphic potential of poetic form, I composed a three-part manuscript of poetry progressing through traditional forms, non-traditional expressions of traditional forms, and culminating in free-form poems. Each section of the manuscript embodies one of these manifestations of form and displays a separate yet integrative aspect of the potential of form in the generation of verse. Using traditional versions of poetic forms, I explore their agency in shaping language, such as when the rhyme schemes of a sonnet pull words into lines I otherwise would not have used, or the syllabics of a haiku push my syntax in directions I never considered. Poems featuring elements of form less traditionally show the malleability of form; these pieces reveal my understanding of the traditional forms and the confidence in that understanding which allows me to push familiar boundaries. Finally, free-form poetry comprises the ultimate demonstration of traditional and closed forms' potential to shape poetic expression: my free-form pieces show control of imagery and sound, concise and potent expression, and employ elements such as refrain without the boundaries of the sonnet, pantoum, haiku, ghazal, etc., being present but their influences clearly represented.

Supported by: FURSCA

KRISTEN DAWES, '11

The Effect of Expressive Autobiographical Composition on Self-Efficacy

Faculty Sponsor: Andrew Christopher

Majors: English (Creative Writing), Psychological Science
Hometown: Bloomfield Hills, Mich.

This research explored the effects of responding to writing prompts on general self-efficacy to better understand possibilities of altering self-efficacy, a key factor in effective, sustained behavioral modification (Bandura, 1997; Collins, 1982). Two sets of expressive writing prompts reflected autobiographical definitions of self-efficacy (Bandura, 1977, 1997) and agency (Bakan, 1966), focusing on either a specific academic performance or control over environment; an additional set of prompts operated within a neutral writing condition, provoking thoughts unrelated to autobiographical reflections, such as listing shapes. The experimental design also employed a non-writing control group. The General Self-Efficacy Scale (GSE) provided a measure of self-efficacy in each of three sessions for the 68 Introductory Psychology student participants (Sherer & Maddux, 1982); participants in writing conditions responded to writing prompts in the last two sessions, subsequently completing the GSE scale.

Analyses of variance revealed no significant effect of writing condition on general self-efficacy; a significant main effect of time on self-efficacy was observed, with GSE scores increasing after the baseline session. Responses to writing prompts were coded for positive and negative evaluations along the cognitive triad (Beck, 1979); findings show that writing prompts with a positive construction produced significantly positive evaluations for self and world, and produced marginally significantly positive evaluations for future. Implications of these results, such as methods to possibly increase self-efficacy, are discussed as a function of narrative therapy. Future research directions include increasing the number of writing sessions and prompts, and narrowing the focus of prompts and measures of self-efficacy.

HEATHER DE BARI, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems)

CHELSEA DENAULT, '12

"The Spirited Will Act": Josiah Quincy, Jr. and the Mob Culture of Pre-Revolutionary Boston

Faculty Sponsor: Christopher Hagerman

Major: History
Hometown: Clinton Township, Mich.

Boston had a long history of working class people using the mob to express their political grievances and successfully achieve the resolution of those grievances through their demonstrations. Yet it was not until the formation of the complex patriot infrastructure in Boston in the early 1760s that the seemingly unruly mob became an essential part of political demonstrations against oppressive policies. Interestingly, the behavior of the mob was characterized by a surprising sense of purpose and discipline, especially in the selection of their targets. These strictly ritualized demonstrations were intended only to intimidate and mock royal officials, which also contributed to the prevention of physical violence.

Ultimately, the discipline and order exhibited by the mob allowed their fellow Boston citizens to feel at ease with the protests against oppressive British policies. Bostonians also demonstrated a consciousness of past mob actions and recorded their successes through the instruments of patriotic almanacs, popular songs, and influential sermons. With these tools, the patriot infrastructure could influence the way the public perceived the mob, as they very obviously did during the Stamp Act riots of August 14 and August 26, 1765.

While many men of the patriot gentry openly supported the Boston mob and even used it to their advantage in the resistance against British policies, Josiah Quincy, Jr. could not tolerate the mob's actions. Quincy's work as an attorney bound him to maintain the rule of law and help keep order in society, and the mob did everything to counter that. To Josiah Quincy, the mobs employed by his own peers were blatantly illegal.

By analyzing the language used in eighteenth-century newspapers to describe the mob's actions, I was able to locate instances of the surprising level of discipline employed in the mob's actions, as well as a moment of disorder. These newspaper reports demonstrate an acceptance and, at times, a manipulation of the mob's action by the patriot infrastructure. Quincy's own letters and law reports added the final dimension to my project and allowed me to understand Quincy's divergent opinions and the reasoning behind them.

Supported by: Albion College Center for International Education/Off-Campus Programs, Associated Colleges of the Midwest Newberry Library Seminar for Research in the Humanities

STEVE DUDAS, '11

"Ambient Noise"

Faculty Sponsor: Scott Hendrix

Major: English (Creative Writing)
Hometown: Livonia, Mich.

"Ambient Noise" is a spoken word poetry collection drawn from my summers as a factory worker at a nitrogen gas spring plant in Plymouth, Mich. The collection's narrative follows a character named College Boy, a shy, younger worker, over the course of one day in the factory world. The poems include dramatic monologues from other characters speaking to College Boy, descriptions of interactions between various workers, and College Boy's addresses to the machinery on the shop floor. I have used musical devices and form in the collection in an attempt to connect the musicality of language to the musicality of industrial sounds and the repetitions of the factory. Specific stylistic influences on the collection's musicality include hip-hop, slam, and traditional literary poetic forms.

Supported by: FURSCA

TOM DUKES, '13

The Life and Writings of Josiah Harlan, the First American in Afghanistan

Faculty Sponsor: Christopher Hagerman

Major: International Studies
Hometown: Midland, Mich.

The writings of Josiah Harlan, the first American to travel to Afghanistan in the mid-nineteenth century, offer a unique account of the country and the period. Although ostentatious, Harlan's prose, including the unpublished *Oriental Sketches* (1841), shows considerable insight into Afghanistan and its people, produced by perceptive observation. This paper examines *Oriental Sketches*, its place in the historiography of its time and field, and its role in creating stereotypical views of the people of Afghanistan, within the framework of Edward Said's *Orientalism* (1978), in particular the characteristics of Westerners writing about Asia. Although Harlan does help spread simplifications of the Afghan people, several unique aspects of the text, not least those which result from Harlan's perspective as an alternative viewpoint to that of the British, set *Oriental Sketches* apart from its contemporaries.

Supported by: FURSCA

ADAM ENDERS, '11

Crisis and Coverage: An Examination of News Media Reporting of the Deepwater Horizon Oil Spill

Faculty Sponsors: Dyron Dabney, Paul Hagner

Majors: Political Science, Public Policy
Hometown: Shelby Township, Mich.

In times of crisis, whether a terrorist attack or a natural disaster, the news media are often essential to disseminating important information that can save lives and aid those in harm's way. With great power comes great responsibility, however, and political scientists and mass communication researchers have exposed the media's tendency to provide the bulk of access to "officials" and "experts," which are oft considered the only legitimate sources of information, while many other credible sources of information are never given a voice.

In this study, I use coverage of the Deepwater Horizon oil spill of 2010 as a case study through which to examine sources of information, incident framing, historical and relevant contextualization, and general quality of news media coverage of a modern-day crisis. One of my central hypotheses is that the incident will largely be framed as a long sequence of single, daily *events*, rather than as an enduring institutional *issue*. The effect of this framing is most likely a severely limited national discussion premised on institutional processes and regulatory failures, and a need to correct those failures. All of these effects support the notion that similar incidents are bound to recur. In order to test my hypotheses I conducted a quantitative content analysis of *The New York Times* as well as the *NBC Nightly News* program during the April 20-August 1, 2010 time period.

MARK FEGER, '11

The Relationship between Cardiovascular Fitness and Mental Fatigue

Faculty Sponsors: Carol Moss, Robert Moss

Major: Athletic Training
Hometown: Kinde, Mich.

We are often called to make important decisions while in a fatigued state, whether it be in academics, athletics, or in life. Previous research has evaluated mental fatigue in relationship to sleep deprivation and the post-fatigue cognitive ability. Very little attention has been given to the relationship between the physiological responses during exercise and to the acute neurocognitive function and/or associated mental fatigue. To test the hypothesis that there would be a direct relationship between the level of physical exertion via VO2 max measures and the level of mental fatigue, we systematically evaluated 10 varsity male athletes. During an incremental progression to maximal physical exertion, subjects were tested cognitively with mental math problems. Percent correct values were obtained for each increment and analyzed to determine what level of cognitive function and/or mental fatigue could be assessed. We were unable to support the hypothesis that mental fatigue could be directly related to physical exertion. However, we were able to demonstrate a relationship between the acute physiological responses to exercise and an increase in neurocognitive function. Further investigation has led us to believe this correlation could be attributed to a brain-derived neurotrophic factor released as one of the acute physiological responses during physical activity.

CONOR FITZPATRICK, '11

Examining the Role of the CIA and U.S. State Department in the Political Fall and Eventual Assassination of Congolese Prime Minister Patrice Lumumba

Faculty Sponsor: Alfred Pheley

Majors: Foreign Policy, Political Science
Hometown: Las Vegas, Nev.

On June 30, 1960, Patrice Lumumba became the first democratically elected leader of Congo-Kinshasa. Seven months later, he was taken to a clearing in the savannah woods and shot by soldiers from Belgium and Katanga. The United States, having already authorized attempts on Lumumba's life, unsurprisingly remained mute. The current primary resource for information regarding the American role in the fall of Lumumba is a book authored by Madeline Kalb in 1982. However, since the original date of publication, additional documents have been declassified by the CIA and U.S. State Department which shed new light upon the motives, directives, and actions of the U.S. government. Furthermore, the government of Belgium has recently declassified and acknowledged its role in Lumumba's execution. By merging information released over the last quarter-century, this study aims to provide a comprehensive account of American involvement in the Congo from the independence movement to Lumumba's assassination in January 1961.

Most current work in academia views the conflict over post-colonial Congo in the context of the Cold War due to Colonel

Joseph Mobutu's close ties with the American Embassy along with Lumumba's appeal to the Soviet Union for assistance in quelling a secessionist movement in the southernmost Katanga province. This research will remain neutral in perspective, decisively steering away from normative judgments about ideology. Primarily, the study will provide an account of what the United States knew, when they knew it, and what independent actions were taken as a way of altering the democratically elected government of the Congo.

COURTNEY FLOOK, '12

Breaking down the Foundation: How School Structure Affects Opinions toward Education

Faculty Sponsor: Suellyn Henke

Major: English (Secondary Education Concentration)
Hometown: Waterford, Mich.

While federal policies, such as No Child Left Behind, are at the center of controversy over the way students receive and participate in their education, the structure of public education is rarely examined as a contributing factor. The purpose of this study is to better understand secondary students' underlying values and assumptions within different public school structures; by comparing students' opinions of varied cultural contexts (France and the U.S.), I was able to gain insight, as a future secondary teacher, on how to engage and motivate learners.

This study is based on a survey of French and American secondary students (ages 11-18). The survey consisted of open-ended questions about their classes, the importance of grades, their likes and dislikes about their school, and their views on the purpose of education. Unstructured interviews were conducted with French and American teachers and administrators to understand their opinions about student involvement, as well as the structure of education.

Preliminary results suggest similarities and differences in the way that the French and American students understand their experience of school. While French students expressed their desire for more free time, Americans shared their desire to have more control over their education; both, however, wished that schools would express more interest in their needs. After completion of this study, I plan to continue investigating the individual components of different school structures in order to be able to propose a new or preferred model with which to meet the educational needs of American students.

EMILY FOSTER, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest)

RACHEL FRANCIS, '14

Carlton VanMeter and the Greatest Generation: A Case Study

Faculty Sponsor: Wesley Dick

Major: Undecided
Hometown: Bryan, Ohio

In *The Greatest Generation*, Tom Brokaw commented on the reluctance of World War II veterans to talk about their experience. Ken Burns, in his 2007 film series, *The War*, reminded us that the World War II generation is fast passing from the scene. "America in Crisis: Great Depression, World War II, and Cold War," an Albion College history class, invites students to interview members of the "Greatest Generation," in the hope that their stories will not be lost.

This case study illuminates the life of Carlton VanMeter, who was born and raised in Albion, Michigan. He came of age during the Great Depression and, following the attack on Pearl Harbor, enlisted in the United States Army Air Force. As a pilot, Carlton was based in France and flew bombing missions over Germany. Meanwhile, Carlton's wife, Dorothy, was holding down the home front. Carlton survived to return to Dorothy and their fifteen-month-old child. This study brings the war home to this community, and it is also a way of saying thank you to Carlton VanMeter and to the "Greatest Generation."

Carlton VanMeter is the definition of courage, sacrifice, and honor. He has done so much, and asks for very little in return. As Carlton VanMeter explained to me, "God has been good to me, and I could ask for nothing more!" It is vital that we record World War II veterans' quotes and experiences before it is too late. This generation will soon be gone, but we hope never forgotten, as their stories live on.

ERIN GOLDMAN, '11

Comparison of Autotrophic and Heterotrophic Microbial Assemblages along Nutrient Gradient in Rice Creek, Michigan

Faculty Sponsor: Ola Olapade

Major: Biology
Hometown: West Bloomfield, Mich.

In aquatic ecosystems, nutrients and predators are important regulators of plankton biomass and productivity. Protozoa are considered to be the most important grazers of bacteria, and mechanisms controlling resource supply are likely to be important since many bacteria and protozoa are considered to live in extremely resource-poor environments. It was

hypothesized that combinations of several factors, including protozoa predation, nutrient supply, and river hydrodynamics, would influence microbial community composition and structure at various temporal and spatial scales. Three sites along Rice Creek were selected: Hicks Road, Pickett Road, and 28 Mile Road. Water samples were collected in triplicates, and physiological measures were gathered using the YSI. Several microbiological techniques, including absorbance peak measurement for chlorophyll *a*, protozoa count [Primulin staining], and DAPI nucleic acid staining, were used to determine whether protozoa or nutrients more significantly affected the number of microorganisms present. From this study, chlorophyll *a* was found to appear in negative quantities, as was not predicted. It has also been determined that temporally and spatially, Rice Creek has exhibited a top-down effect, in which protozoa significantly affect the quantity of microorganisms present.

Supported by: FURSCA, Beta Beta Beta

CYNTHIA HANSON, '12

Description of Mudflat Animals from Intertidal Mudflats along the Coast of Suriname, South America

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Menomonie, Wis.

The intertidal mudflat coast of Suriname is full of invertebrate life from crustaceans to polychaete worms, which are crucial prey for migratory shorebirds, yet there has been comparatively little research done on this area and its inhabitants. In recent trips to Suriname, Dean McCurdy and his research team have been finding what could possibly be undescribed, "new" species of amphipod, nemertean, isopod, and polychaete. I worked in the lab last summer to identify some "unknown" amphipods preserved in ethanol through DNA extraction and barcoding techniques. I perfected a procedure to successfully extract the crustacean DNA. Unfortunately, the preserved samples may have degraded too much, and there was most likely contamination from a local test species used (*Gammarus minus*), because the few sequences that were long enough to barcode matched with *Gammarus minus* in the DNA database. To follow up, I traveled to Suriname to collect fresh samples of these amphipods, as well as an "unknown" nemertean and several polychaete samples to test and barcode. These samples are still being processed, but they should provide better results.

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

ZANE HAVENS, '12

Major: Earth Science
Hometown: Albion, Mich.

ABIGAIL WILLIAMS, '12

Major: Geology
Hometown: Stillwater, Minn.

Diel Turbidity Cycles in the Upper Kalamazoo Watershed, South-central Michigan

Faculty Sponsor: Thomas Wilch

Diel (daily) cycles in turbidity and other stream parameters occur in the north branch of the Upper Kalamazoo River. Although turbidity is an important water quality parameter, diel fluctuations are not accounted for in stream assessments. Data were collected at select sites in the stream and adjacent wetland areas between May and November 2010. Turbidity, specific conductance, pH, ORP, and temperature levels were measured at 15-minute intervals using data logging instruments, and stage level and water table levels were measured at the same intervals using pressure transducers. Cycles in turbidity typically peaked at ~7 NTU (turbidity units) at approximately 4:00 a.m., and range ~5 NTU, but during storm events, turbidity levels reached over 25 NTU. Water table levels also showed cycling, with a peak right before sunrise, and a trough right before sunset, changing approximately 30 cm over a course of 24 hours, which is likely the effect of wetland pumping. Stream stage levels did not show definite cycling like water table levels, but showed some change in stage that could be attributed to groundwater input.

Previous student research on the nearby Rice Creek watershed showed similar relationships between turbidity and adjacent groundwater levels. The turbidity cycles were attributed to a wetland groundwater pumping phenomenon that resulted in groundwater flow, stream level, and turbity cycling. Future work in the Upper Kalamazoo watershed will focus on determining causes of diel cycling of turbidity.

Supported by: FURSCA, Taylor Fund for Undergraduate Research in Geology

NICHOLAS HERRMAN, '12

Photolytic Cleavage of Leader Peptides

Faculty Sponsor: Vanessa McCaffrey

Majors: Chemistry, Biology
Hometown: Baroda, Mich.

The field of leader peptide-guided biosynthesis is rapidly expanding, with the development of techniques to utilize biosynthetic enzymes *in vitro* greatly aiding this research. However, the *in vitro* reconstitution of the protease activity that removes the leader peptide has been unsuccessful. A variety of compounds allow for site-specific photolytic cleavage of peptides, but these linkers generally result in non-natural termini on the cleavage fragments. In this work, a photolabile linker was developed that affords native termini on the product after cleavage to ensure proper folding. This linker is shown to be completely compatible with Fmoc solid phase peptide synthesis, with a wide variety of amino acids tested both N- and C-terminal to the linker. The linker is also amenable to Cu(I)-catalyzed alkyne-azide cyclo-addition, and successful tests of the linker in conjunction with leader peptide-guided biosynthetic enzymes suggest that it has broad applicability to the study of posttranslationally modified natural products.

Supported by: National Institutes of Health and University of Illinois Snyder Summer Research Scholars Program

AUDREY HUGGETT, '12

Animals in Graphic Novels: A Comparative Analysis of *We3* and *The Pride of Baghdad*

Faculty Sponsor: Nels Christensen

Major: English
Hometown: Traverse City, Mich.

This presentation explores the use of nature as a thematic element in graphic novels by comparing the role of animals in Grant Morrison's *We3* and Brian K. Vaughan and Niko Henrichon's *The Pride of Baghdad*. The animals in these graphic novels challenge accepted notions of "wild" and "domestic," often acting in ways that are violent and unrestrained, even as they struggle to free themselves from the equally, wildly violent influence of humans. The tension between wildness and domesticity presented in the novels reveals both the different ways that humans categorize the world around them and the disturbingly dangerous implications these categories have when placed in a context of war and violence.

Supported by: FURSCA

NICOLE JOHNSON, '11

Genetic Diversity between Central and Peripheral Populations of *Sabatia angularis*

Faculty Sponsor: Sheila Lyons-Sobaski

Major: Biology
Hometown: Port Huron, Mich.

Sabatia angularis (Gentianaceae) is a state-threatened plant species in Michigan. Michigan populations are considered peripheral as they are at the edge of a species range. Central populations are located in the main portion of the species range, and thus are expected to have higher levels of gene flow between populations and relatively high levels of genetic diversity within populations. Peripheral populations that are located at the edge of a species range are isolated, and thus experience low to no gene flow between populations. The hypothesis for this study is that, if peripheral populations have low gene flow rates, then peripheral populations of *S. angularis* will be genetically different from central populations. Five microsatellite genetic markers were used to test the central-peripheral hypothesis by comparing three populations of *S. angularis*, one central and two peripheral, to determine if there is a difference in genetic diversity between these population types. Microsatellite loci were amplified using PCR. PCR products were visualized and scored using the Beckman-Coulter CEQ 8000 DNA Analyzer. Locus Sc1, Sc4, and Sc255 indicated genetic diversity both within and among populations; however, another locus, Sc281, was monomorphic. The results of this study will help to determine if peripheral populations of *S. angularis* are important for conservation.

Supported by: FURSCA, Beta Beta Beta

ANGELA JOHNSTON, '11

Tanaid Crustaceans from Suriname, South America as Bioindicators of Environmental Mercury Levels

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Saline, Mich.

Small-scale gold mining is an issue in many parts of the world, but especially in Suriname, South America. Illegal miners use toxic mercury as an amalgam to obtain gold from waterways, and they subsequently release mercury into the environment by burning it from the gold. High levels of mercury in the environment and in food may have adverse effects on humans by causing mental, neural, and other sensory damage upon consumption or absorption. As part of a project to monitor mercury concentrations in Suriname's waterways, I measured mercury levels in two tanaid crustacean species—*Discapseudes surinamensis* and *Halmyrapseudes spaansi*—collected from the coast of the country. I also characterized 5,126 tanaids in the summer of 2009 and conducted laboratory studies in the winter of 2009 to assess whether or not these animals might be useful as bioindicators. I found that tanaids were easily characterized and could survive and reproduce in laboratory situations, making them suitable models for toxicity testing. In the summer of 2010, with the help of Trimatrix Laboratories, I was able to test the original tanaids for mercury. My preliminary results indicate that tanaids may be good candidates as bioindicators for assessment of mercury contamination, and there is evidence that contamination has occurred in natural populations, though more studies must be done to confirm these results.

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

KATIE JONATZKE, '11

The Effects of Physical Rehabilitation on Coping with Injury in Division III College Athletics

Faculty Sponsor: Robert Moss

Major: Athletic Training
Hometown: Hartford, Mich.

Each year several collegiate athletes suffer from injuries while participating in their respective sports. The purpose of this study was to research if rehabilitation of the injury not only helped the athlete get better physically, but also if it helped the athlete cope emotionally with the injury while limited in participation. Injured athletes from Albion College's fall 2010 season of varsity sports participated in the study by filling out questionnaires and being interviewed. This study was also used to evaluate the effectiveness and satisfaction of athletes treated by the athletic training staff at Albion College.

The top emotions reported by injured players were frustration, optimism, and anger. Half of the participants reported that doing rehabilitation and making progress helped them feel better and cope emotionally. The responses varied from doing team activities outside of practice, knowing they wouldn't miss the entire season, having more personal time, reassurance from the athletic training staff, and not hurting as much physically. Out of the 18 athletes who participated, 16 of them felt that rehabilitation had helped them improve physically and cope emotionally with the injury. The other two athletes were "not sure" if their rehabilitation helped. With 88.89 percent of the athletes responding that rehabilitation helped them deal with their injury, the data having a p value of 0.0009 concludes that the athletic training program at Albion College is effective and respected by the athletes. Also, it can be concluded from the athletes' responses that rehabilitation helped them deal with their emotions while injured.

CLAIRE KAISLER, '11

Examining How Intersex Track Athletes Are Unfairly Treated at the Elite Level

Faculty Sponsor: Alfred Pheley

Major: English
Hometown: Tipton, Mich.

This presentation explores intersexuality in elite track athletes, although other sports will be used as examples. The condition of intersexuality itself is not the primary focus of analysis; rather, I will explore how intersex individuals are forced into gender and sex categories to which they do not necessarily belong.

Intersex individuals are those whose genotype indicates that they are neither 100 percent male nor 100 percent female, but somewhere in between. Recent controversy in track and field has raised questions about the gender division in which the intersex athlete should compete. More specifically, do intersex athletes who self-identify as female have an advantage over individuals with a completely female genotype? If so, should these intersex individuals be compelled to compete against men?

My aim is to provide suggestions about how to make track events (and other athletic programs that may take their lead from track) as fair as possible with regard to sex and gender, as well as to consider and briefly explain some possible changes to the current system.

MARIA KAISLER, '11

A Social Skills Board Game for Children with Autism: A Case Study

Faculty Sponsor: Jacque Carlson

Majors: Biology, Chemistry
Hometown: Tipton, Mich.

One element required for a diagnosis of autism is a deficit or impairment in the area of social skills. Appropriate social skill development has been linked to high academic achievement and positive peer acceptance (Rao, Beidel, & Murray, 2007). Deficits in this area have been found to have a profound impact on an individual's social functioning, both in the academic arena and in the workforce (Howlin & Goode, 1998).

The goal of this study was to develop and evaluate a board game designed for children with autism to target social skill improvement. We evaluated the game's efficacy using a single-subject case study. The participant was an eight-year-old boy whose mother reported he had been diagnosed with moderate autism. To evaluate the effectiveness of the game, the child was given two assessments before playing the game for the first time, and was given the same assessments once he had played the game three times.

The child's mother also completed an assessment before her son played the game for the first time and again after he played for the last time. These assessments, along with additional narrative reports from the child's mother, were used to determine the game's efficacy.

Based on the differences between the child's pre- and post-game assessments, the game fulfilled its intended purpose of improving specific social behaviors in a child diagnosed with high-functioning autism. Although further research is required to better determine the game's efficacy, this study provides an excellent foundation for such work.

Supported by: FURSCA

NICK KATCHER, '11

The Effects of Alpha-Synuclein and Proteasome Function in a *Drosophila* Parkinson's Disease Model

Faculty Sponsor: Kenneth Saville

Major: Biology
Hometown: Macomb, Mich.

Parkinson's disease is a syndrome that is commonly noted for neurodegenerative characteristics such as the loss of dopaminergic neurons in the substantia nigra. Mutations in the α-synuclein gene are linked to familial Parkinson's disease in which α-synuclein accumulates in Lewy bodies and Lewy neurites, visible intracellular structures found in affected neurons.

One theory in Parkinson's-related research is the function of the proteasome in the mechanism for this disease. Proteasomes are an organism's machinery to aid in the catabolism of proteins. Once a protein is targeted to the proteasome, it will be broken down into smaller peptides and amino acids to be reused in protein metabolism. Accumulations of α-synuclein are found in the Lewy bodies of patients, but we don't know why these aggregates of α-synuclein fail to be degraded by the proteasome.

I will be expressing normal and mutant forms of α-synuclein in *Drosophila* and exhibiting a Parkinson's model in *Drosophila*. We will genetically express α-synuclein in specific domains (such as the eyes) using the GAL-4/UAS driver system. Once expressed, these flies can be analyzed for Parkinson's-like symptoms. Flies can be analyzed by using several techniques looking for physical malformations in the eye, or by looking for less coordinated motor function using a climbing assay. Once a Parkinson's model of flies has been procured, further testing can be done using genetic modification or drugs. Strategies to be tested include: knocking out proteasome function in healthy flies (testing for proteasome function), knocking out α-synuclein-producing genes, testing α-synuclein inhibitors in flies that produce α-synuclein to see if healthy flies will develop in the drug's presence, testing for faulty tagging in the proteasome-ubiquitin-α-synuclein mechanism, and testing for the inability of the proteasome to break down α-synuclein aggregates. Each of these strategies could be used to potentially treat Parkinson's disease in flies and further be applied to research in humans.

RACHEL KEENER, '12

Our World, Our Health: Girls Club Garden

Faculty Sponsor: Trisha Franzen

Majors: Sociology, Women's Studies
Hometown: East Grand Rapids, Mich.

There is no denying that what we buy and where we buy our food is under intense scrutiny. Authors such as Michael Pollan stress the importance of not only buying food from your local farmers' market, but also growing it in your own back yard. This information has reached upper-middle class families with comfortable levels of time and money. However, if this "naturalist movement" is good enough for the United States' most wealthy families, is it not beneficial to all families, including ones with fewer economic resources? This research attempted to cross that divide and several more.

Our program, a continuation of the Albion College/Washington Gardner Middle School Girls Club, attempted to introduce a nutritional/wellness consciousness as well as food-related skills to 11-13 year-old girls from Albion. Over seven weeks, I, my faculty mentor, and the girls who participated, planted a garden, prepared homemade healthy foods, and explored the current debates about wellness.

Supported by: FURSCA and Albion Community Foundation

KATHERINE KIRSCH, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest)

HANNAH KOACHES, '11

Catalytic Folding Patterns of the *Anabaena* Group I Intron

Faculty Sponsor: Christopher Rohlman

Major: Biochemistry
Hometown: Midland, Mich.

The *Anabaena* Group I ("Group One") intron serves as a model system for a self-cleaving RNA ribozyme. Currently, there is no published structural model for this Group I intron. Understanding of a structure begins with the study of the catalytic folding patterns within the *Anabaena* Group I introns and the corresponding ribozyme catalysis carried out by the molecule. First, the appropriate quantity of ribozyme will be synthesized and purified. A series of fluorescent assays with varying conditions will then be performed and analyzed using the ABI 310 genetic analyzer in the Albion College Dow Laboratory. This instrument identifies the components of a sample, and the change in amounts over time, therefore allowing for the measurement of the rate of chemical cleavage catalyzed by the *Anabaena* Group I ribozyme. Finally, the bioinformatics explored through JalView will allow for a review of the variants of the *Anabaena* ribozyme previously generated by Christopher Rohlman and evaluation of how effective they are at catalyzing the cleaving of their RNA substrate. The ultimate goal of this study is to identify structural and catalytic patterns within the *Anabaena* ribozyme that can be compiled into an accepted three-dimensional structure.

Supported by: FURSCA

DANA KOENIG, '11

Development of Microsatellite Genetic Markers for *Sabatia angularis*

Faculty Sponsor: Sheila Lyons-Sobaski

Major: Biology
Hometown: Midland, Mich.

Since the summer of 2010, I have been working to develop microsatellite genetic markers in *Sabatia angularis*, a state-threatened plant species in Michigan. Microsatellites are sequences of one to six nucleotide repeats found in genomes at high frequency and are highly variable within species. They have many uses including identifying members of a species and estimating the extent of relatedness among individuals and populations. To develop these markers, I first extracted DNA from plant tissue. I constructed a size-selected DNA library that was enriched with microsatellite DNA. The library was screened for microsatellites using PCR techniques. Once these repeated sequences were detected, they were sequenced, had primers designed around them, and were screened for polymorphisms. The development of microsatellite markers is key to furthering our understanding of the evolution of genetic variation and implications for conservation among these plant populations.

Supported by: FURSCA

JACK KRONNER, '12

An Evaluation of Supracondylar Humerus Fractures: Is There a Correlation between Delayed Treatment and a Need for Open Surgical Intervention?

Faculty Sponsor: Andrew French

Major: Biochemistry
Hometown: Grosse Pointe Woods, Mich.

Supracondylar humerus fractures (elbow fractures) are some of the most common fractures experienced by the pediatric population. In the past, pediatric supracondylar humerus fractures were treated as emergencies, and therefore taken for surgical treatment without delay to prevent further injuries. Recently, it has been common practice to delay surgery without any perceived adverse effects. Previous research studies have evaluated the differences in complication rates of patients undergoing delayed versus early treatment, but the results of these investigations have been inconclusive.

The purpose of this study is to determine if delayed treatment of supracondylar humerus fractures results in a higher rate of open surgical treatment, in order to give recommendations for optimal treatment for future patients. The procedure involved retrospectively evaluating the medical records of patients who sustained a Gartland type III supracondylar humerus fracture from January 1, 2009-December 31, 2009. The patients' treatments and outcomes were analyzed. The length of time between the elbow injury and treatment was evaluated to determine if there was a correlation between delayed treatment and the need for open surgical treatment and increased complications. Patients who had delayed surgical treatment of Type III supracondylar humerus fractures did not require open reduction more often than those who received early treatment. Patients who had delayed surgical treatment of Type III supracondylar humerus fractures did not experience a significant increase in complications or poorer outcomes compared to those who received early treatment.

RACHEL LEADS, '12

Behavioral Variation in *Drosophila* Due to *Wolbachia* Localization in Specific Adult Brain Regions

Faculty Sponsor: Roger Albertson

Major: Biology
Hometown: Farmington Hills, Mich.

Parasites alter host behavior in order to increase the rate of parasite transmission (Dobson 1988). In laboratory research, the fruit fly *Drosophila* can be used as a model organism to study host-pathogen interactions and to investigate the influence of the pathogen on the development of the host. This research studies the interaction between *Drosophila* and the bacterium *Wolbachia.* This study is unique because it analyzes how *Wolbachia* induce host behavioral changes at both the organismal and cellular level. During late embryonic development, *Wolbachia* segregate within the host asymmetrically, causing the bacteria to concentrate in specific regions of the adult brain (Albertson et al 2009). Confocal laser microscopy was used to map this asymmetric localization of *Wolbachia* in adult and larval *Drosophila* brains. The data indicate that the *Wolbachia* localize to cell bodies within the central nervous system; however, they do not localize to axons. It was also observed that hyperproliferation of *Wolbachia* within the host cell led to cell lysis. It is important to know where *Wolbachia* are localizing within the brain because high concentrations of the bacterium within specific brain regions may account for changes in *Drosophila* behavior. It was also observed that different species of *Drosophila* may be susceptible to higher levels of *Wolbachia* infection. Initial data from behavioral comparisons of infected and cured populations of *Drosophila* suggest that *Wolbachia* infection induces behavioral changes within the host, which may lead to greater fitness and a higher rate of parasite transmission.

Supported by: FURSCA

KIMMY LEVERENZ, '13

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems)

MATTHEW MAHONY, '11

A Comparison of Eocene Basin-Margin and Basin-Center Crocodiles from the Bridger Formation, Green River Basin, Wyoming

Faculty Sponsor: William Bartels

Major: Geology
Hometown: Ann Arbor, Mich.

This study describes new specimens of Eocene (52 million years old) crocodylids from basin-margin deposits and compares them to age-equivalent specimens from basin-center environments.

Fossil crocodylians are abundant and diverse elements in the sedimentary deposits of the Rocky Mountain region. The majority of described species are known only from basin-center deposits representing river, lake-margin, and lake environments well removed from upland areas. Several crocodile species have been described from the basin-center, the most common being the large and broad-snouted "*Crocodylus" affinis* that is found in river deposits and the narrow-snouted "*Crocodylus" acer* and short-snouted *Borealosuchus wilsoni* which are found in lake deposits.

The South Pass area of the Green River Basin preserves lake deposits of the Green River Formation alternating with river deposits of the Wasatch and Bridger Formations. The crocodiles described in this study are from river channel sandstones of the lower part of the Bridger Formation. These deposits are early Eocene (Bridgerian) in age.

The basin-margin crocodiles described in this study have been compared to the better-known basin-center crocodile species. They are most similar to "*Crocodylus*" *affinis* and *Borealosuchus wilsoni* but differ in several minor ways from the basin-center specimens.

Vertebrate faunas from basin-margin settings are characterized by anachronistic taxa (appearing earlier or later than in basin-centers), rare taxa (common in basin-margins but rare in basin-centers), unique taxa (found only in basin-margins), and morphologically distinct forms assignable to basin-center taxa. The crocodiles described in this study appear to be an example of this last pattern.

Supported by: FURSCA, Taylor Fund for Undergraduate Research in Geology, Langbo Trustees' Professorship (Bartels), The University of Michigan Museum of Paleontology

ANTHONY MCCOY, '11

Time of Day Effects on the Use of the Anchoring Heuristic

Faculty Sponsor: Mareike Wieth

Major: Psychological Science
Hometown: Albion, Mich.

The anchoring heuristic is a decision-making shortcut that individuals use when asked to make an estimate about an unknown value. When using the anchoring heuristic, individuals will utilize previous information (the anchor) to help make a current decision. For example, when participants are first asked to answer a question, such as "Is Mount Everest shorter or taller than 2,000 feet?," and then asked to answer a follow-up question, such as "What is the height of Mount Everest?," they will use the number 2,000 from the first question to answer the follow-up question. The closer participants' answers are to the number 2,000 the more influenced they were by the anchor. Time of day effects are defined as the influence of circadian arousal on an individual's ability to function. Whereas most people are familiar with time of day influences on physiological processes (e.g., hunger and feeding), research has shown that time of day also affects cognitive processing. More specifically, research has shown decreases in individual's ability to focus and allocate attention during an individual's non-optimal compared to optimal time of day.

In order to test the effect of time of day on the use of the anchoring heuristic, participants were asked to complete 10 anchoring tasks either during their optimal or non-optimal time of day. The results indicated that participants tested at their non-optimal time of day were significantly more influenced by the anchor than those participants tested at their optimal time of day. These results suggest a connection between the reduction in attentional processes during a non-optimal time and participants' increased use of the anchor.

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

ANTHONY MCCOY, '11

The Effect of Within- and Across-Hemisphere Processing on the Use of the Anchoring Heuristic

Faculty Sponsor: Mareike Wieth

Major: Psychological Science
Hometown: Albion, Mich.

The anchoring heuristic is a decision-making shortcut that individuals can use when making a judgment or giving an estimate. When anchoring occurs, individuals utilize previous information (the anchor) to help make a current decision. In this study, participants were asked to process and respond to anchoring information either across both or within one hemisphere of the brain. Previous research investigating interhemispheric processing has found benefits for across- compared to within-hemisphere processing. This benefit is believed to be due to the ability to utilize attentional resources from both hemispheres. In order to test the effect of within- and across-hemisphere processing on the use of the anchoring heuristic, participants were presented with an anchoring number to either their left or right visual field and were asked to respond using either their left or their right hand. It was predicted that participants using within-hemisphere processing would be significantly more influenced by the anchoring information than participants using across-hemisphere processing.

The results of this study showed that participants responding with their left hand were less anchored (chose an answer farther from the initial anchoring number) when responding to information presented to the right visual field than participants responding with their right hand. Participants responding with their right hand were less anchored when responding to information presented to the left visual field than participants responding with their left hand. The results indicate that across-hemisphere processing leads to less anchoring than within-hemisphere processing and suggests that attentional load plays a role in the use of the anchoring heuristic.

KELLY MCNEAR, '11

Stability of Nanomaterials in an Electro-Fenton Reactor as a Model for Advanced Oxidation Reactions in Wastewater Processes

Faculty Sponsor: Kevin Metz

Major: Chemistry
Hometown: Portage, Ind.

The increased production and use of engineered nanomaterials will inevitably lead to the entrance of these materials into municipal water supplies. When nanomaterials, such as silver nanoparticles or quantum dots, go through municipal water treatment facilities they have the potential to decompose into more toxic substances, e.g., silver or heavy metal ions. These ions from the wastewater treatment plant may then enter the drinking water supply, leading to unintended consequences. There is currently much interest in understanding the impact wastewater treatments will have on the fate of engineered nanomaterials. This work has examined the impact of electro-Fenton processes, an advanced oxidation process used in some wastewater treatment plants, on engineered nanomaterials. Current results will be presented.

Supported by: FURSCA

DANIEL MERRITT, '13

A Concerto in Economics: Finding Art in the Study of Market Trends

Faculty Sponsor: Amber Cook

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

This project was the result of an honors class final project that asked me to connect my major to an artistic theme, and create a piece of art around that. In light of those requirements, it was no challenge for me to decide that I should connect my one artistic talent to my major in economics and management. As a longtime violinist with absolutely no experience in composing music, I wrote this concerto with the intention of drawing symbolic parallels between the musical composition and economic trends. I tried very hard to create something that was both easy on the ears, stylistically appropriate, and representative of the economic period I was trying to encapsulate.

In creating this piece, I made an effort to research a style of music that would be stylistically appropriate to represent the tumultuous economic and market trends of recent years. I also researched the market trends themselves, and the opinions of leading economic theorists as to the causes of these trends, to ensure that my artistic representation was historically accurate.

The result of this project was a surprisingly fluid synthesis of musical style and financial history. This project supports the theory that the arts can be situated alongside much more rigid and scientific disciplines with great success, and in many cases make the less flexible academic disciplines more accessible to those less educated in their subtleties.

COURTNEY MEYER, '11

Is Foreign Aid Aiding the Poor? An Analysis of the Motivations Fueling the Allocation of Official Development Assistance to and in Developing Countries

Faculty Sponsor: James McCarley

Majors: Economics and Management, International Studies
Hometown: Prudenville, Mich.

This study explores the distribution patterns of one type of foreign aid, official development assistance (ODA), from member countries in the Organisation for Economic and Co-operative Development (OECD) and the impact of this aid on poverty in recipient countries. Although research from 1995 by Peter Boone demonstrates that aid allocations often remain in the hands of receiving officials, having little impact on human development indicators like infant mortality or life expectancy rates and primary school ratios, models discredited in mainstream economics still suggest that allocations promote economic growth.

Self-interested motivations of donor and recipient governments place heavy constraints on efforts to promote development or encourage economic growth. Often, aid is improperly allocated, in that it follows not the existence of poverty, but the colonial, geopolitical, and commercial objectives of donor countries. Approximately 75 percent of official development assistance is not allocated to countries which might benefit from some form of assistance as a result of constraints on their developmental capacity due to their income level. The probability of its success is complicated not only by this, but by rent-seeking and misappropriation within receiving economies.

Government failure, on both the donating and receiving ends, has seemingly caused the failure of official development assistance. If this conclusion is accepted, the changes in allocation patterns often suggested as a remedy for aid's ineffectiveness will not achieve the desired increase in efficacy; global expectations would still exceed ODA's capacity. Even when allocated to countries which might "require" it to obtain economic growth, evidence has more often indicated that ODA is unable to assist poor populations.

COURTNEY MEYER, '11

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest)

DREW MILLER, '12

Personality Facets and Sexism: The Mediating Roles of Right-Wing Authoritarianism and Social Dominance Orientation

Faculty Sponsor: Andrew Christopher

Majors: Psychological Science, Political Science
Hometown: Troy, Mich.

We examined how the facets of two personality factors, openness and agreeableness, predicted two different types of prejudice against women: benevolent sexism and hostile sexism. Furthermore, we examined how right-wing authoritarianism (RWA) and social dominance orientation (SDO) mediated these relationships. Benevolent sexism characterizes women as innocent, pure "creatures" requiring protection. Hostile sexism views women in an adversarial manner and perceives women as trying to control men. RWA measures deference and respect for authority, whereas SDO measures preference for a hierarchical society.

Ekehammar and Akrami (2007) found that the openness facet of values and the agreeableness facet of tender-mindedness most strongly predicted generalized prejudice. Christopher and Mull (2006) found that RWA predicted benevolent sexism but not hostile sexism, whereas SDO predicted hostile sexism but not benevolent sexism.

We expected the openness facet of value and the agreeableness facet of tender-mindedness to predict benevolent sexism and hostile sexism, respectively. We also expected RWA to mediate the relationship between values and benevolent sexism, and SDO to mediate the relationship between tender-mindedness and hostile sexism.

American adults (N = 291) completed measures of agreeableness and openness and their smaller facets, as well as RWA, SDO, benevolent sexism, hostile sexism, and demographic characteristics. We conducted two multiple regression analyses, one with benevolent sexism as the criterion and one with hostile sexism as the criterion. We found that trust and values were the only significant predictors of both hostile sexism and benevolent sexism. Additionally, we found SDO mediated the strength of trust to predict hostile sexism, whereas RWA mediated the strength of values to predict benevolent sexism.

Supported by: Faculty Development Committee

CHRIS OMERZA, '12

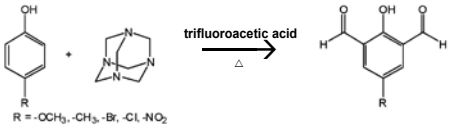
The Duff Formylation of Substituted Phenols: A Regiochemical Study

Faculty Sponsor: Vanessa McCaffrey

Major: Biochemistry
Hometown: Empire, Mich.

Salicylaldehydes are aromatic compounds that are useful in several fields. They have been shown to have pharmacological and environmental applications. They are also precursors to Schiff-base macrocycles. The Duff reaction is known to yield salicylaldehydes when carried out on phenol or its substituted derivatives by addition of an aldehyde (CHO) group. Ortho-, meta-, and para-substituted phenols were used in the Duff formylation to determine the effect of substituent location on reactivity. Several substituents ranging from the electron-withdrawing nitro group to the electron-donating methoxy group were used. The regioselectivity of the Duff formylation of these substituted phenols was also

investigated. The data support both steric and electronic effects of substituents on the addition of the aldehyde group. All reactions were performed under microwave irradiation, and conditions were varied to maximize individual product yields.



Supported by: FURSCA, American Chemical Society Petroleum Research Fund

ALEX PARKER, '11

Biochemical Responses to Darkness with and without Circadian Clock Input

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychological Science
Hometown: Ann Arbor, Mich.

The circadian clock is a mechanism found in organisms from single-celled bacteria to humans which regulates the rhythmic changes in behavior, physiology, and biochemistry in these organisms. The clock receives cues via sensory organs and alters the organism appropriately. The cues of interest in this research are light and darkness.

Animals that live in diurnal environments (environments with both light and dark phases in a 24-hour cycle) undergo rhythmic changes in retinal function that are regulated by diurnal light and the circadian clock. Clock-driven structural changes in the retina have been thoroughly investigated, but these biochemical changes remain largely unexplored. Understanding these biochemical changes is crucial to understanding normal vision.

Since mammalian creatures not only have a "master-pacemaker" in the brain, but also cellular-level clocks, these organisms make extremely complicated models for study. Since these cellular-level clocks are not fully understood, the present research used the arthropod *Limulus polyphemus,* or the American horseshoe crab, as a model organism because of its clock's simplicity. Before this novel research is discussed, a basic review of circadian and visual anatomy, physiology, and vision will be presented.

This study used immunocytochemistry and confocal microscopy to quantify levels of photopigments (light-sensitive proteins) in retinal cells of the horseshoe crab, and characterized changes in the levels of these proteins with and without circadian clock input during the day and at night. This research also examined the time course over which these changes occurred.

LINDSEY PETERSON, '11

Finding Your Way Home Again: Reverse Culture Shock and the Reentry Process

Faculty Sponsor: Mareike Wieth

Majors: Psychological Science, English
Hometown: Novi, Mich.

Reverse culture shock is the adjustment process individuals go through upon coming back to their home country after having spent time abroad. Reverse culture shock receives far less attention than the better known phenomenon of culture shock but is just as prevalent in students. Returners commonly report feelings of displacement, independence, and distance from what was once considered "home." Some returners find themselves struggling with social, personal, and cultural comparisons as well. Being a returner myself, I wanted to promote awareness and understanding of reverse culture shock. Through a series of interviews and a review of the literature, I have proposed a model of reentry and composed a handbook to help guide students in their return home. The handbook illustrates experiences that highlight aspects of reverse culture shock and are based on the interviews I conducted with students who studied abroad. It is my hope that the model, along with the handbook, can be implemented by international education programs to help ease the transition from host culture to home culture.

COURTNEY PICKWORTH, '13

How Do Working Memory and Sentence Length Influence Syntactic Flexibility?

Faculty Sponsor: Andrea Francis

Majors: Psychological Science, Biology
Hometown: Columbus, Ohio

This study explored the relationship between working memory and one's ability to inhibit syntactic priming. Syntactic priming is the tendency to recreate a recent syntactic pattern (Bock 1986). Thirty-five undergraduates completed a task in which they were asked to produce pairs of sentences from provided verb and noun phrases. In the prime sentence, the noun phrases were ordered such that participants could keep them in the same order and produce a grammatical sentence. In the target sentence, half of the verbs required participants to change the order of the noun phrases to produce a grammatical sentence. This was the inhibitory condition. Additionally, we manipulated whether the noun phrases were short or long. We also measured participants' working memory span (reading span and spatial span) and inhibition ability (Stroop task).

We predicted that individuals with low working memory spans would show greater difficulty in inhibiting primed syntactic structures than those with high working memory spans. Furthermore, we predicted that inhibition would be mediated by the length of sentences inhibited and produced. Results supported our hypothesis. There was a negative correlation ($r(35)$ =-.381, p<.05) between working memory span and the number of ungrammatical sentences produced in the inhibitory condition. However, this was only true for long sentences (r(35)= -.499, p<.05), not for short sentences (r(35)= -.150, p = .391), supporting the notion that working memory measures capacity. There was no correlation between performance on the Stroop interference test and the number

of ungrammatical sentences produced, supporting the importance of working memory capacity in sentence production.

KAYLEIGH PUNG, '11

Assessment of Source, Transport, and Fate of Fecal Indicator Bacterial Populations along the Watershed of the Kalamazoo River

Faculty Sponsor: Ola Olapade

Majors: Biology, Psychological Science
Hometown: Grand Rapids, Mich.

The occurrence of various fecal indicator bacteria (FIB) populations including *Escherichia coli,* Bacteroides, and *Clostridium perfringens* was studied at two spatially different locations (i.e., Victory Park and McClure Park) along the Kalamazoo River with the goal of examining their respective sources, transport, and fate using combinations of standard microbiological techniques and molecular approaches. Overall, the two river sites differed significantly in FIB found in the various sources examined, with *E. coli* more commonly detected than the other FIB groups targeted at the two river sites. Specifically, while relatively equal numbers of *E. coli* populations were enumerated in both the soil and fecal samples from Victory Park, comparatively, the numbers in soil samples were higher than those recorded in fecal samples collected from McClure Park. In general, the discrepancies observed in *E. coli* populations could be partly attributable to variations in soil type as well as differences in the source and quantity of fecal material deposition between the sites and sampling periods.

Supported by: FURSCA, Beta Beta Beta

LYNDSEY REYNOLDS, '12

Palladium Nanoparticles on Porous Polycarbonate Membranes as a Catalyst for the Suzuki Coupling Reaction

Faculty Sponsor: Kevin Metz

Majors: Biology, Biochemistry
Hometown: Waterford, Mich.

The Suzuki coupling reaction is a metal-catalyzed organic reaction that synthesizes a carbon-carbon bond in aqueous solution. Carbon-carbon bond formation is important because it is imperative in the creation of pharmaceuticals and agrochemicals. Palladium chloride is often used to catalyze the Suzuki reaction. Palladium chloride, however, is not an ideal catalyst because it can be difficult to recover, which limits reuse and causes impurities in the products. The purpose of this project is to study the use of palladium nanoparticles supported on polycarbonate membranes as catalysts in the Suzuki reaction. This approach will allow for the recovery and reuse of the palladium catalyst, if successful. To date, gas chromatography-mass spectrometry has revealed that palladium nanoparticles successfully catalyze the Suzuki reaction in a model system. In the future, palladium nanoparticles could improve the pharmaceutical and agrochemical industries' carbon-carbon bond formation methods.

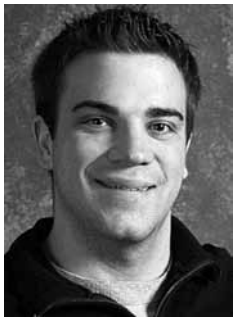
Supported by: FURSCA, American Chemical Society Petroleum Research Fund

JACOB RINKINEN, '11

Cytotoxic Effects of Combinational Therapy of Ascorbic Acid and 3PO on Breast and Non-Small Cell Lung Cancer Cells

Faculty Sponsor: Christopher Rohlman

Majors: Biochemistry, Anthropology/Sociology
Hometown: Highland, Mich.



Many malignant cancer cells maintain a high rate of glycolysis even in the presence of oxygen. This phenomenon, known as the Warburg effect, has become a selective target for many novel therapeutic agents targeting specific enzymes involved in glycolysis. Causes for this cancerous phenotype have been postulated to occur due in part to mitochondrial respiratory injury and damaged oxidative stress mechanisms within the cell. Thus, therapeutic approaches that inhibit glycolysis and induce oxidative stress simultaneously may be particularly effective in damaging cancerous cells. Therefore, the compound 3PO (glycolysis inhibitor) was used along with ascorbic acid/vitamin C (pro-oxidant), as a combinational approach against breast (MCF7) and non-small cell lung (H1299) cancer to test this hypothesis. The results demonstrate a synergistic loss of cell viability occurs when a combination of drugs was used against non-small cell lung cancer cells. Similarly, a synergistic induction of DNA damage and apoptosis (programmed cell death) in H1299 cells was correlated with decreased viability. Interestingly, MCF7 cells did not respond to the treatment with the same efficacy as H1299 cells, insinuating a stronger resistance to 3PO and ascorbic acid. Moreover, reactive oxygen species (ROS) levels, which are known to damage DNA and other biomolecules within the cell, were assessed at various time points in H1299 cells. Results depict an increase in ROS levels at earlier time periods when treated with drugs, and a diminished degree of ROS at later time points. Mitochondrial dysfunction

was also analyzed to see if apoptosis was proceeding by means of the intrinsic apoptotic pathway in H1299 cells. Data suggest that, at higher doses with combinational drug therapy, mitochondrial integrity is disrupted. Overall, our results suggest that a combinational approach directed against glycolysis and oxidative stress shows synergistic, cytotoxic results in non-small cell lung cancer.

Supported by: Owensboro Cancer Research Program

LAUREN ROBERTS, '12

Challenging Binaries: Understanding Intersexed Identities

Faculty Sponsor: Scott Melzer

Majors: Sociology, Music
Hometown: Saline, Mich.

This project examines intersexed individuals (people with sex characteristics that do not allow them to be easily categorized as male or female) and their identities. After reviewing the literature surrounding intersexed individuals 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 intersexed individuals, I discovered a lack of sociological research on intersexed persons and their identity formation. My research hopes to bring to life the challenges faced by intersexed individuals. I will examine the competing identities in the recent split between disorders of sex development and intersexed identity by looking at the differences between medicalization and identity. Through a grounded theory approach consisting of interviews of intersexed adults and analysis of letters, memoirs, videos, and other documents, my research will look at the identities and relationships of these persons. I will be uncovering what contributes to the identity of intersexed persons through qualitative interviews and supporting my claims with an extensive literature review. This project aims to help understand intersexed identities through a sociological lens and a careful examination of the gendering process and binaries ever present in society. The construction of gender in our society plays a large role, and my research shows what this means for those who identify as intersexed.

Supported by: FURSCA

NICKI ROCKENTINE, '11

P-T Paths of the Luliang Shan UHP Locality, Western China

Faculty Sponsor: Carrie Menold

Major: Geology
Hometown: Bloomfield Hills, Mich.

Ultrahigh-pressure (UHP) metamorphic rocks record the subduction of continental crust to mantle depths (~100 km) and their subsequent exhumation. A key feature of these rocks is their possible very rapid return to the crust. The exhumation mechanism of deeply buried rocks remains uncertain, and therefore the rate of this process provides a crucial constraint for any proposed exhumation model. Exhumation rates for UHP terranes can be inferred from P-T paths. The North Qaidam UHP terrane is located in northwestern China, north of the Qaidam Basin. Detailed petrologic studies have been conducted in the Luliang Shan locality of the North Qaidam terrane in order to constrain more precisely the P-T paths of high-pressure rocks during exhumation. The Luliang Shan is comprised of a homogeneous leucocratic epidote-amphibolite grade orthogneiss containing discrete blocks of partially retrograded mafic eclogite. The eclogites contain the peak assemblage garnet, omphacite, rutile, quartz (coesite), and phengite. The retrograde assemblage is taramitic and pargasitic amphibole, diopside/augite, albite, titanite, ilmenite, and epidote. P-T paths have been constructed for several eclogites in the Luliang Shan in conjunction with a detailed study of mineral chemistry and zoning in the participating phases. Preliminary results indicate an open clockwise P-T path where maximum temperature was reached at much shallower levels along the exhumation path; it suggests heating during decompression from UHP depths. The post-UHP heating appears to increase significantly to the southwest, suggesting non-uniform exhumation through the middle crust.

Supported by: FURSCA

ABBY SCHONFELD, '11

Nwagni Friction: An Anthropological Look at International Service and Education

Faculty Sponsor: Molly Mullin

Major: Anthropology and Sociology
Hometown: Brooklyn, Mich.

In 2006, the Nwagni Project was founded by students at Albion College in an effort to raise money for an elementary school to be built in Cameroon. This study analyzes the Nwagni Project and the impact that it has had in the Albion community as well as its target community in Batchingou, Cameroon. It covers the development of this unique, student-run project and its goals in Batchingou and Albion and how they've changed over time, as well as how perceptions of Africa have or have not changed throughout the years and how this relates to the ways in which projects such as Nwagni function. The research is based primarily on interviews of people involved with the project, observations and ethnographic research in a fifth grade class at Harrington Elementary School in Albion, and literature review. This research explores the ways in which non-profit organizations function, especially between developed and non-developed countries, and the ways that Africa is perceived by American children. On the basis of the research, suggestions will be presented for how Nwagni might best enrich the quality of education in both Albion and Batchingou.

Supported by: FURSCA

KJIRSTEN SNEED, '11

La Culture Équestre Française

Faculty Sponsor: Dianne Guenin-Lelle

Major: French
Hometown: Washburn, Wis.

The term "equestrianism" evokes a multitude of ideas, images, and associations, from battles and farming to art and sport. Throughout history, the horse has been a tool of agriculture and of war, as well as an icon of grace and spirituality. Europe has been especially influential in the development of the equestrian art. Each country lends its own personality and flair, making for an exciting and diverse equestrian culture.

Equestrian culture includes qualities ranging from bloodlines and temperament to physical athletic ability. The importance of various qualities differs from country to country, reflecting specific values and history. The French place a great deal of importance on variety in the work they do with their horses—equine cross-training—which differs from the Germanic school's stress upon perfection through repetition. It can also be said that modern-day riding has its bases in the military, for the French school of Saumur, arguably the most influential place of equestrian thought and learning in France, was initially established as a military school.

This study delves into the world of equestrian culture in France today, focusing on the evolution of the equestrian sports in France and in other European countries, and then examines the historical reasons for why equestrianism seems so distinctly individual to each country, and yet globally the same.

CHARLOTTE SPENCER, '11

The Effects of Priming Religious Concepts with a Christian Symbol, the Cross, on Perceptions of Self and Others

Faculty Sponsors: Eric Hill, Andrew Christopher

Major: Psychological Science
Hometown: Ypsilanti, Mich.

Religion has been shown to relate to a variety of perceptions. Having a deep, internalized faith is related to increased social desirability. Endorsement of Christianity has been related to increased benevolent sexism and decreased hostile sexism. Research has shown varied evidence on the effects of religion on interpersonal relationships. Priming with religious concepts has been shown to influence several behaviors, such as increased generosity, racial prejudice, and submission to authority. Culturally-laden symbols have been used to prime Americans and change their perception of the world; that is, priming led Americans to perceive the world based on East Asian ideals rather than American principles.

The present study examined the effects of a Christian cross on participants' expressed socially desirable behaviors, hostile and benevolent sexism, and homonegativity. Fifty participants from Albion College were either primed or not primed with a Christian cross (printed on a shirt worn by an experimenter) as they completed measures of social desirability (Reynolds, 1982), hostile sexism and benevolent sexism (Glick & Fiske, 1996), and modern homonegativity (Morrison & Morrison, 2002). Later, a religiousness scale (Blaine & Crocker, 1995) was completed. It was hypothesized that priming with the cross would increase socially desirable responding, benevolent sexism, and homonegativity, particularly among those with more conservative religious affiliations. Specifically, priming with the cross will decrease hostile sexism and homonegativity for those with more liberal or Catholic affiliations. Results will be discussed.

CHRISTIN SPOOLSTRA, '11

Term Limits and Minority Voter Turnout: A Study of the Michigan State Legislature

Faculty Sponsor: Dyron Dabney

Majors: English, Political Science
Hometown: Valparaiso, Ind.

Historically, the United States engenders low voter turnout among all its citizens, but the turnout rates for African Americans and Latino Americans are significantly lower than for other racial populations. Since voting is a citizen's most common expression of political efficacy, low turnout represents a possible prelude to declining democratic health. So what are the causes of this lack of voter participation? And why are certain minority groups severely affected?

To examine tangibly these questions of minority efficacy in the political realm, this research focuses on the potential correlation between voter turnout and the introduction of term limits on state-level elected representatives. Assuming that term limits (directly linked with a drastically lower incumbency rate) will engender an environment that promotes less careerism and more competitive ballots, citizens theoretically should be more stimulated and encouraged to vote on election day for these manufactured open seats. Due to the theories behind lower minority voter turnout, I hypothesize that the structural effects of term limits will be most relevant to African American and Latino American voters with regard to increasing turnout.

The correlation between term limits and minority turnout has been comprehensively examined in the context of the Michigan State Legislature, which adopted an amendment to its constitution imposing term limits upon its representatives and senators in 1992. By analyzing the voter turnout and the demographic composition of Michigan's districts, I examined whether theories regarding voter turnout hold valid under the catalyst of structural shifts wrought by term limits.

Supported by: FURSCA

KATIE STEPHENS, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest)

JACOB STONEBURNER, '11

Synthesis and Evaluation of Chiral Iodophenyl Oxazolines as Organocatalysts

Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Wyandotte, Mich.

Hypervalent iodine compounds have the potential to be used as organocatalysts for oxidation and tosylation reactions. Further, chirality may be imparted in these products with high stereoselectivity if the catalyst has a known stereochemistry. Two chiral iodoaryl oxazolines were synthesized for use as such catalysts in nucleophilic α-oxytosylation reactions to enolizable ketones. Also in question are the electronic interactions between iodine(III) and either heteroatom in the oxazoline ring and the resulting conformation that the interaction induces. Synthesis of these oxazolines was successfully carried out via a known synthetic scheme. Degradation in acidic environments of the catalyst disallowed iodine oxidation by TfOH and mCPBA, thus forcing an investigation toward other oxidative techniques. These techniques also degraded the catalyst, with either no reaction taking place, or side reactions between substrates creating unwanted products.

Supported by: FURSCA

EMILY STUDLEY, '13

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems)

EMILY SULLIVAN, '11

Conversion Disorders and Their Neurological Implications

Faculty Sponsor: Ruth Schmitter

Major: Biology
Hometown: Midland, Mich.

Patients presenting with unexplained neurological symptoms have increased in frequency in the last few years. Their diagnosis as possible conversion disorders warrants more focused research on their neurological origins. Conversion disorders are currently classified as a somatoform disorder by the DSM-IV-TR. Diagnoses may be difficult to make since the physical symptoms of limb paralysis, seizures, loss of vision or hearing, inability to speak and form words properly, and poor balance may indicate other disorders. Many patients presenting with conversion disorders often have psychological distress and have a history of either physical or sexual abuse. Research has indicated the importance of establishing the diagnosis both psychiatrically and neurologically, as manifestations of the disorder may not be easily determined as being organic by a neurologist alone. Current fieldwork suggests the influence of the motor and limbic systems of the brain, especially the amygdala, and suppression of these regions at inappropriate times during attempted motor responses. While it is agreed that conversion disorders are defined by interrupted and unusual brain responses, a reliable model has yet to be developed.

KATIE TENNANT, '11

Perceptions of Educational Attainment by Pregnant Teens as Affected by Race and Status

Faculty Sponsors: Jacque Carlson, Barbara Keyes

Majors: English, Psychological Science
Hometown: Kalamazoo, Mich.

The United States has the highest rate of teenage pregnancy of any industrialized nation. This has been attributed to differences in social policy as well as sex education (Darroch, Frost, & Singh, 2001). Teenage mothers have a higher risk for dropping out of school, a risk that increases for black teens (Aud, Fox & KewalRamani, 2010).

In this study, participants read one of four vignettes about fictional pregnant teenagers who were either black or white and had either high or low status (a combination of academic success and social status). Participants rated the teens on their likelihood of graduating, among other educational questions. The aims of this study were the following: (1) to determine what influenced perceptions of school completion rates among pregnant teenagers based on their race and status, and (2) whether the race of the researcher (white and black) played a role in this rating. These results were combined with data from a previous study that utilized the same vignettes and surveys, but were collected by a black researcher. It was found that the status of the teen significantly affected perceptions of her likelihood of graduating, while her race and the race of the researcher had no significant effect.

These perceptions are not fitting with studies that show that black teen mothers are less likely to graduate than their white counterparts. Future research on this topic could involve interviewing school counselors and social workers, who may have different views on the subject than the college students surveyed.

JACOB TRAPP, '11

Mozart Arias with the Albion Orchestra

Faculty Sponsor: Maureen Balke, James Ball

Majors: Music, German
Hometown: Jackson, Mich.

Wolfgang Amadeus Mozart (1756-1791) is considered to be one of the most important composers of the classical era. Though his life was tragically short, he composed a wide array of pieces during his lifetime, spanning all the popular genres including concertos, symphonies, and various piano pieces. Some of his most renowned works are his 22 operas.

The first aria being performed today is "Il mio tesoro intanto" from the opera *Don Giovanni*. In this opera, Don Giovanni is a gallivanting womanizer of great skill who tries to seduce various women before karma finally strikes, and he is punished for his lifestyle. The aria is sung by Don Ottavio, promising revenge against Giovanni for his fiancée, Donna Anna, because Giovanni killed her father when he tried to protect her from Giovanni's assault.

The second aria today is "Un'aura amorosa" from the opera *Cosi fan Tutte*. Two men, Ferrando and Guglielmo, praise the fidelity of their fiancées, Dorabella and Fiordiligi, when a man named Alfonso places a bet that he can prove the women are fickle. He makes the men disguise themselves as Albanians, and he instructs them to try and woo the other's fiancée. This aria occurs just after the first attempts at wooing the women fail, and Ferrando praises his and Dorabella's love.

MICHELLE VALENTINE, '12

(See The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems)

STEPHANIE VANCE, '11

Frames of Mind

Faculty Sponsor: Gary Wahl

Major: Art
Hometown: Union, Mich.

The invention of photography in the 1800s changed people's minds forever. If you think about our world, about every time you see an image, or look at a photograph, you realize how hard it is to think about it without images. It's impossible, since the photograph has forever changed us. There's no longer a separation between our reality and photography. Before photography existed, people visually understood the world differently. Humans did not have the ability to instantly recall places or people if they had never seen them before. Today, your mind works in frames, memories living inside of your mind, like images in a filing cabinet or movies on a reel that you can play again and again. The purpose behind my images is to encapsulate traces of memory in the times, places, and spaces in which they occurred. I'm recreating moments of time in which events could have happened, and making connections with these spaces and the people who inhabited them.

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

KELLY ROSE VOIGT, '11

"The Still Point of the Turning World": A Fiction Collection

Faculty Sponsor: Danit Brown

Majors: Theatre, English (Creative Writing)
Hometown: Farmington, Mich.

Humans are not an exception to the laws of inertia. We constantly resist changes in our state of being. However, the world is characterized by motion, and it is impossible to resist moving forward, moving up, or moving on. With my collection of short fiction, I sought to create characters whose emotions and relationships were caught at a standstill. My stories include a coming-of-age story of a young cellist during the summer before her senior year of high school, a depiction of grief and how it can affect a family, a story of a mother whose life was shattered by her newly-empty home after her children moved away, and others. "The Still Point of the Turning World" is a collection that explores what it feels like to be stagnant in a world of constant motion.

WILLIAM WARD, '11

Whole-Rock Geochemistry of Ultra High Pressure Rocks in North Qaidam, China

Faculty Sponsor: Carrie Menold

Majors: Geology, English
Hometown: Traverse City, Mich.

The early Paleozoic tectonic evolution of Tibet is still poorly understood, particularly the pre-Devonian history. Tibet has grown by accretion of several land masses. The Qaidam-Qilian terrane was one of the first to be accreted in the early Cambrian (~545 Ma). To better understand the tectonic evolution of the region, whole-rock geochemistry analyses were obtained for the Paleozoic aged rocks. The region is comprised primarily of two suites of rocks: ultra high pressure rocks (UHP), continental crust which has cycled through the collision zone, and an ophiolite sequence (oceanic crust). Rock and mineral chemistry reflects the original magma source; different plate tectonic settings have unique chemical signatures. Whole-rock geochemistry of the oceanic sequence suggests formation in either a forearc or back arc setting (similar to the Sea of Japan), with the protolith of the UHP forming in the arc itself. From this data, a model of Cambrian collision geometry for North Tibet can be constructed and will help build a tectonic model for the construction of Tibet in the Paleozoic.

WILLIAM WARD, '11

Cold Air Pools in Crooked Creek Valley, White Mountains, California

Faculty Sponsors: Christopher Van de Ven, Thomas Wilch

Majors: Geology, English
Hometown: Traverse City, Mich.

Crooked Creek is a subalpine valley (3090m-3230m) in the White Mountains of California east of the town of Bishop that has been a natural study area for climate change impacts on vegetation. In and around this valley, trees have been documented expanding their distributions upslope and onto colder hillsides. In the past, tree growth had been inhibited in the bottom of the valley by cold air drainage. Cold air drainage is when the dense cold air at upper elevations displaces the lighter warmer air at lower elevations. This displacement creates a cold air pool when the air gets backed up at a bottleneck such as the narrowing at the bottom of Crooked Creek valley. Young trees are now growing at elevations below the established tree line in Crooked Creek. Cold air drainage results in a temperature inversion when temperatures at lower elevations, such as a valley, are colder than the temperatures of surrounding slopes and ridges. This suggests that in recent decades the strength of the inversion has decreased.

This study's goals are to determine the magnitude and frequency of the inversions in Crooked Creek. To calculate inversions, the annual average temperature, humidity, precipitation, and wind speed collected from the Crooked Creek Weather Station for each year from 2006 to 2010 were compared to hourly temperatures recorded by 35-90 temperature data loggers placed throughout Crooked Creek valley and on surrounding hillsides and uplands. The weather data show that high humidity and low wind speed result in strong cold air drainage and strong inversions. If there was high wind speed, there tended to be no inversion. Although covering too short a time frame to be statistically significant, the data from 2006 to 2010 showed wind speed and temperature increased, suggesting weaker inversions. In addition to the strength, the shape of the cold air pool was analyzed. The temperature loggers showed that in Crooked Creek valley, the cold air pool was about 30 meters deep with the pool being about 10 degrees Celsius colder (18°F) than the air above. The air was coldest coming down from a small, narrow saddle in the valley to the north, rather than the broad opening to the southwest.

Supported by: FURSCA-Bruce A., '53, and Peggy Sale Kresge, '53, Science Fellowship, Taylor Fund for Undergraduate Research in Geology

LINDSAY WAY, '11

La Ferme de Gally: Reflections from a Month on a French Farm

Faculty Sponsor: Dianne Guenin-Lelle

Major: French
Hometown: Mt. Pleasant, Mich.

In response to growing ecological and health concerns in the United States, author Michael Pollan asks, "What would happen if we were to start thinking about food as less of a thing and more of a relationship?" Inspired by a month-long internship at the Ferme de Gally (Gally Farms) in Albion's sister city, Bailly, France, I explore how the French answer this question. France is globally renowned for its cuisine; in November 2010, the United Nations Educational, Scientific and Cultural Organization (UNESCO) recognized French gastronomy as one of the world's "intangible cultural heritages." Gastronomy is more than food; it encompasses the *art* of preparing and enjoying it, thus connecting food and culture. Why are French gastronomy traditions so strong? The French love food, and they operate with a holistic approach to it that includes both community solidarity and an understanding of ecological processes. I explore how cultural values, attitudes, and traditions of food production, consumption, and healthy lifestyles are transmitted from generation to generation. I analyze the French history and social climate that have shaped gastronomy and formed a strong food culture. Central to this project is an understanding of the balance between maintaining strong roots in tradition while allowing innovations that support this process. I apply daily business at the *Ferme de Gally* to the larger context of French culture, showcasing

its important role in reinforcing values of French gastronomy through education and the promotion of community cohesion.

ABIGAIL WILLIAMS, '12

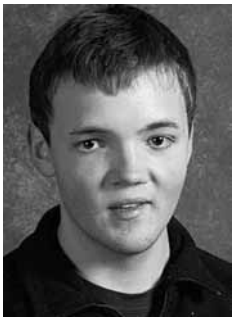
(See Zane Havens, '12, Abigail Williams, '12)

ALAN WILLIAMS, '11

Congressional Earmarks: Alternative Approaches to the Concept of Representation

Faculty Sponsor: William Rose

Major: Political Science
Hometown: Mt. Pleasant, Mich.



Recently, many Americans have become familiar with earmarks as part of political reality. For the uninformed, however, an earmark is a term used when members of Congress who wish to secure government funds to benefit the people of their district attach specific spending provisions to a bill. Friction comes when the public realizes that money is often used on projects that appear, at least on the surface, to be frivolous. Thus, even as some members of Congress decry the frivolities of federal budget deficits run amok due to the prevalence of earmark spending, those same congressional representatives are the ones who create earmark-spending provisions for their districts in the first place.

This dual position of Congress, evident by publicly condemning earmarks while simultaneously allowing members to attach earmark amendments to bills, exemplifies the important role earmarks have in our democratic system. Further, it is also through congressional hypocrisy over earmark spending that questions of the exact nature of representation are raised because one must understand whose best interests a representative is elected to serve: their constituents or the nation.

By looking at the purpose of earmarks, how earmarks and political deal-making affect the political process, and public outcry against earmarks, one can see that earmarks will be prevalent in Washington, D.C. for a long time to come because earmarks are an essential part of modern American politics.

JULIANA WURZLER, '11

The UV-Visible Absorption Properties of Benzoic Acid Derivatives

Faculty Sponsor: Craig Bieler

Major: Biochemistry
Hometown: Mason, Mich.

Within the last several years, a spectrometry technique called Matrix Assisted Laser Desorption/ Ionization (MALDI) has come into common use. This technique allows mass spectrometry of large organic molecules by crystallizing them into one of a variety of nonorganic matrix compounds. However, a satisfactory understanding of the processes by which these matrix compounds absorb light has not yet been attained, thereby undermining the understanding of the MALDI mechanism as a whole. My research has focused primarily on hydroxybenzoic and aminobenzoic acids, some of the more common matrix compounds, in particular, the ways in which the position of the hydroxy or amino group and the number of those groups on the benzene ring affect the molecule's ability to absorb light. The methods used in this process consisted of preparing several dilutions of solutions made with each compound, followed by running the sample through a UV-Visible spectrometer. Calculations were then made to determine the absorptivity of each compound. The idea is that, if we can gain more insight into how the position of the functional group affects the photophysics of benzoic acid, we may be able to better suggest and support hypotheses about how the molecule is involved in the matrix absorption process.

Supported by: Albion College Chemistry Department

MATTHEW ZABOROWICZ, '11

Classification and Characterization of *Tetrahymena* and *Twort* Group I Introns and Fluorescently Labeled Group I Intron Substrates

Faculty Sponsor: Christopher Rohlman

Major: Biochemistry
Hometown: Sterling Heights, Mich.

There is a great deal of research being performed in the field of RNA, due to the discovery of the many functions of non-coding RNA. Initially it was believed that RNA was merely a stepping stone in the transcription/translation process. However, it is now understood that RNA does much more than just code for proteins. This is due to the structure-function hypothesis. Since RNA is single-stranded as opposed to the double-stranded DNA, it can form complex three-dimensional structures by folding and forming base pairs within a single strand. This characteristic allows RNA to perform activities that DNA never could. This is the reason many researchers have moved on from DNA and turned their attention to RNA as the nucleic acid of interest. One such RNA molecule is the Group I intron. Prior to translation, RNA will often undergo a splicing process where the introns are cleaved and the remaining exons are spliced together. Group I introns possess the ability to self-splice through three-dimensional folding and phosphotransesterification reactions. These introns are studied in the ribozyme form which is a modified version of the original strand with an "active site" that allows for catalytic reactions. These reactions are studied in a recently developed technique utilizing the fluorescent detection laser of a genetic sequencer. The sequencer allows for better detection with less reactant use compared to traditional band shift gel assays.

Supported by: FURSCA

As part of a Prentiss M. Brown Honors class entitled "Biodiversity and Conservation in the Converting World," students spent two weeks in Suriname, South America studying environmental issues and working on research projects. Pictured (left to right): Katherine Kirsch, Katie Stephens, Emilee Studley, Emily Foster, Courtney Meyer, Dean McCurdy (instructor), Michelle Valentine, Kimmy Leverenz, Michael Albano, and Heather de Bari.

The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on Coastal Ecosystems

MICHAEL ALBANO, '12
Major: Chemistry
Hometown: Rockford, Mich.

HEATHER DE BARI, '12
Major: History
Hometown: Saginaw, Mich.

KIMMY LEVERENZ, '13
Major: Biology
Hometown: Grosse Pointe, Mich.

EMILEE STUDLEY, '13
Major: International Studies
Hometown: Concord, Mich.

MICHELLE VALENTINE, '12
Major: English
Hometown: Jackson, Mich.

Faculty Sponsor: Dean McCurdy

The muddy coastline that runs along the coast of Suriname is the longest in the world, and small invertebrates that live in this ecosystem support millions of migratory birds and species of fish. As part of a Brown Honors Program seminar trip to Suriname, our group studied the biology of coastal mudflats within the Suriname River estuary. A survey of gut contents of fish purchased from local boatmen showed that bottom-feeding and pelagic-feeding fish fed on a variety of small fish species and crustaceans, although most prey items were species found in open water. Samples of mud collected within the estuary contained high densities of tanaid crustaceans, although these animals were not found within emergence traps or fish, suggesting that they do not disperse on high tides. We also observed polychaete worms, an isopod crustacean, and a nemertean worm, which all represent new records for Suriname (and possibly undescribed species). Taken together, our results indicate that food webs are more complex and biodiversity within estuarine ecosystems in South America may be richer than previously thought. Further research is needed urgently, given evidence of rapid environmental change occurring along the northern coast of South America.

The Prentiss M. Brown Traveling Seminar to Suriname, South America: Research on the Politics of Development and the Interior Rainforest

EMILY FOSTER, '12
Major: Biology
Hometown: Charlevoix, Mich.

KATHERINE KIRSCH, '12
Majors: French, English
Hometown: Schoolcraft, Mich.

COURTNEY MEYER, '11
Majors: Economics and Management, International Studies
Hometown: Prudenville, Mich.

KATIE STEPHENS, '12
Major: Spanish
Hometown: Dearborn Heights, Mich.

Faculty Sponsor: Dean McCurdy

This presentation will report on projects conducted in Suriname that relate to the Saramaccan people living within the interior rainforest of the country, and broader development issues faced by people in Suriname in light of recent developments in foreign relations and changes in the political landscape within the country. One group of students developed a photographic key for medicinal plants used by peoples living near the Brownsberg Nature Park and along the upper Suriname River at Botopassie (plants were described using local names and uses and were later identified with scientific names). A second project investigated local health-care issues within remote villages in Suriname and perceptions of Western medicine (interviews were done with a bush doctor, a Cuban volunteer doctor, and a guide). A third project explored environmental and developmental consequences of historical and current political and economic activities in Suriname using a series of informal conversations and interviews. At the time (May 2010) the party coalition including the National Democratic Party (NDP) and its leader Desi Bouterse were poised to obtain a parliamentary majority and the presidency (events which have since transpired). This presentation will include a description of how recent political events might impact the Suriname people and foreign relations.

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
Ben E. Hancock, Jr.
T. John Leppi, '59 (deceased)
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)

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)

THE 2011 ISAAC STUDENT RESEARCH SYMPOSIUM COMMITTEE

Craig Bieler (Chemistry)
Sarah Briggs (Communications Office)
Jeffrey Carrier (Biology)
Gene Cline (Philosophy/Brown Honors Program)
Chelsea Denault, '12
Lisa Lewis (Chemistry, Academic Affairs)
Vanessa McCaffrey (Chemistry/FURSCA)
Anne McCauley (Art and Art History)
Dean McCurdy (Biology/Brown Honors Program)
Michael Van Houten (Stockwell-Mudd Libraries)