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ELKIN R. ISAAC ALUMNI LECTURE

Eileen A. Hebets, '94

Eileen Hebets is currently an assistant professor in the School of Biological Sciences at the University of Nebraska-Lincoln, where she teaches zoology and behavioral ecology. From 2003 to 2005, she held appointments at the University of California, Berkeley as assistant professor in the Department of Environmental Science Policy and Management/Division of Insect Biology, curator of the Essig Museum, and member of the Helen Wills Neuroscience Institute. She held a National Institutes of Health post-doctoral research fellowship in the Department of Neurobiology and Behavior at Cornell University in 2002-03.



A specialist in the evolution of animal communication systems, Hebets is currently focusing her research on the development of complex signaling systems in various spider species. Supported by a Searle Scholars Program Fellowship and a National Science Foundation CAREER grant, her work includes both field-based experiments and observations and an array of laboratory techniques and methods drawn from molecular biology and neurophysiology. Hebets' field research has taken her to caves in Puerto Rico, rain forests in Costa Rica, and the sky islands in Arizona.

Her findings have been covered by national and international news organizations, including *The New York Times*, *USA Today*, *The Boston Globe*, BBC Online, CNN, ABC News, and National Public Radio. She also served as a consultant for the movie *Spider-Man* (2002). Hebets' scholarly publications include articles in the *Proceedings of the National Academy of Science*, *Journal of Experimental Biology*, *Animal Behaviour*, *Behavioral Ecology*, and the *Journal of Insect Physiology*, among others.

After graduating from Albion College in 1994, Hebets went on to earn a master's in biology at the University of Cincinnati (1996), and then a master's (1998) and Ph.D. (2002) in ecology and evolutionary biology at the University of Arizona.

This year's lecture marks the first time in the history of the Isaac Symposium that our Alumni Lecturer also participated in the symposium as an undergraduate. In 1994, Hebets gave a presentation entitled, "Habitat and Courtship Behavior of the Wolf Spider *Schizocosa retrorsa*." Named the outstanding senior biology major that year, she also received the Edmund and Kathleen Jenkins Research Award from Albion.

JOSEPH S. CALVARUSO KEYNOTE ADDRESS

Steven Pinker

In choosing him as one of the world's 100 Most Influential People, in 2004, *TIME* magazine postulated that "every half-century . . . an eminent Harvard psychologist crystallizes an intellectual era. . . . [Steven Pinker] seems poised to keep its tradition alive."

One of the world's leading experts on language and the mind, and a founding scholar in the field of evolutionary psychology, Steven Pinker asks audacious questions about the true nature of our humanity, and then boldly sets out to answer them. Pinker simultaneously enlightens and confounds academia and the public alike with his revolutionary understanding of the interconnectedness of language, instinct, consciousness, emotions, and neurology.

Pinker is the author of the *New York Times* bestseller and Pulitzer Prize finalist *The Blank Slate: The Modern Denial of Human Nature*. His earlier bestsellers include the Pulitzer finalist *How the Mind Works*; his classic, *The Language Instinct*; and the book popularizing his own research, *Words and Rules: The Ingredients of Language*. Pinker's next book, *The Stuff of Thought: Language as a Window into Human Nature*, is already enjoying brisk sales on Amazon.com, five months before its release in September. Pinker has written countless academic articles and frequently contributes to a variety of mainstream publications, including *The New York Times*, *Nature*, *Atlantic Monthly*, *Slate*, and *TIME*.

Appointed Harvard University's Johnstone Family Professor of Psychology in 2003, Pinker previously served on the faculties of the Massachusetts Institute of Technology and Stanford University. He is also a fellow of several scholarly societies, including the American Academy of Arts and Sciences and the American Association for the Advancement of Science. Pinker has received numerous awards, including the Troland Research Prize from the National Academy of Sciences and five prizes from the American Psychological Association. In addition to this recognition for his research, he has won a number of teaching prizes, is included in the *Esquire* Register of Outstanding Men and Women, and was named among the *Newsweek* 100 Americans for the 21st Century.

A native of Montreal, Pinker is a graduate of McGill University and holds a doctorate in psychology from Harvard.



STUDENT PRESENTATION SCHEDULE—THURSDAY, APRIL 26, 2007

FORUM #1—Norris Center 102

8:30	Catherine Fontana (Olapade)	What Is Lurking in Your Bathroom: The Effectiveness of Environmentally-Friendly Cleaners
8:45	Danae Willenberg (Schmitter)	Something to Smile About: An Exploration of the Link between Oral Health and Cardiovascular Disease
9:00	Sarah Moilanen (Elischberger)	To Conform or Not Conform: The Social Influences on Gender Identity
9:15	Sarah Heddon (White)	Sustainable Fishing on the Northern Kenya Coast
9:30	Elizabeth Weage (Olapade)	Temporal Changes in the Abundance and Distribution of Coliform Bacteria Populations in the Kalamazoo River
9:45	William Leach (Olapade)	Detection, Quantification, and Molecular Characterization of <i>Bdellovibrio</i> and Like Organisms (BALO) in Rice Creek
10:00	Andrew Hasley (Scheel)	Blasted Bugs
10:15	Veronica Tucker (Moss)	The ImPACT of Concussions on the Neurological Factors of the Human Brain
1:15	Megan Anderson (Wilson)	Effects of Dentate Gyrus and CA1 Lesions on Trace Appetitive Conditioning in Rats
1:30	Dorela Shuboni (Jechura)	The Effect of Alcohol and Pheromones on the Reentrainment Rate of <i>Octodon degus</i>
1:45	Mark Wojda (Christopher)	Right-Wing Authoritarianism, Social Dominance Orientation, and Attitudes toward Working Parents
2:00	Alicia Simon (Christopher)	Conservative Ideology and Attitudes toward Fat People
2:15	Cynthia Cardwell (Wilson)	Within-Subject Assessment of Appetitive Conditioned Inhibitors in the Rat: Summation and Retardation-of-Acquisition Tests
2:30	Amanda Tilot (Jechura)	Examination of Unihemispheric Sleep in an Australian Lizard, the Bearded Dragon
2:45	Emily Swanson (Jenson)	The Influence of Aging Stereotypes on Recovery Projections
3:00	Catherine Game (White)	Science- versus Art-based Modules: Nonformal Sustainability Education for Children
3:15	Nick Bismack (Jechura)	The Effects of Public Displays of Affection (PDA) on Subjective Stress Levels, Cognitive Performance, and Circadian Cortisol Levels
3:30	Jacob Sauser (Wieth)	Chunking and Context Effects and Their Effects on Media Recall
3:45	Hannah Sprague (Jechura)	Effects of Bright Light Treatment on Sleep Consolidation and Entrainment of Circadian Rhythms
4:00	Kristy Clement (Wyss)	Why Merce? Merce Cunningham's Influence on Choreography and Modern Dance

FORUM #2—Norris Center 104

8:30	David Goodyear (Yewah)	Africa Demythified: A Personal Reflection of My Experiences in Cameroon
8:45	David Brandt (Cocks)	The Economic Decline and Collapse of the Ottoman Empire
9:00	Grace Shin (Wu)	Widows as Portrayed in South Korean Media: 1950s to the Present
9:15	Meghan Esper (Young)	The Importance of <i>Guanxi</i>
9:30	Sara Ellena (Mullin)	Seeing for Myself: Politics of Representation and the Study Abroad Experience
9:45	Laura Willobee (Cocks)	<i>Riam Nar Druid O Sbairn Lann</i> : Factors in Recruitment for the Irish Brigade in the American Civil War
10:00	Erin Franzen (Chapman)	YES: Take Two
10:15	Carolyn Jacques (Berkey)	Community and Spirituality among Albion College Students
1:15	Arielle Carter (Togunde)	In Their Own Words: The Consequences of Child Labor in Urban Nigeria
1:30	Sarah Richardson (Togunde)	Children's Educational and Occupational Aspirations in Urban Nigeria: Implications for Policy Development
1:45	Rachel Szymanski (Melzer)	The Career Experiences of Instrumental Musicians
2:00	Jamie Gove (Johnson)	Four- and Five-Year Olds' Perceptions on Physical Activity and Nutrition
2:15	Simona Shuboni (Cocks)	Rock 'n' Roll and the Nationalities Question: Creating a Yugoslav Culture, 1960-1992

2:30	Benjamin Passavant (Dick)	The Automobile Refueling Emissions Controversy
2:45	Bobbie Cole (Ariza)	The Effect of Sorority Membership on Black Female Identity and Adaptation at a Predominantly White Institution
3:00	David Geer (Collar)	The Formation of Transgender Activism within the Stonewall Gay Rights Movement: An Analysis of Gender and Sexuality within Post-Stonewall Politics
3:15	Theresa Vinic (Wickre)	Trap, Neuter, Return: Feral Cat Management in Michigan
3:30	Meaghan Walters (Dick)	Radium Watch Dial Girls: Was the Price Worth the Watch?
3:45	Amanda Boundy (Mullin)	The Accidental Gypsies: Irish Travelers in the American South
4:00	Lindsay Pingel (Erlandson)	Nonverbal Coding of Roommate Conflict

FORUM #3—Norris Center 100

8:30	Elizabeth Colville (C. Van de Ven)	Climate Change and the Response of Plant Distribution in the White Mountains, California
8:45	Ashley Fields (Beilstein)	Progress toward an Electrochemical Immunoassay
9:00	Shane Walton (Miller)	Infrared Photon Transport in Biological Material
9:15	Paul Roberts (Wilch)	Field Analysis of Volcanism and Glaciation at Minna Bluff, Antarctica
9:30	Andrew Fidler (Bieler)	The Photophysics of Cinnamic Acid Derivatives
9:45	Lesley Simanton (Zellner)	Training in Astronomical Spectroscopy
10:00	Jacqueline Fillingier (Rohlman)	Characterization of the <i>Tetrahymena</i> Group 1 Ribozyme Using a Fluorescence-based Assay
10:15	Andrew Brusoe (McCaffrey)	Synthesis of Diimino and Tetraimino Ligands for Use in Magnetic Materials
1:15	Paul Beach, Wendy Simanton (Scheel)	An Investigation of the Effects of Netrin on Cellular Growth in the Imaginal Wing Disc of <i>Drosophila melanogaster</i>
1:30	Megan Ermler, Amie Freeman (Saville)	Investigation of Double-Stranded DNA Gap Repair Following Excision of a <i>hobo</i> Transposable Element in <i>Drosophila melanogaster</i>
1:45	Mark Weismiller (Saville)	Investigating Mechanisms of DNA Repair in <i>Drosophila melanogaster</i> by Analyzing Excision Events Using the Transposable Element <i>hobo</i>
2:00	Melissa Love (Harris)	Organic Chemistry Is the Bomb: Degradation of RDX by Potassium Permanganate
2:15	Jennifer Smith (Carrier)	Behavioral Studies and Investigations of Acoustic Nerve Pathways in Nurse Sharks (<i>Ginglymostoma cirratum</i>)
2:30	David Goodyear (Kennedy)	Does the Source of DNA Matter? A Comparison of DNA from Feathers and Blood of Nestling House Wrens and Tree Swallows
2:45	Sarah Bury (Skean)	Endocarp Morphology and Its Implications for Biogeography in the Symplocaceae
3:00	Shauna Paradine (French)	Catalytic Enantioselective α -Oxytosylation of Propiophenone Using Chiral Hypervalent Iodine Reagents: An International Collaboration
3:15	Sarah Simmons (French)	Attempted Aziridinations and Sulfonilations Using Simple Iron Catalysts and Hypervalent Iodine Reagents
3:30	Kapil Mandrekar (Lyons-Sobaski)	Chemical Cues, 3-D Structure, and Social Experience in Contests between Similarly Sized Juvenile Black Midas Cichlids, <i>Amphilophus</i> sp. "Short"
3:45	Kristen Krum (McCurdy)	Using Radio Telemetry to Determine Home Range Sizes of Wood Turtles, <i>Glyptemys insculpta</i> , in Nova Scotia, Canada
4:00	Lake Sweet (McCurdy)	Fine-Scale Movement Patterns and Habitat Use by Wood Turtles, <i>Glyptemys insculpta</i>

FORUM #4—Towsley Lecture Hall/Norris Center 101

8:30	Bethany Corriveau (Morrow)	Lions on the Edge: The Marginal Imagery of the Cathedral of Saint-Trophime
8:45	Sarah Wingo (Young)	Contextualizing Shakespeare: Changing Views of Love and Courtship Investigated through Two of Shakespeare's Comedies
9:00	Brandon Hill (Guenin-Lelle)	La Louisiane dans <i>Les Éphémères</i> par Alexandre Latil

(continued on next page)

9:15	Jason Sebacher (Kanter)	An “Uncouth Swain” Tells an Uncouth Poem: John Milton and the Duality of <i>Lycidas</i>
9:30	Michael Melvin (Jordan)	Celebrity, Scandal, and Self-Construction: Lord Byron and Oscar Wilde in the Public Eye
9:45	Rachel McKinney (Madhok)	Semantic Externalism, Social Construction, and Privileged Access to Self-Identification Claims: A Challenge to Haslanger?
10:00	Abigail Geegan (Oswald)	El efecto de la dictadura de Francisco Franco en la literatura “tremendista” de posguerra inmediata española/The Effect of the Dictatorship of Francisco Franco on the <i>Tremendista</i> Literature in Immediate Post-Civil War Spain
10:15	Lauren Duthie (Grimm)	The Eternal Feminine Draws Us Onward: Johann Wolfgang von Goethe’s Perceptions of Women
1:15	Amanda Boundy, Halie Watt (Ball)	“Sous le Dôme Épais” (The Flower Duet) from <i>Lakmé</i> by Léo Delibes and “Song to the Moon” from <i>Rusalka</i> by Antonín Dvořák
1:30	Kelly Parsell (McCauley)	“Static”: A Collection of Poems and Prints
1:45	Laura Beyer (McCauley)	Personality Portraits
2:00	Kevin Ryan (Abbott)	The Life, Music, and Legacy of Howard Hanson and His Influences on American Classical Music and the American Music Education System
2:15	Brenda Errichiello (McIlhagga)	Drill Writing: From Concept to Completion
2:30	Carmen Weddell (Abbott, Ball)	Beethoven Concerto No. 3 for Piano and Orchestra, Op. 37
2:45	Brianna Caszatt (Mesa)	“Reading a Map”: A Collection of Poems
3:00	Corey Crowley (Brown)	“Along the Brick Street: Albion Short Stories”
3:15	Catherine Janssen (Jordan)	“Stink Cheese”: Stories for Feasting
3:30	Rebekah Simmons (Stotz-Ghosh)	“The Aviary”: A Collective Series of Poems with Corresponding Works of Art
3:45	Allison Gessner (R. Van de Ven)	Mozart Meets Jazz: Arranging Concerto K. 314 for Jazz Oboe
4:00	Thomas Carpenter (Abo, Ball)	Concerto No. 3 in G Major: First Movement by W.A. Mozart

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

Laura Beyer (McCauley)	Human versus Nature: An Artistic Examination
Elizabeth Colville (Wilch)	A Petrographic Analysis of Adare Basin Seamounts in Western Ross Sea, Northern Victoria Land
Kristyn Darmafall (McCaffrey)	Synthesis of Organic Ligands Based on Indole-substituted Quinones for Magnetic Materials
Catherine Game, John Cawood, Mike Eggleston, Adam Hashimoto, Jason Lindberg, Kapil Mandrekar, Dylan Simons (Harris)	Calories to Kilowatts: A Workout for Energy Education
Megan Lupek (McCurdy)	Stress Levels in Green Frogs in Relation to Colonization by a Waterborne Pathogen
Sarah Mapes (Olapade)	Incidence and Distribution of Surface-associated Bacteria on the Albion College Campus
Amanda Millhouse (Bartels)	Morphometric Analysis of Emydid Turtles from the Eocene of South Pass, Wyoming
Carrie Oleszkowicz (Saville)	Meta-Analysis of Prefrontal Cortex from Acute Ethanol Studies in Mice: Making a Myelin Gene Network
Kelly Parsell (McCauley)	“Static”: A Collection of Poems and Prints
Rasleen Saluja (Saville)	Designing a Novel Genetic Assay to Measure Reverse Transcriptase Fidelity
Jacob Sauser (Christopher)	The Relationship between Job Security and Job Satisfaction in College Professors
Rebekah Simmons (Stotz-Ghosh)	“The Aviary”: A Collective Series of Poems with Corresponding Works of Art
Jeff Stephens (McCurdy)	Reproductive Behavior of Intersexes in an Intertidal Amphipod, <i>Corophium volutator</i>
Mark Wojda (Christopher)	Social Dominance Orientation, Right-Wing Authoritarianism, Ambivalent Sexism, and Prejudice toward Women in the Workforce

ABSTRACTS OF STUDENT PRESENTATIONS

MEGAN ANDERSON, '07

Effects of Dentate Gyrus and CA1 Lesions on Trace Appetitive Conditioning in Rats

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychology
Hometown: Clarkston, Mich.

Aversive conditioning studies have demonstrated that acquisition of trace classically conditioned responses requires the hippocampus. The dentate gyrus (DG) has been shown to increase in activity during trace intervals in appetitive conditioning, while the CA1 subregion of the hippocampus eventually shows decreased firing during the trace. We examined classically conditioned nosepoke responses to a trace CS predicting delivery of a sugar pellet US in female Sprague-Dawley rats. Rats received sham lesions or discrete electrolytic lesions of DG or CA1. CA1 lesion rats learned more slowly than sham lesion rats, and DG lesion rats more slowly than CA1 lesion rats. Over time CA1 lesion rats reached the same level as sham lesion rats. These findings have implications for the role of the DG in memory, and will be discussed in light of the growing evidence that neurogenesis in DG is important to memory consolidation.

Supported by: FURSCA-Metalonis Fellowship



PAUL BEACH, '08

Major: Biology
Hometown: Sturgis, Mich.

WENDY SIMANTON, '07

Major: Biology
Hometown: Niles, Mich.

An Investigation of the Effects of Netrin on Cellular Growth in the Imaginal Wing Disc of *Drosophila melanogaster*

Faculty Sponsor: Molly Scheel

Netrins are chemoattractant proteins that guide axon growth during the development of the nervous system and are important throughout the neural development of many organisms, including humans. It was hypothesized that, in addition to guiding axon growth, netrin also directly promotes cellular growth by inducing expression of cellular growth genes (cell cycle regulators). To test this hypothesis we utilized the power of *Drosophila* genetics, *in situ* hybridization, microscopy, and digital imaging. We found that netrin upregulated the expression of genes necessary for cellular growth. Through this discovery we also deduced a theoretical biochemical pathway that netrin may utilize to promote growth. This research is important in allowing for a better understanding of how netrin induces axonal growth toward desired targets in the body during nervous system development. A more thorough understanding of neural dynamics may be beneficial for developing therapies for individuals afflicted with neurodegenerative disorders such as Alzheimer's disease. Netrins have also been found to be expressed outside of the nervous system and have well-established links in the development of tumors.



Beach



Simanton

Thus, understanding how netrin induces cellular growth could provide further insight into cancer development and treatment.

Supported by: FURSCA-Robson Fellowship (Beach), FURSCA-Kresge Fellowship (Simanton), Albion College Faculty Development Fund

LAURA BEYER, '07

Personality Portraits

Faculty Sponsor: Anne McCauley

Major: Art
Hometown: Birmingham, Mich.

My portfolio of portraits examines the unique human figure. The concept of portraiture is time-honored in art-making, and this body of work continues to explore and redefine this tradition. This portfolio was executed by combining the printmaking techniques of etching and letterpress, providing the viewer with a multi-faceted portrait of the sitter. Each etching portrays an individual in his or her personal environment with special attention paid to objects that are telling of the sitter's personality. Each portrait incorporates an additional band of details such as a video camera, a guitar, a pair of glasses, or a favorite record to assert the role of the possessions in the piece. Finally, each portrait includes a written catalog of these objects of significance, providing another layer of insight for the viewer. This project complements the notion of the traditional portrait by creating a body of work that renders a physical likeness to the sitter, while highlighting additional elements of significance, providing an acutely personalized method of portraiture.



Supported by: FURSCA

LAURA BEYER, '07

Human versus Nature: An Artistic Examination

Faculty Sponsor: Anne McCauley

Major: Art

Hometown: Birmingham, Mich.

The consuming method of human occupation is at odds with the natural world. Examples of this conflict are prominently placed within urban environments including paved roads, concrete buildings, and fenced-in backyards. An image I find to be particularly compelling is a tree with its limbs cut back from a phone line. The implications of this vision are quite clear; the technological advancement of communities results in a scarred landscape.

Responding to the fragmentation of nature in residential communities, I constructed a series of prints focusing on the image of a tree cut away from a phone line. Met with the challenge of portraying the weight of this conflict and capturing this enormous subject matter, I decided to execute my prints in an oversize scale. The wood block for each printing matrix measures 4 ft. by 8 ft., the prints pulled from them nearly as large.

These prints examine the commonplace reminders of a developed landscape in an exaggerated light, provoking the viewer to reevaluate the implications and probable consequences of these decisions.

Supported by: FURSCA

NICK BISMACK, '08

The Effects of Public Displays of Affection (PDA) on Subjective Stress Levels, Cognitive Performance, and Circadian Cortisol Levels

Faculty Sponsor: Tammy Jechura

Major: Psychology

Hometown: Rochester Hills, Mich.

This study was designed to scientifically examine the relationship that exists between public displays of affection (PDA), stress levels as measured by subjective self-reports and cortisol sampling, and cognitive performance.

A successful analysis of these relationships would provide scientific evidence in support of or in opposition to modern PDA laws. It was hypothesized that exposure to a PDA stimulus would produce significant interaction effects between stress levels, cognition, and cortisol levels. A group of 120 students was divided into moderate, mild, and no PDA conditions. While subjects were given a measure of cognitive ability, a pair of "experimenters" performed varying degrees of PDA. Subjects then completed a stress indicator survey and also gave a saliva sample for cortisol content analysis. Mean stress levels, cognitive scores, and cortisol levels were compared across conditions to determine the effects of PDA. MANOVA results indicated that both cognitive score and cortisol content variables exhibited significant interaction effects while stress levels did not.

Supported by: FURSCA



AMANDA BOUNDY, '07

The Accidental Gypsies: Irish Travelers in the American South

Faculty Sponsor: Molly Mullin

Majors: Anthropology, Music Performance
Hometown: Eben Junction, Mich.

The Irish Travelers are a minority with origins in Ireland and have distinct work, marriage, family, and education practices. During the Great Famine of the mid-1840s, some Irish Travelers immigrated to the United States and brought these traditions with them. Eventually settling in the southern United States, the Travelers played an integral role in the southern mule trade. The largest population of these southern Travelers was called the Georgia Travelers.

Today, those once called Georgia Travelers live in an enclave of approximately 2,000 people called Murphy Village, South Carolina. The Travelers of today maintain many of their traditional practices including young marriage, portable occupations, and low levels of education. Although many traditional Traveler practices remain, the Irish Travelers are a highly adaptive community. Characteristics such as portable occupations have allowed the Travelers to adapt to changing social conditions, and therefore survive in many countries such as Ireland, England, and the United States.

Travelers are often referred to as "gypsies" and are targets for local prejudice. In South Carolina, the Traveler community is reputed to be insular and private, and those who live there are portrayed as scam-artists and thieves. Because of the negative stereotypes and the reputation for being insular, the Travelers are considered both backward and illegitimate. They are understood as either an ethnic group of ill-repute or not an ethnic group at all.

This study of the Irish Travelers of Murphy Village, South Carolina reveals instances of survival, adaptability, and discrimination against Irish Travelers in the American South through interviews, archival research, and participant observation research.

Supported by: FURSCA



AMANDA BOUNDY, '07

Majors: Anthropology, Music Performance
Hometown: Eben Junction, Mich.

HALIE WATT, '07

Major: Music Education
Hometown: Lake Orion, Mich.

“Sous le Dôme Épais” (The Flower Duet) from *Lakmé* by Léo Delibes and “Song to the Moon” from *Rusalka* by Antonín Dvořák

Faculty Sponsors: James Ball, Emily Benner, Jin Sook Hong

Born Clément Philibert Léo Delibes in Saint-Germain du val, France on February 21, 1836, Delibes wrote the opera *Lakmé* in 1882. *Lakmé* was first performed by the Paris Opéra Comique in 1883. The opera is set in India during the period of British colonization and revolves around the young daughter of a Brahmin priest, Lakmé, and the British officer with whom she has fallen in love. *The Flower Duet* is sung by Lakmé and her slave, Mallika, as they begin their daily tasks. Delibes died in Paris on January 16, 1891.



Watt

Antonín Dvořák was born in Nelahozeves, near Prague, Czech Republic in 1841. *Rusalka* is the ninth of his 10 operas and one of his most successful. It was written in 1900 and first performed at the Prague National Theatre in 1901. The story is based on a fairy tale by Friedrich de la Motte Fouqué and the libretto written by Jaroslav Kvapil. In the opera, Rusalka is a water nymph who has fallen in love with a human prince and so longs to be human herself. In *Song to the Moon*, Rusalka prays to the moon to tell the prince that she is waiting for him. The opera ends when the prince dies, and a heartbroken Rusalka returns to the lake. Dvořák died in Prague in 1904.

DAVID BRANDT, '07**The Economic Decline and Collapse of the Ottoman Empire**

Faculty Sponsor: Geoffrey Cocks

Majors: History, Economics and Management
Hometown: Highland, Mich.

The beginning of the twentieth century saw the collapse of one of the last great empires in the world. The Ottoman Empire stood for nearly 600 years and stretched from southern Europe to northern Africa and from the Mediterranean Sea to the borders of India. The empire was able to weather many wars and internal challenges, but its economic infrastructure was slowly being devastated through competition from an increasingly wealthy and more powerful Europe. During the last half of the empire's rule, it would go from possessing one of the wealthiest trade industries in the world to a country of third-world status. European powers not only enjoyed tremendous trade profits but made substantial territorial gains at the expense of the empire as well. The Ottoman Empire fell as a result of capitulations in terms of trade to Europe, a history of weak political leaders, and the failure to maintain and manage its richest per capita territories. Studying the fall of the Ottoman Empire from an economic perspective brings greater understanding to the region known as the Middle East today.



ANDREW BRUSOE, '08**Synthesis of Diimino and Tetraimino Ligands for Use in Magnetic Materials**

Faculty Sponsor: Vanessa McCaffrey

Major: Chemistry
Hometown: Toledo, Ohio

Conventional magnets, those that rely on clusters of metal atoms to exhibit magnetic properties, have intrinsic size minima. These limits can be overcome by combining the magnetic properties of metal ions and free radical-containing organic ligands. The two ligands studied are based on the tetrone structure developed in the Jackson laboratory at Michigan State University. The two molecules, one a diiminotetrone, the other a tetraiminotetrone, vary by the presence of two imine functional groups. Although the molecules are electronically similar, the nitrogen-metal bonds display more covalent character than do oxygen-metal bonds. This should allow for better coordination with metals, and therefore better propagation of magnetic properties. The synthesis and electronic characterization of these ligands are described.



Supported by: FURSCA-Robson Fellowship

SARAH BURY, '07

Endocarp Morphology and Its Implications for Biogeography in the Symplocaceae

Faculty Sponsor: Dan Skean

Major: Biology
Hometown: Jackson, Mich.

The Symplocaceae is a family of 325 extant species of flowering shrubs and trees distributed from eastern Asia to the neotropics where they are found mainly in high-elevation cloud forests. There is a large fossil record of Tertiary Symplocaceae fruits found in Europe and Asia. The endocarps (fruit pits) are easily identified in fossils due to the presence of an apical pore. A morphological survey and imaging of 67 neotropical and nine Asian species of Symplocaceae fruits and endocarps was completed with more than 350 captured images compiled in a database. Endocarp number was then mapped on a five-gene molecular tree of evolutionary relationships in the family. The combined tree showed a connection between endocarp number and currently recognized lineages. Fruits and endocarps of neotropical species and images of fruits and endocarps from extant Asian species compiled by Steven Manchester, Bruce Tiffney, and Peter Fritsch were compared to a revision of the fossil species of the family by Mai and Martinetto, in press. *Symplocos tetraporina* and *Symplocos germanica* are fossils found in the Lower and Middle Miocene of Germany that can now be assigned to lineages. Assuming a constant rate of molecular change, the divergence times of lineages in the family can be estimated using fossils as a calibration tool. The divergence times of the family are important in establishing dispersal events to North and South America.



Supported by: National Science Foundation Research Experiences for Undergraduates, California Academy of Sciences Robert T. Wallace Internship. This research was conducted at the California Academy of Sciences under the guidance of Peter Fritsch.

CYNTHIA CARDWELL, '08

Within-Subject Assessment of Appetitive Conditioned Inhibitors in the Rat: Summation and Retardation-of-Acquisition Tests

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychology
Hometown: Jackson, Mich.

A conditioned inhibitor (CI) is a stimulus indicating absence of an expected event. Commonly, CIs are established by following one conditioned stimulus (CSA) with the unconditioned stimulus (US), unless the CSA is followed by the CI:

- (1) $CS_A \rightarrow US$
- (2) $CS_A + CI \rightarrow NoUS$

This training may indicate: (1) CI signifies absence of the US, or (2) CSA with CI becomes a separate stimulus from CSA alone. Two complementary tests demonstrate true inhibitory properties of any CI. The summation test examines the CI's ability to prevent a conditioned response (CR) to another well-established CS at a greater rate than a neutral stimulus (NS). The retardation-of-acquisition test measures the CI's ability to actually predict the US. If it acquires the ability to elicit CRs more slowly than another NS, its inhibitory property is demonstrated.

We examined the ability of an auditory CI trained in an appetitive setting (CS-indicated delivery of a sugar pellet) to pass these tests. While others have used appetitive CIs to prevent onset of CRs, we considered CI effectiveness on a fine-grained time scale, examining its ability to inhibit CRs after the CS already elicited them. Our appetitive CI caused the rat to stop making the anticipatory CRs when a signal for food was presented, and passed the summation and retardation tests. Thus, we established true inhibitory meaning of this CI: the expected sugar pellet will not be delivered. Our finding validates this appetitive procedure for the study of conditioned inhibitors, enabling studies surrounding the neural bases of CIs and their role in clinical settings.



THOMAS CARPENTER, '07

Concerto No. 3 in G Major: First Movement by W.A. Mozart

Faculty Sponsors: Takeshi Abo, James Ball

Major: Music Performance
Hometown: Maple Grove, Mich.

Wolfgang Amadeus Mozart was born January 27, 1756 and died December 5, 1791 after composing over 600 pieces. As one of the most prominent composers of the Classical Era (1730-1820), he helped expedite change by focusing his efforts toward operas and virtuoso pieces that could be performed in public for multiple nights. This was in contrast to many of the other famous composers of the time, such as Haydn, who worked as court composers for royalty.



Mozart composed the Concerto No. 3 in G Major in 1775 while in Salzburg. In that same year he also composed four other violin concertos, two operas, and a piano sonata. The Concerto No. 3 in G Major is said to be one of his most famous concertos because of its combination of Italian-influenced simplicity and German-influenced counterpoint and polyphony.

The violin is the smallest instrument of the string family, holding roots in the ninth century and taking more than 450 years to realize its present state. The violin has no frets, and therefore requires precise muscle memory and fine motor skills to play. I have worked on the Concerto No. 3 since December of last year, selecting the piece specifically for the Albion College Concerto Competition. Through my close work with my studio professor, Dr. Takeshi Abo, the nuances of the Mozart concerto took shape over time, developing into a historically minded interpretation and performance.

ARIELLE CARTER, '08**In Their Own Words: The Consequences of Child Labor in Urban Nigeria**

Faculty Sponsor: 'Dimeji Togunde

Majors: International Studies, Political Science

Hometown: Grand Rapids, Mich.

This paper utilizes a 2002 dataset gathered through interviews with 1,535 children (aged 8-14 years) and their parents in urban Nigeria to examine the dangers and hazards reported by children who work in the urban



economy. Slightly over half of the interviewed child laborers are female. They begin work as early as age 7 and work for an average of four hours a day in order to contribute financially to the sustenance of the family and to acquire training needed in future occupations. The children come mostly from large households of about six persons, where many of the parents have low levels of education, income, and occupational status. Furthermore, because the sample is urban-based, the children come mostly from nuclear and monogamous households. A significant percentage of working children are involved in motor accidents, and face attempted kidnapping, rape, and sexual molestation. Many are also invited by gangsters to participate in robbery and anti-social activities. Others suffer from physical exhaustion and pains due to frequent long walks. These health problems have detrimental effects on children's school attendance, punctuality, school performance, and leisure time. This study has implications for regulating child labor in Nigeria.

Supported by: FURSCA

BRIANNA CASZATT, '07**"Reading a Map": A Collection of Poems**

Faculty Sponsor: Helena Mesa

Majors: English (Creative Writing), History
Hometown: East Lansing, Mich.

I recently spent six months living in Brighton, England, which has made me think about language in an entirely new way. One of the things that struck me was the reality that I could not understand what people around me were



saying, and that they could not understand me either, even though we both professed to speak the same language. As a history major, it intrigued me to live in a place so steeped in it—my apartment building was once a hospital during World War II, and there was an eleventh-century church across the way from the shopping center.

"Reading a Map" is a collection of poems based on my experiences while living abroad. Essentially it is a kind of linguistic travelogue. As such, I'm exploring different written forms, such as a postcard and a letter, and what it means to write specifically for other people. I'm fascinated by the image of a map because of its association with travel, and also because of its potential as a tool to discuss place and time. It provides a way to examine the relationship between a person's lived experiences and imagined ones. Furthermore, I'm exploring images of maps as a means of analyzing history and its relevance to the present. I question how much a map demonstrates the particular characteristics of the landscape and also how much it expresses the complex history experienced by the people within its borders.

JOHN CAWOOD, '08

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

KRISTY CLEMENT, '07**Why Merce? Merce Cunningham's Influence on Choreography and Modern Dance**

Faculty Sponsor: Melissa Wyss

Major: English

Hometown: Rockford, Mich.

Merce Cunningham is a well-known modern dancer and choreographer whose company has been together for over 50 years. His work, although controversial, is unique and has had an impact on the dance world. My thesis identifies questions that every choreographer must answer when creating a new piece, and it explains the most common ways that Cunningham would answer them. I also discuss why it is important for dancers and choreographers to be familiar with his views and the work he has done.



Choreographers must decide what type of movement and style they wish to follow in their creative work. The first chapter talks about Cunningham's technique and how his dancers are prepared to perform his choreography. The second chapter talks about accompaniment. A choreographer has to decide what type of relationship he wants the music and movement to have. Cunningham believes that music and dance merely exist at the same time and that is their only relationship. The third and fourth chapters discuss how Cunningham creates his dances through chance operations and using technology. The fifth chapter answers the question of theme and meaning. Most of Cunningham's dances have no meaning, but the audience interprets the pieces in surprising ways. These points that are unique to Cunningham's work help free the choreographer and give him or her unlimited possibilities when making a dance.

BOBBIE COLE, '07

The Effect of Sorority Membership on Black Female Identity and Adaptation at a Predominantly White Institution

Faculty Sponsor: Diana Ariza

Major: Communication Studies
Hometown: Detroit, Mich.

On a predominantly white campus, black female students are an isolated and discontented group which could be attributed to their double minority status. Being a black female makes it difficult to adjust and be accepted at a predominantly white institution, confronting issues of race as well as gender.



According to the American Council on Education's 2003 Minorities in Higher Education Annual Status Report, 42 percent of black women are enrolled in college; however, many of these women are finding it difficult to adapt socially on their campuses. Some black women are coping with these difficulties by becoming involved in organizations such as black sororities; however, issues of acceptance and seclusion within their college community still affect them.

This paper will examine the experiences of black female members of Alpha Kappa Alpha Sorority Inc. (AKA). AKA was founded as a means of creating a bond of sisterhood as well as a support mechanism for black women. Yet, challenges continue to be raised that make it difficult for black women to lead a normal social life amongst people who do not share their same background.

Using in-depth interviews, personal experience, and participant observation, I explore the maintenance of black female identity. Other questions I examine are: How does being a part of this black sorority affect other relationships on campus for black women? How does the sisterhood really improve the social life and adaptation of the black women involved? Also, how does a black sorority influence the adaptation and satisfaction of its black female members?

ELIZABETH COLVILLE, '07

Climate Change and the Response of Plant Distribution in the White Mountains, California

Faculty Sponsor: Christopher Van de Ven

Major: Geology
Hometown: DeWitt, Mich.

Climactic records indicate that the mean global surface temperature has warmed between 0.2 and 0.6°C during the twentieth century. This increase in temperature will cause many plants to shift to cooler locations at higher elevations.

Evidence for plant response to climatic warming is best observed where topographic and climactic factors have ultimate control over the ecological environment, such as the upper limits of vegetative growth in mountainous regions. The White Mountains in east-central California are a semi-arid mountain range that provides a natural laboratory for observing historic and current responses of plant species to climatic change. This study examined the uppermost elevation limits of *Artemisia arbuscula* (dwarf sagebrush), *Cercocarpus ledifolius* (mountain mahogany), and *Pinus monophylla* (pinyon pine). These plants are abundant at the middle to upper elevations in the White Mountains. Their abundance and easy identification make them ideal plant species to study to gain an understanding of how vegetation shifts occur within mountain ranges in the face of local topographic and geologic variability. Each plant's relative size, location, and elevation were recorded with a global positioning system (GPS), and then analyzed using GIS (geographic information systems) technology. Initial observations indicate that *Artemisia arbuscula* is undergoing an upslope migration, which may be a response to recent climactic warming, whereas evidence for *Cercocarpus ledifolius* and *Pinus monophylla* upslope migration is inconclusive.

Supported by: FURSCA-Kresge Fellowship, Department of Geological Sciences Taylor Fund



ELIZABETH COLVILLE, '07

A Petrographic Analysis of Adare Basin Seamounts in Western Ross Sea, Northern Victoria Land

Faculty Sponsor: Thomas Wilch

Major: Geology
Hometown: DeWitt, Mich.

Detailed analysis of volcanic rocks (basalts) collected from seamounts from the Adare Basin will be used to constrain the origin and evolution of volcanism and rifting in the western Ross Sea, west Antarctica. Basaltic magma that is erupted from the volcanic seamounts comes from a source deep within Earth known as the mantle. The hot magma can melt and incorporate small amounts of crust as it travels upward to Earth's surface; this melted crust can "contaminate" the original magma composition. An important objective of this study is to sample magmas that have traveled through thin oceanic crust, as opposed to the much thicker and compositionally distinct continental crust, in order to better constrain the original mantle source composition of west Antarctic basalts. A better understanding of sources for volcanism will provide valuable information on the processes of rifting and the breakup of New Zealand, Tasmania, and Australia from Antarctica approximately 80 million years ago. Basalts were collected from 13 seamounts (< 500 to ~1700 mbsl) by dredging. The basalts recovered are fine-grained, vesicular, and contain crystals of olivine (highly altered) and plagioclase. None of the seamounts appear to be active, but the fact that some of the samples are glassy and lack manganese coating suggests that the volcanic activity is relatively young. Before the samples are analyzed for chemistry and dated, a thorough petrographic investigation will be conducted. Petrographic examination of the samples will determine mineralogy, texture, and amount of secondary alteration. The results will be used to access their suitability for geochemical analysis and dating by the Ar-Ar technique.

Supported by: National Science Foundation Research Experiences for Undergraduates. This research was conducted in the Ross Sea and at Bowling Green State University under the guidance of Kurt Panter.

BETHANY CORRIVEAU, '07**Lions on the Edge: The Marginal Imagery of the Cathedral of Saint-Trophime**

Faculty Sponsor: Kara Morrow

Majors: Art History, Music
Hometown: Grand Rapids, Mich.

On the church of Saint-Trophime in Arles, France, the sculpted portal imagery possesses a wealth of meanings supporting and illuminating the concept of the Last Judgment. The lions present in the lowest register of the portal are the only images unattached to a specific narrative; the interpretation of these lions is dependent on a complex combination of the historical background, the use of symbols in medieval thought, and the political structure of the town during the construction of the portal. My project examines the historical and cultural circumstances that inspired the creation of the lions, their function within the sculptural program of the porch, and their impact on the viewer and the city.

Arles' history, marked by changing political rulers, allowed the consistently present power of the Catholic Church to rise to prominence. This power reached its height during the twelfth and thirteenth centuries, culminating in the creation of an independent Republic of Arles. This republic was loosely allied to the Holy Roman Empire, with the archbishop presiding over a secular consulate. I argue that the portal structure reflects this power of the church over secular powers in the Last Judgment theme. The lions serve to link the town of Arles specifically to the majesty of Christ and the salvation he grants to the faithful; they also symbolize the archbishops' authority over Arles. They also support the scriptural messages in the façade through meanings known to twelfth-century viewers from bestiaries and folktales. As a testament to the strength of this symbol, the lions have remained on the heraldic emblem of the city of Arles since the twelfth century.

Supported by: FURSCA, Prentiss M. Brown Honors Institute, Faculty Development Grant



COREY CROWLEY, '07**"Along the Brick Street: Albion Short Stories"**

Faculty Sponsor: Danit Brown

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

The stories in "Along the Brick Street" focus on two Albion College students. Luke grew up in the city of Albion and attempts to find a balance between being a member of the city and being a member of the college. Aidan is coming to terms with his father's death as he tries to determine what his role in his family should be, as well as the place for his father's memory.

Supported by: FURSCA



KRISTYN DARMAFALL, '07**Synthesis of Organic Ligands Based on Indole-substituted Quinones for Magnetic Materials**

Faculty Sponsor: Vanessa McCaffrey

Major: Chemistry
Hometown: Macomb, Mich.

The synthesis and characterization of quinone-based building blocks for molecular magnetic materials will be presented. In order to create magnetic materials, we are using a "metal-organic radical" hybrid approach. The organic ligands are based on a series of 3,6-diindole-2,5-dihydroxyquinones that have been synthesized in our lab. After oxidation to the quinone structure, the metal binding and magnetic properties of the ligand will be explored. The metal coordination of a similar series of ligands has been shown to be weak. It is hoped that the nitrogen of the indole ring will increase the coordination



capacity of the ligand and generate cooperative magnetic interactions that will be effective in yielding solids with useful properties.

Supported by: FURSCA-Irwin Fellowship

LAUREN DUTHIE, '07**The Eternal Feminine Draws Us Onward: Johann Wolfgang von Goethe's Perceptions of Women**

Faculty Sponsor: Catherine Grimm

Majors: German, Political Science
Hometown: Dearborn, Mich.

Johann Wolfgang von Goethe was a universal genius who revolutionized the different fields in which he worked. He made advances in science with his search for the *Urpflanze* (archetypal plant), as well as with his *Theory of Color*. His influence on European culture in general and German culture in particular was vast, and, as a writer, he was esteemed as a national treasure in Germany throughout the late eighteenth and nineteenth centuries.

My thesis focuses on Goethe's perceptions of and relationship to women, both in real life and in his artistic texts. I chose to concentrate on three different works: an early cycle of poems called *Die Sesenheim Lieder*; a short novel in letters, *The Sorrows of Young Werther* (*Die Leiden des jungen Werthers*); and the play, *Iphigenie in Taurus* (*Iphigenie auf Tauris*).

Whether directly or indirectly, it is clear that certain "real" women influenced Goethe's writing, and the figure of an ideal woman is apparent in his works. I am most intrigued by how these women are portrayed in Goethe's work, but also by the "real" women's connection to his artistic creation. I analyzed this issue using the following questions as my basis: Who is Goethe's idealized woman? Can she be found only in his writing or did she exist beyond the borders of his works? I also consider why Goethe fictionalized his many love affairs.

Supported by: FURSCA



MIKE EGGLESTON, '08

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

SARA ELLENA, '07

Seeing for Myself: Politics of Representation and the Study Abroad Experience

Faculty Sponsor: Molly Mullin

Majors: Anthropology, History
Hometown: Lisle, Ill.

This project explores how the study abroad experience helps shape the ways in which students construct their vision and understanding of the Middle East. My vehicle is the auto-ethnography. Used by anthropologists, ethnography combines detailed description with close analysis to create a realistic portrayal of a small but closely observed part of a society. In *auto-ethnography*, the writer is also a participant in the area of life being observed. In this study I have used my own experiences as a study abroad student at the American University in Cairo combined with interviews with fellow program participants and literature on study abroad, travel, and the Middle East to explore issues of representation, cross-cultural exchange, and the production of knowledge.

As a student of culture and politics, I wish to show what this case reveals about the workings of power, culture, and representation in the arena of international education and the position of Americans studying abroad in a period of such overt hostility and profound mis-education about the people and cultures of the Middle East. I looked closely at three dimensions of the politics of representation and contemporary American study abroad programs in Egypt: first, perceptions and attitudes toward the Middle East prior to leaving; second, cultural exchange, adaptation, and how students acquired and formulated knowledge; and third, students' ability to synthesize and present their experience and new understandings to family and friends. I also recommend ways students can enhance and broaden their study abroad experiences.



MEGAN ERMLER, '07

Major: Biology
Hometown: Petoskey, Mich.

AMIE FREEMAN, '08

Major: Biology
Hometown: Macomb, Mich.

Investigation of Double-Stranded DNA Gap Repair Following Excision of a *hobo* Transposable Element in *Drosophila melanogaster*

Faculty Sponsor: Kenneth Saville

DNA repair is critical for preserving genomic integrity, and disease can occur when DNA damage is not properly mended. There are many mechanisms for fixing a double-strand DNA break (DSB). In this study, we are analyzing the repair mechanism that occurs following the excision of a transposable element called *hobo*. This transposable element is a piece of DNA that can be made to jump out of the chromosome, damaging the surrounding

DNA in the process. We are investigating two potential mechanisms for repairing this damaged DNA. The first possible mechanism is homologous recombination using the sister chromatid as a template. The second mechanism is non-homologous end joining (NHEJ), in which the two broken DNA ends are directly rejoined. Our model utilizes a *hobo* element in *Drosophila melanogaster* called '132', located on the X chromosome, which carries a gene making the flies' eyes red. When this element jumps out and the DNA is repaired, the flies' eyes are white. In order to make the *hobo* element jump, a transposase source was introduced by means of crossing '132' females to males carrying a transposase gene. Expression of the transposase in the offspring of these crosses results in red and white mosaic-eyed flies. A total of



Ermler



Freeman

130 mosaic-eyed males and 135 mosaic-eyed females were recovered from these crosses. The female flies were frozen for future molecular analysis. One hundred seven of the mosaic-eyed males were mated with white-eyed females. Excision of the *hobo* element results in white-eyed females from this cross. Of 1,338 total females, 659 were white-eyed, an excision rate of 49.25%. The DNA from these females will be extracted, and the region of DNA from the site of *hobo* excision will be amplified using the polymerase chain reaction. Amplified DNA will be sequenced to determine the specifics of the mechanism for the DSB repair.

BRENDA ERRICHELLO, '07

Drill Writing: From Concept to Completion

Faculty Sponsor: Samuel McIlhagga

Majors: Music Education, History
Hometown: Countryside, Ill.

Drill is one of the few places in music where science and art come together to make a unified whole. Artistic expression is a huge part of drill-writing because the pictures on the field should be indicative of the music that



is happening at the time. Science, however, must still be considered because of the way sound waves travel, the way the human eye perceives figures at different angles, and our own ambulatory restrictions. As such, the drill writer has to learn about the way that each instrument produces sound, where to best arrange them on the field, and how to organize each instrument group so that they can be where they need to be when it is their turn to be featured on the field.

This project encompassed the entire process of writing drill—the on-field choreography of marching bands. The final product was the drill for Albion College's marching band, The British Eighth, and a short explanation and analysis of the drill. Over the course of the 2006-07 season, the band performed four halftime shows, composed of 5-30 sets (pictures) each, for a total of over 80 pages of drill. Although these shows were the final product, there was much preparation to do before the drill was written. This

project encompassed all of the parts of drill writing, including the following: (1) choosing and analyzing music, (2) becoming familiar with Pyware (the drill writing program), (3) learning about the physical limitations of sound waves and then applying that knowledge, (4) learning about the physical limitations of the performers, and (5) developing strategies to aid in the creation of expressive forms to match the music. This was accomplished over the course of the year through personal research, clinics, conversations with drill writers, and with the help of my sponsor, Dr. Sam McIlhagga.

One part of becoming an effective drill writer is improvement through critical analysis of one's drill. Through interviews with members of the band, I will attempt to assess the success of the drill from individual performers' perspectives and on the level of the entire ensemble. In this way, the project is composed of not only the procedure for writing drill, but the perceived effectiveness of said drill, which will help me assess my performance and draw upon that assessment to make positive changes for the future.

Supported by: FURSCA

MEGHAN ESPER, '07

The Importance of *Guanxi*

Faculty Sponsor: Margaret Young

Majors: Communication Studies, Music
Hometown: Birmingham, Mich.

In this presentation, I will be discussing an important Chinese cultural element: *guanxi*. *Guanxi*, loosely translated, means "connections" or "relationship." All of China operates on a *guanxi*-based, or relationship-based,



system. The rules applicable to western cultures are not applicable when interacting in a Chinese context. A person's *guanxi* refers to the tangled web of relationships and connections upon which he or she may draw for favors, with the assurance of reciprocal obligation. *Guanxi* is complicated and difficult to discuss with authority for various reasons. I plan to discuss the issues regarding scholarship and research done in this field during the presentation. I first became interested in *guanxi* during a study abroad term in China.

I will incorporate both my own experiences and the scholarship of others in the presentation of my research.

Supported by: FURSCA

ANDREW FIDLER, '08

The Photophysics of Cinnamic Acid Derivatives

Faculty Sponsor: Craig Bieler

Majors: Chemistry, Physics
Hometown: Rochester, Mich.

Cinnamic acid and several of its derivative compounds have traditionally been used as matrix compounds in matrix-assisted laser desorption/ionization (MALDI) mass spectrometric methods. While MALDI has become a common analytical tool for mass determination of high Dalton molecules, the mechanics by which the desorption/ionization process operates are still not readily understood. Absorbance and fluorescence measurements for a range of cinnamic acid derivatives will be reported. These data are also correlated to substituent type and position and compared between compounds that are currently used as matrix compounds and those that are not currently used. Additionally, *ab initio* excited states calculations are reported as an attempt to learn more about the excited states involved in these processes.



Supported by: FURSCA-Bethune Fellowship, Herbert H. and Grace A. Dow Professorship

ASHLEY FIELDS, '08

Progress toward an Electrochemical Immunoassay

Faculty Sponsor: Amy Beilstein

Major: Chemistry
Hometown: Chicago, Ill.

Atrazine (2-chloro-4-ethylamino-6-isopropylamine-1,3,5-triazine) is one of the most widely used herbicides in the U.S., with an annual use of more than 75 million pounds. Despite its widespread use, the effect of this herbicide on human and wildlife health is not completely understood. Previous research by Tyrone Hayes concluded that atrazine contaminates various waterways, and amphibian exposure has negative results. The study showed that 0.1ppb leopard frogs were transformed into hermaphrodites. Thus, in areas where atrazine use is prevalent, a straightforward, reliable, and affordable means of monitoring atrazine in drinking and ground water is desired. The development of an electrochemical immunoassay will make a fundamental contribution in the detection of atrazine, creating a process that is miniaturized, travel-friendly, faster, and easier to use on site. The electrochemical immunoassay requires that ferrocene-atrazine conjugates be synthesized and then analyzed for their use in the immunoassay. Here, we present our progress in the synthesis of compounds that can be used to monitor the concentration of atrazine in the environment using an electrochemical immunoassay.



Supported by: FURSCA-Irwin Fellowship

JACQUELINE FILLINGER, '07

**Characterization of the
Tetrahymena Group 1 Ribozyme
Using a Fluorescence-based Assay**

Faculty Sponsor: Christopher Rohlman

Major: Chemistry (Biochemistry)
Hometown: Grand Ledge, Mich.

Similar to DNA, RNA is a carrier of genetic information; however, research over the past 25 years has brought greater focus on its function in gene regulation and its ability to catalyze cellular reactions.



Biocatalysts are at the heart of biochemical research. A catalyst has the ability to accelerate chemical reactions allowing metabolism to function with greater efficiency, and therefore is vital to the function of living cells. Proteins that catalyze reactions are known as enzymes, and RNAs that catalyze reactions are ribozymes. Essential to its catalytic function is RNA's ability to form a wide variety of three-dimensional structures. Thus, understanding how this molecular architecture is created and then how it functions is the essence of the research. We analyze ribozyme structure using a fluorescence resonance energy transfer (FRET) assay in which molecules that fluoresce, rhodamine and fluorescein, are linked to the RNA. The amount of fluorescence from these molecules is measured as changes occur within the RNA structure during catalysis. For our work, a eukaryotic protist, *Tetrahymena*, was used since it can be grown and studied in the laboratory. Using the catalytic RNA from *Tetrahymena*, we developed and optimized this ribozyme assay by altering the reaction conditions, including pH, temperature, and the concentrations of biomolecules.

*Supported by: Albion College Faculty
Development Fund*

CATHERINE FONTANA, '08

**What Is Lurking in Your
Bathroom: The Effectiveness of
Environmentally-Friendly Cleaners**

Faculty Sponsor: Ola Olapade

Majors: English, Biology
Hometown: Dearborn, Mich.

Since the introduction of sterile stainless steel and alcohol-based hand sanitizers, our society has become increasingly obsessed with the elimination of pathogenic bacteria from our kitchen sinks and our lives.



However, despite our best efforts to scrub away scum, we are continually living in a microbial world in which bacteria are ever-present. Another new practice among the public is the use of environmentally-friendly products in the home, including cleaning solutions. Given the recent release of such products on the market, there has not been extensive research published on the effectiveness of these "green" cleaners in reducing the formation of bacteria colonies in comparison with traditional cleaners that contain harsh chemicals.

Eight direct contact points were chosen in a college annex bathroom used by seven individuals. Over a five-week trial, original bacteria from these areas were plated. The bathroom was cleaned on alternating weeks using traditional cleaners and "green" cleaners. Bacteria from the eight direct contact points were plated 30 minutes after cleaning and again after one week of growth before the bathroom's weekly cleaning. Although bacteria are never completely eradicated from any environment, the "green" cleaners significantly reduced the formation of bacteria colonies after both the post-cleaning 30-minute and one-week growth intervals. The results from the traditional cleaners indicated that these "99% anti-bacterial" cleaners do not significantly inhibit colony growth and conversely contribute to the movement of bacteria around the bathroom. This overwhelming growth could be due to microbial resistance to traditional cleaners.

ERIN FRANZEN, '07

YES: Take Two

Faculty Sponsor: Jennifer Chapman

Major: Political Science
Hometown: Flint, Mich.

YES: Take Two is a theatre-based intervention that looks at and evaluates middle school youths' perceptions of conflict and violence in their lives and community. My project is comprised of weekly workshops that use movement, art, writing,



and improvisational drama activities to stimulate thought and discussion about issues of conflict, violence, and community change. My goal is to investigate the effectiveness of drama as a tool for community dialogue. My research methods include a literature review, practical application, surveys, and a final analysis.

Integral to my study is the use of students' own definitions of violence and conflict resolution to guide us through the process. The students and I collaboratively defined violence as any act, physical or emotional, that is inflicted upon another person with the intention of inducing harm. Together we defined conflict resolution as any action intended to prevent, minimize, or resolve an act or effect of violence upon another individual.

My study builds upon the work of YES (Youth Empowerment Solutions for Peaceful Communities), a program developed and piloted by the University of Michigan-Ann Arbor in Flint, Mich. YES is a community change project based on the idea that efforts to reduce youth violence will be most successful if youth are actively involved in the process. My project also draws from scholarship and practice in the field of theatre education. I use the work of theatre educators Augusto Boal, Michael Rohd, Phillip Taylor, and Sharon Grady to plan and develop my drama lesson plans. I hope that my work will further the discussion about the role of the fine arts as a means of intervention for youth violence.

AMIE FREEMAN, '08

(See Megan Ermler, '07, Amie Freeman, '08)

CATHERINE GAME, '08

Science- versus Art-based Modules: Nonformal Sustainability Education for Children

Faculty Sponsor: Douglas White

Major: Biology
Hometown: Iron Mountain, Mich.

Science or art? This study explores the interdisciplinary nature of nonformal sustainability education by evaluating science-based modules compared to art-based modules. Children in grades 2-5 were taught through a two-week Eco-Discovery summer day camp.



Many interpretive centers and nature programs use science-based activities as a vehicle for children's environmental education. Eco-Discovery contrasted the effectiveness of art- versus science-based modules to evaluate the importance of integrating additional disciplines into nonformal environmental education. Children were split into a 2nd-3rd grade group and 4th-5th grade group. Each grade group participated in the two-week program. The program focused on three major sustainability issues: recycling, renewable energy, and sustainable building. Each issue was taught to participants using a science-based module and an art-based module. Children completed a pre- and post-test to assess their general knowledge on each of the three issues and whether art or science modules were more memorable.

Although the study was small (28 children completed the pre-test, 20 completed the post-test), results indicated that art might be as effective as science for teaching children about sustainability. No significant difference existed between the effectiveness of art- and science-based modules for each grade group. This also suggests that different sustainability issues may benefit more from nontraditional educational methods. Children who participated in Eco-Discovery significantly increased their general knowledge of the targeted sustainability issues.

Supported by: FURSCA, Whitehouse Nature Center

CATHERINE GAME, '08

Major: Biology
Hometown: Iron Mountain, Mich.

JOHN CAWOOD, '08

Major: Biology
Hometown: Okemos, Mich.

MIKE EGGLESTON, '08

Major: Biology
Hometown: Honor, Mich.

ADAM HASHIMOTO, '08

Majors: Pre-Engineering, Music
Hometown: Center Line, Mich.

JASON LINDBERG, '08

Major: Biology
Hometown: Traverse City, Mich.

KAPIL MANDREKAR, '07

Major: Biology
Hometown: Kalamazoo, Mich.

DYLAN SIMONS, '08

Major: Economics and Management
Hometown: Brighton, Mich.

Calories to Kilowatts: A Workout for Energy Education

Faculty Sponsor: Clifford Harris

The lack of effective energy conservation education and interest in alternative energy sources on Albion College's campus illustrates a common problem among American university campuses. This study integrated both education and renewable energy sources into a program designed to educate college students on energy conservation and consumption. Through the technical development of an energy generating and storing exercise system, Calories to Kilowatts, student participants utilized workout equipment to convert their own body energy into stored energy for electrical use. Participants received energy audits in their dorm rooms that measured the energy consumption of their electrical



Cawood



Eggleston



Hashimoto



Lindberg



Mandrekar



Simons

appliances. After one month of participation, students pledged to consume on a Saturday only as much energy as they generated in the workout facility. The effectiveness of the program was measured by comparing pre-participation surveys to post-participation surveys.

Supported by: U.S. Environmental Protection Agency

ABIGAIL GEEGAN, '07

El efecto de la dictadura de Francisco Franco en la literatura "tremendista" de posguerra inmediata española/The Effect of the Dictatorship of Francisco Franco on the Tremendista Literature in Immediate Post-Civil War Spain

Faculty Sponsor: Kalen Oswald

Major: Spanish
Hometown: Marcellus, Mich.

The Spanish dictatorship of Francisco Franco lasted from 1939 to 1975, during which censorship of the intellectual community was severe. Authors were forced to turn in their works to the *consulta previa*, the government's way of screening all works before they were published in order to determine whether they contained themes that portrayed the government in a favorable way. If this criterion was not met, the work would not be published and the authors could be punished. During the 1940s, immediately after the Spanish Civil War and the start of the dictatorship, a new tendency in literature, called *tremendismo*, emerged. *Tremendismo* reflects the pessimistic environment of violence and frustration that was found in Spain after the war. The two novels analyzed in this thesis were *La familia de Pascual Duarte* by Camilo José Cela, written in 1942, and *Nada* by Carmen Laforet, written in 1945. Cela and Laforet remained in Spain throughout both the war and the dictatorship and experienced these events firsthand. These novels belong to the *tremendismo* genre because they were both found to have "tremendous" events that were influenced by the Spanish Civil War and the dictatorship under which they were written. Although the *tremendismo* tendencies and influences of the dictatorship are expressed differently in each novel, the presence of both is strong, and allows for extensive analysis.



DAVID GEER, '08

The Formation of Transgender Activism within the Stonewall Gay Rights Movement: An Analysis of Gender and Sexuality within Post-Stonewall Politics

Faculty Sponsor: Mary Collar

Major: Feminist and Identities Studies
Hometown: Taylor, Mich.

Histories of queer activism rarely appear in mainstream accounts of liberatory politics within U.S. history. When queer representation does work its way into history textbooks or academic writings, it is often "covered" under the activism of lesbians and gay men. Transgender or pre-transgender lives and experiences are often ignored by historians or assimilated into gay-identified activism. The denial of transgender representation within queer history mimics the silencing that transgender activists have faced within queer activist groups. This silencing has continued to build since the 1969 Stonewall riots in New York, when queers fought back during a homophobic police raid on the gay-frequented Stonewall Inn.



The research I conducted this past summer through FURSCA is centered on uncovering the histories of transgender activism within the U.S., primarily focusing on the activism that arose from the infamous Stonewall riots. Researching the existence of transgender activists within post-Stonewall activism has led to an analysis of the sexual and gender politics of the gay and lesbian organizations that formed during the heat of Stonewall. The activism that sprang from Stonewall continuously denied the inseparability between sexuality and gender, thus silencing and stigmatizing transgender individuals within the gay and lesbian movement. From this stigma, self-identified "street transvestites" involved in the Stonewall riots formed the Street Transvestite Action Revolutionaries (STAR) House and began the

current transgender activist movement. My research focuses on the transgender individuals involved within the onset of Stonewall activism and the ways in which gay and lesbian activists denied a space for gay-identified, gender outlaws within the onset of the U.S. gay rights movement.

Supported by: FURSCA

ALLISON GESSNER, '08

Mozart Meets Jazz: Arranging Concerto K. 314 for Jazz Oboe

Faculty Sponsor: Rebecca Van de Ven

Major: Music Performance
Hometown: LaGrange, Ky.

I began learning about jazz last spring in a Jazz Improvisation class, and it piqued my interest in jazz. There are not many jazz oboists, and only a very few play oboe exclusively. I have always wanted to play in a jazz band, but there are very few pieces written for jazz oboe, so I'd never had the opportunity to do so. This past summer, I arranged the first movement of W.A. Mozart's famous Oboe Concerto in C Major in a jazz style, as an experiment in jazz oboe and musical form.



There have been other arrangements of classical pieces by small jazz combos, but none like what I have undertaken. Most arrangements take the classical melody and superimpose it on the standard jazz form, changing it to adhere to the jazz chord progressions. My arrangement makes a different combination of the melody and progression, retaining much of its concerto form, and changing the harmonies and rhythms. I also orchestrated it slightly differently. Rather than using a typical saxophone and brass section, I used woodwinds to allow the oboe to be heard and dominate the texture. This is the first of three movements, which will comprise my thesis when completed and will be performed in their entirety at my senior recital next year.

Supported by: FURSCA, Albion College Music Department Grant

DAVID GOODYEAR, '07**Africa Demythified: A Personal Reflection of My Experiences in Cameroon**

Faculty Sponsor: Emmanuel Yewah

Major: Biology

Hometown: Perry, Mich.

Confront the assumptions that come to your mind when someone mentions Africa. How do you normally regard the “dark continent” when it is portrayed in the news or in other forms of media? Are there wild animals constantly running free? Are the cities too poor to provide adequate food, lodging, and transportation for their tourists and visitors? Is Africa too dangerous to visit? Unfortunately, stereotypes about Africa are easily generalized to all of its countries.



My thesis is a detailed description of the trip I took to Cameroon with my First-Year Seminar at Albion College. The title of the course was “Africa: Myth and Reality.” I am using the narrative of my experience in Cameroon to break down myths and stereotypes about Africa, its countries, and its people in order to enforce the realities of the misunderstood Africa of today. Specifically, I describe seven aspects of Cameroonian culture: rural vs. urban atmospheres, hotels and hospitality, cuisine, shopping and the market, landscapes and landmarks, transportation, and traditions. I cannot generalize the specific details of my reflection to encompass all of Africa; Africa is much too large to support such broad generalizations. As I was visiting Cameroon, the differences among the cities we visited encouraged me to challenge my assumptions about Africa, and I hope to inspire readers to question what they think they may know about Africa as well.

Supported by: First-Year Experience Travel Grant

DAVID GOODYEAR, '07**Does the Source of DNA Matter? A Comparison of DNA from Feathers and Blood of Nestling House Wrens and Tree Swallows**

Faculty Sponsor: E. Dale Kennedy

Major: Biology

Hometown: Perry, Mich.

Recent advancements in molecular biology have led to an increase in the number of methods available for obtaining DNA from birds. Ornithologists are progressively more interested in avian DNA for studies of sex ratios, paternity, phylogeny, and fingerprinting. Two common sources of avian DNA are blood and feathers. We compared concentration and purity of DNA collected from blood and feathers of nestling house wrens (*Troglodytes aedon*) and tree swallows (*Tachycineta bicolor*) to determine the better source of DNA. In wrens ($n = 69$), DNA extracted from feathers was of lesser purity and lower concentration than DNA from blood (purity 1.52 ± 0.34 vs. 1.75 ± 0.18 , paired $t = 6.207$, $df = 68$, $P < 0.0001$; concentration 20.13 ± 11.11 vs. 44.08 ± 18.04 , paired $t = 9.670$, $df = 68$, $P < 0.0001$). In tree swallows ($n = 134$), DNA from feathers and blood did not differ in purity (1.75 ± 0.21 vs. 1.78 ± 0.10 , paired $t = 1.82$, $df = 133$, $P = 0.07$) but did differ in concentration (27.06 ± 15.96 vs. 40.65 ± 16.22 , paired $t = 7.20$, $df = 133$, $P < 0.0001$). Blood provided purities closer to the ideal 260/280 ratio of 1.8 (the ratio of pure DNA) for both species. Feathers of the two species differed in purity and concentration of DNA.

Supported by: FURSCA-Hyde Fellowship, Biology Department, A. Merton Chickering Professorship in Biology

JAMIE GOVE, '07**Four- and Five-Year-Olds' Perceptions on Physical Activity and Nutrition**

Faculty Sponsor: Thomas Johnson

Majors: Physical Education, English

Hometown: Clarkston, Mich.

A survey was created specifically for four- and five-year-old boys and girls at the Jump into Kindergarten Camps in Kalamazoo, Olivet, Battle Creek, and Marshall. This research project took place because of the lack of knowledge about children's perceptions about physical activity and nutrition. Portion size, favorite activities, and body image were also discussed in the questions. I surveyed all of the 100 children at these sites, and recorded the information in such a manner to keep the administration of the survey consistent.



The feedback and answers that we received have been very interesting and may prove to be reason enough for schools and other programs to start pushing parents and guardians to begin teaching children about nutrition and physical activity at a younger age. I will discuss the findings and share the significance of this information to generate interest in the topic for future teachers, parents, and anyone else who deals with children on a daily basis.

Supported by: FURSCA, Physical Education Department

ADAM HASHIMOTO, '08

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

ANDREW HASLEY, '07

Blasted Bugs

Faculty Sponsor: Molly Scheel

Major: Biology
Hometown: Grand Junction, Colo.

Over the last decade, bioinformatics has become an integral part of virtually every field of study in the biological sciences. The purpose of bioinformatics is to make use of modern computer technology and growing database resources to identify proteins, the genes that code for them, and the relationships between them. Over the past two summers I have used bioinformatics techniques to assist in the examination of nervous system development in various arthropods. Looking at nervous system development in multiple organisms can give us a better idea of how the development of the nervous system evolved, and therefore give us a better understanding of how it works. My research specifically addressed the identification of genes that code for numerous proteins that are active in the development of the central nervous system. To do this, we used a combination of experimental data, genomic information available in the public domain, and specialized computer software. This work had two major results. First, we completed phylogenetic analyses of a netrin homologue cloned from *Artemia franciscana* (brine shrimp). Netrin is a protein that is responsible for axon guidance in many different species, including humans. The second outcome of the project was the discovery of several nervous system genes from the recently-sequenced genome of *Tribolium castaneum* (red flour beetle). Finally, we used the research protocols we had developed to help design an educational laboratory experiment for use in upper-level genetics and developmental biology courses.



Supported by: National Institutes of Health

SARAH HEDDON, '07

Sustainable Fishing on the Northern Kenya Coast

Faculty Sponsor: Douglas White

Major: Anthropology
Hometown: Hartland, Mich.

I explored the artisanal fishing industry along the northern coast of Kenya to generate community-informed recommendations for transforming and revitalizing a deteriorating industry. Obstacles to sustainable development are growing poverty, environmental destruction, government marginalization, and foreign industry, tourism, and oil exploration. I seek to empower Lamu coastal communities to understand and utilize the potential of their own marine resources.



Throughout two trips and stays in Kenya, I studied the coastal artisanal fishing industry from Mombasa to Lamu in partnership with local Kenyan fisheries departments. Qualitative and quantitative research methods were employed to maximize a community-driven analysis of obstacles and subsequent solutions.

I identified significant environmental, economic, and social obstacles that drive a cycle of poverty along the coast, inhibiting the development of a sustainable fishing economy. Obstacles include declining fish productivity due to significant environmental degradation and destruction of inshore areas; overfishing; underdevelopment of offshore areas due to inadequate equipment and technology; lack of educational and management resources; lack of basic infrastructure or access to profitable markets; and the inability to control the environmental destructiveness of foreign trawling, investment, tourism, and oil exploration.

By identifying these challenges, I can recommend ways in which Kenya's artisanal fishery can be transformed to decrease environmental destruction, empower coastal communities, and contribute significantly to the growth of Kenya's national economy.

I conclude the artisanal fishing industry can be sustained and driven from within coastal communities, giving them the resources and education to effectively improve their lives.

Supported by: FURSCA

BRANDON HILL, '07

La Louisiane dans *Les Éphémères* par Alexandre Latil

Faculty Sponsor: Dianne Guenin-Lelle

Majors: Biology, French
Hometown: Plymouth, Mich.

Alexandre Latil published a collection of poetry entitled *Les Éphémères* in 1841 in New Orleans, La. This text, which includes 29 poems, as well as an important preface and author's notes, can be used to gain a better understanding



of mid-nineteenth-century Louisiana history and to further elucidate Louisiana literature's rightful place among francophone literature.

Latil's work is important for a variety of reasons, including the fact that it contains many intertextual references to other Creole and French writers of the time period, through direct quotations, dedications, or as subjects of the poems. In addition, other subjects of his poems and the references he makes to New Orleans society as well as his personal history reveal some important aspects of his life in Louisiana. All of these references allow the reader insight into the perspective of a young Creole man during this period. His poetry represents issues related to the economy of New Orleans, the social structure during this period in history, the literary community of which Latil was a member, medical care relative to leprosy (Latil was a leper), as well as the history of his own family through colonial times.

Supported by: FURSCA-Irwin Fellowship

CAROLYN JACQUES, '07**Community and Spirituality among Albion College Students**

Faculty Sponsor: Leonard Berkey

Majors: Sociology, Music
Hometown: Ashland, Ohio

Religious groups often convince new members to join their mosques, synagogues, temples, churches, or gurdwaras by emphasizing the social networks they offer. These groups assert that because their members share



beliefs and priorities, their behavior toward each other will be more loyal and trustworthy than that of other people or groups.

As a religious person, I have experienced the benefits and disadvantages of membership in such groups. I wondered, if a person is religious, is s/he more likely to feel very close to fellow faith practitioners?

To understand this problem, I studied three student groups which profess shared values: one religious, one cultural, and one which blends both elements. The religious group I chose was the Leadership Team for the student worship service known as Chapel. Break the Silence, Albion's gay-straight alliance group, was the cultural or "values-based" group. The third group, Albion College Hillel, straddles both religious and cultural life at Albion. During the 2006-07 school year, I conducted a study combining quantitative and qualitative methods to compare participants' self-concepts of spirituality with the amount of closeness they feel to those who are important to them. Using two surveys and semi-structured interviews, I gained an in-depth understanding of the social networks connected with each of these student groups and how important these networks are to the groups' core members. I found that shared identity—a common experience of self and closely aligned values and perspectives—is a mitigating factor in the relationship between spirituality and interpersonal attachment. Identities built on a strong sense of spirituality are only one type of shared identity through which students may connect with others like themselves and find a support network while they live at school.

Supported by: FURSCA

CATHERINE JANSSEN, '07**"Stink Cheese": Stories for Feasting**

Faculty Sponsor: Sarah Jordan

Majors: English, French
Hometown: Monroe, Mich.

Would you like stink cheese on your toast? Go for it. Perhaps with some deer sausage or bologna? Don't hold back. Care to slather some on a sticky bun and let the manila-folder-colored goo mingle irreverently with every cinnamon deposit that it meets? Now that, my friend, is genius.



"Stink Cheese," a creative non-fiction, is a Janssen family gathering—a small collection of a large family's legends. I assembled these stories between the ending of one love story and the beginning of another—between my grandfather's death and my cousin's wedding—or at least that was how I looked at our family story before I started writing. During the writing process, when I started assembling the Janssens around kitchen tables and beer buckets, a different story emerged—the story of a clan whose quirks, their love of bonfires and stink cheese, have created a strangely cohesive love.

When I started feeling the gaps, the distances of experience, growing between me and the family that remains in the hometown of Freeburg, I started to wonder about our gatherings. I started asking myself how so many people managed to fit together. Why do men in slacks and men in overalls pull up lawn chairs and talk about politics and kangaroos? When we're all getting farther apart, what is it that has us singing Dean Martin from different rooms of the house? I'm not quite sure, but from the smell of it I'd say it's edible.

Grab a fork. Help yourself.

KRISTEN KRUM, '08**Using Radio Telemetry to Determine Home Range Sizes of Wood Turtles, *Gleptemys insculpta*, in Nova Scotia, Canada**

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Sturgis, Mich.

Wood turtles, *Gleptemys insculpta*, like other turtles, are facing rapid population decline. Throughout their range (southeastern Canada to the northeastern United States) wood turtles are considered endangered or rare. In fact, many states and provinces are starting to protect these turtles by preventing their sale and conserving their habitats. I looked at the home range of wood turtles in Nova Scotia, Canada. Radio telemetry was used to track 11 turtles with a radio transmitter attached to their shells throughout the summer. Every time a wood turtle was located, a GPS point was taken. Through these data points, the home range for each turtle was determined. I found that females tended to have larger home ranges than males. This could be because of the inclusion of the females' travel to a nesting beach and their time there. These home ranges can help determine where turtles go and what habitat they use, which will allow us to determine ways to prevent their decline.

*Supported by: FURSCA-Irwin Fellowship, Biology Department*

WILLIAM LEACH, '08

Detection, Quantification, and Molecular Characterization of *Bdellovibrio* and Like Organisms (BALO) in Rice Creek

Faculty Sponsor: Ola Olapade

Major: Biology
Hometown: Ann Arbor, Mich.

Bdellovibrio and like organisms (BALO) are small gram-negative bacteria that prey on other gram-negative bacteria in the environment. These bacterial parasites are of significant ecological and environmental importance, because of their existence in a wide range of habitats, including fresh and salt water streams. Studies have documented the susceptibility of some bacterial populations within biofilm communities in response to the presence of *Bdellovibrio* (e.g., Kadouri and O'Toole, 2005). Despite their ecological importance as one of the major sources of bacterial mortality in nature, our understanding about their diversity is still very limited. Therefore, the aims of this research project include the detection, enumeration, and characterization of indigenous BALO populations in Rice Creek using a combination of standard microbiological and molecular approaches.



JASON LINDBERG, '08

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

MELISSA LOVE, '07

Organic Chemistry Is the Bomb: Degradation of RDX by Potassium Permanganate

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: Southfield, Mich.

As the world becomes more environmentally conscious, one branch of applied organic chemistry is concerned with cleaning up sites in the environment that are contaminated with chemicals. One method for remediating contaminated groundwater is *in situ* chemical oxidation (ISCO). A common reagent used in ISCO is potassium permanganate because it is a strong oxidizer and remains in the ground as manganese dioxide, its natural state. Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) is a commonly used explosive that has caused widespread groundwater contamination at numerous military sites. Previous research with RDX and potassium permanganate indicates that complete mineralization to CO₂ is possible and that 4-nitro-2,4-diaza-butanal (4-NDAB) may be an intermediate in the degradation scheme. Describing and identifying intermediates is an important step in determining a successful ISCO reagent in order to ensure safety to humans and the environment. To test the hypothesis that 4-NDAB is in fact present in the degradation of RDX by potassium permanganate, 4-NDAB was synthesized and the degradation products produced between RDX and potassium permanganate were analyzed with high-performance liquid chromatography and liquid chromatography/mass spectrometry.



Supported by: FURSCA, University of Nebraska-Lincoln

MEGAN LUPEK, '08

Stress Levels in Green Frogs in Relation to Colonization by a Waterborne Pathogen

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Utica, Mich.

In the Great Lakes region, "red-leg" disease has been associated with mass-mortality events in captive and natural populations of frogs and is often tied to the presence of *Aeromonas* bacteria on frogs. I investigated the prevalence and intensity of *Aeromonas hydrophila* bacteria on the skin of green frogs (*Rana clamitans*) from populations at the Pierce Cedar Creek Institute in western Michigan. I also explored links between parasitism, stress, and reproductive behavior of frogs. Prevalence of bacteria was higher on frogs than in previous studies done in the Great Lakes region, and the frequency of high-density colonization by bacteria increased over the breeding season. Factors such as frog mass, length, sex, and water temperature were not related to the likelihood of having low versus high densities of colonization by bacteria or to bacterial counts on frogs. Efforts to study stress hormone levels in frogs using HPLC have been inconclusive.



Supported by: FURSCA, Willard G. Pierce and Jessie M. Pierce Foundation (URGE Program)

KAPIL MANDREKAR, '07**Chemical Cues, 3-D Structure, and Social Experience in Contests between Similarly Sized Juvenile Black Midas Cichlids, *Amphilophus* sp. "Short"**

Faculty Sponsor: Sheila Lyons-Sobaski

Major: Biology

Hometown: Kalamazoo, Mich.

Juvenile Midas cichlids are not territorial under natural conditions but become so when placed in small aquaria. The potential effects of prior experience with 3-D structure, recent social interaction, and chemical cues on determining the outcome of contests between juvenile black Midas cichlids were tested under laboratory conditions. Subjects were held in individual pre-test aquaria for 2-4 days after which two similarly sized individuals were transferred to a test tank.

Fish with a clay pot in their pre-test tanks defeated opponents without such prior experience when test tanks contained an identical pot. Experience in a small group of conspecifics had no significant effect on contest outcome, although fish that held lower size ranks tended to lose contests. Chemical cues did not affect the outcome of contests. Thus, juvenile black Midas cichlids are not typically territorial but are sufficiently plastic to behave territorially, and



they use prior experience with environmental structure as do animals that are naturally territorial. Stronger prior residence effect in a structurally enriched environment indicates that residents defeated intruders because they placed more value on the structure than did intruders, who had not had opportunity to evaluate the structure and identify it as a resource.

Supported by: Ronald G. Oldfield, Paul Bronstein, University of Michigan Museum of Zoology, University of Michigan Department of Ecology and Evolutionary Biology, American Cichlid Association Guy Jordan Research Award

KAPIL MANDREKAR, '07

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

SARAH MAPES, '08**Incidence and Distribution of Surface-associated Bacteria on the Albion College Campus**

Faculty Sponsor: Ola Olapade

Major: Sociology

Hometown: New Boston, Mich.

Bacteria are prokaryotic, single-chromosome microorganisms that are ubiquitous in nature and have particularly adapted to survival in biofilms on various surfaces, including those cleansed with over-the-counter antibacterial agents.

Some commonly found bacteria of public health importance on various surfaces such as fomites include species of *Escherichia*, *Alcaligenes*, *Bacillus*, *Neisseria*, *Streptococcus*, and *Lactobacillus*. Fomites are inanimate objects or substances that can be contaminated with, retain, and transport contagious or infectious organisms, e.g., pathogens (Maier et al. 2000). Examples include day-care toys, towels, money, cell phones, dust particles, and improperly cleaned medical equipment. Therefore, shared surfaces and environments predispose human populations to contact with and contamination by fomite-associated bacterial as well as other microbial populations.



Albion College, as typical of college campuses, has commonly shared equipment including computer units located in the main library and also in various computer labs around the campus. These are potential surfaces for bacterial contamination, especially in the absence of frequent and adequate hygiene practices. Therefore, the main focus of this particular study is to examine surfaces of selected computer keyboards in one of the well-frequented computer labs (i.e., Ferguson lab) for bacterial presence, abundance, and distribution on the college campus. The objectives of the study also include the isolation and characterization of major bacterial isolates from the surfaces by employing standard microbiological methodologies.

RACHEL MCKINNEY, '07**Semantic Externalism, Social Construction, and Privileged Access to Self-Identification Claims: A Challenge to Haslanger?**

Faculty Sponsor: Bindu Madhok

Major: Philosophy

Hometown: Bloomington, Ind.

In this paper, I offer a response to Sally Haslanger's appeals to semantic externalism and confirmation holism in her latest work on social construction. I ask whether analyses that turn on acceptance of the theory of semantic externalism

allow an agent to hold privileged access to her self-identification claims, and how we can evaluate the truth values of these claims. (How do we adjudicate disagreements about race and gender predications? Are there principles for sorting out a correct interpretation when an expert and an individual disagree about what term the individual falls under? How do we account for self-knowledge?) I suggest reasons for thinking that constructivist analyses of race and gender must take self-identification claims seriously in order to give a complete picture of social location, and suggest that an investigation of the limit case of description disagreement—slurs and epithets—may provide reasons for thinking that self-identification is an important, though perhaps overlooked, condition for determining the legitimacy of social kind terms.



MICHAEL MELVIN, '07

Celebrity, Scandal, and Self-Construction: Lord Byron and Oscar Wilde in the Public Eye

Faculty Sponsor: Sarah Jordan

Major: English

Hometown: Northville, Mich.

For the Romantic poet Lord Byron and the Victorian writer Oscar Wilde, it was a combination of their literary work and their personae that attracted the public of their respective eras. Through their self-revealing literature, including Byron's *Childe Harold* and Wilde's *The Portrait of Dorian Gray*, both authors built a connection with their audience that established them as more than mere writers: they were celebrities.

Before their adoring publics, Byron and Wilde toyed with their images to add to their enticement. Byron, always emphasizing his own melancholy, reproached a sculptor for not perfectly capturing his image: "My expression is more unhappy," he scolded. Wilde, forever willing to break social norms, shocked an upper-class audience at the opening of *Lady Windermere's Fan* by smoking before the crowd. "Ladies and gentlemen, it's perhaps not very proper to smoke in front of you, but . . . it's not very proper to disturb me when I am smoking," he said. However, revelations regarding their non-normative sexualities led to both men being ostracized by the publics who had once so revered them.



My thesis explores the connections between Byron and Wilde, two authors separated in time by more than 30 years, drawing from the biographies of their young lives and progressing through the construction of their literary personae, which were built upon flirting with the unspeakable acts for which they were later condemned. Finally, I examine the hidden homoerotic messages in their literature and how social disapproval affected Byron and Wilde's position in our literary canon.

Supported by: FURSCA

AMANDA MILLHOUSE, '07

Morphometric Analysis of Emydid Turtles from the Eocene of South Pass, Wyoming

Faculty Sponsor: William Bartels

Major: Geology

Hometown: Grand Blanc, Mich.

The Eocene of Wyoming was characterized by mountain building and the erosion of sediments into a large subtropical lowland known as the Green River Basin. A diverse vertebrate fauna thrived in this area, including several taxa of emydid turtles, a group represented today by sliders and box turtles. Two major depositional areas existed within the basin during the Eocene and are referred to as the "basin-center" (low topographic relief containing lakes and meandering streams) and the "basin-margin" (higher topographic relief with braided streams and alluvial fans). Generally, different species of emydid turtles are found in the two areas, but the lowest basin-margin deposits at South Pass contain what appear to be basin-center species. These specimens are larger than their basin-center counterparts, and could represent: (1) large individuals of the common basin-margin taxon, (2) large individuals of basin-center taxa, or (3) a new taxon.



My study uses morphometric (size and shape) analyses to try to resolve what these specimens represent. The size and shape of the front part of the lower shell (epiplastral lobe) and its individual elements (epiplastra, entoplastron, and epiplastral gutter) were analyzed for specimens from the basin-center (*Echmatemys wyomingensis*, *Echmatemys septaria*) and the basin-margin (the large unknown specimens and a common new species near "*Echmatemys*" *euthetna*). While some morphometric parameters provide little distinction between taxa, others clearly separate them. Preliminary results indicate that the large unknown specimens represent a new taxon of emydid that inhabited the basin-margin area at South Pass before the common basin-margin taxon appeared.

Supported by: FURSCA, Langbo Trustees' Professorship, Lawrence D. Taylor Fund for Undergraduate Research, University of Michigan Museum of Paleontology Research Fund

SARAH MOILANEN, '08

To Conform or Not Conform: The Social Influences on Gender Identity

Faculty Sponsor: Holger Elischberger

Major: Psychology

Hometown: Empire, Mich.

According to the *Diagnostic and Statistical Manual (DSM)* of the American Psychological Association, people who strongly identify with an opposite gender, and have extreme discomfort with their biological sex, could be diagnosed with gender identity disorder.

Similarly to many transgendered authors, I feel that the *DSM* offers a narrow perspective on gender identity; specifically, it unquestioningly accepts the prevalent gender binary and fails to pay sufficient attention to societal factors that cause much of the distress experienced by transgendered people throughout their lives. In order to further explore these issues, I worked with TransGender Michigan to meet and interview people who identified outside the gender binary.

In my interviews I found that people who identify outside the gender binary experienced discomfort in various personal and societal relationships. Interviewees indicated that their family members and

peers often negatively impacted their self-esteem and general psychological well-being. Interestingly, all interviewees described coming out as a generally positive experience as it signified the recognition of their gender identity and sexuality to themselves and others.

Consideration of societal influences is important when discussing gender identity as a "disorder." Although my sample was small and those interviewed were not necessarily diagnosed with gender identity disorder, their testimonials provided a wealth of subjective information that is not reflected in the *DSM*. I believe that more knowledge about the experiences of transgendered people is important when considering gender identity disorder. Otherwise, the transgendered community that is stigmatized with this "disorder" cannot be represented in an inclusive manner.

Supported by: FURSCA

CARRIE OLESZKOWICZ, '07

Meta-Analysis of Prefrontal Cortex from Acute Ethanol Studies in Mice: Making a Myelin Gene Network

Faculty Sponsor: Kenneth Saville

Major: Chemistry
Hometown: Plymouth, Mich.

The progression from casual drug use to addiction is seen at the molecular level by changes in gene expression that lead to permanent drug-induced neuroplasticity in the brain. Gene networks are an important tool used in the analysis of large amounts of data and can be helpful in drug research to locate specific gene targets for treatment of addiction. It has been proposed that the regulation of myelin gene expression may be part of a crucial signaling



pathway involved in the development of alcoholism and is differentially evoked by acute and chronic alcohol administration in the prefrontal cortex. Large amounts of microarray data from previous studies on acute ethanol in mouse strains with contrasting behavioral responses to ethanol were compiled. Bioinformatic programs such as TMEV and Ingenuity Pathway Analysis were used in the analysis of the s-scores from oligonucleotide microarrays (144 microarrays and about 12,000 genes from PFC analyzed). TMEV was used to statistically filter and cluster the data, and Ingenuity was used to formulate gene networks consisting of some of the key myelin-related genes. It was found that many of the myelin-related genes upregulated following acute ethanol were found in previous studies to be regulated by fyn tyrosine kinase (10 genes). Analysis of the gene networks showed that myelin genes were upregulated most strongly in the ethanol-sensitive mouse strains, revealing the importance of underlying genetics to drug-induced changes and behavior. The hypothesis generated that can be further explored is that ethanol regulates the expression of a subset of myelin-related genes in a region-specific manner through fyn tyrosine kinase.

Supported by: National Science Foundation, National Institutes of Health. This research was conducted at the Bioinformatics and Bioengineering Summer Institute, Virginia Commonwealth University, under the guidance of Michael Miles.

SHAUNA PARADINE, '08

Catalytic Enantioselective α -Oxytosylation of Propiophenone Using Chiral Hypervalent Iodine Reagents: An International Collaboration

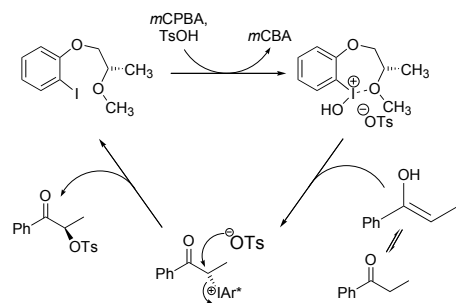
Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Schoolcraft, Mich.

Very recently, catalytic reactions with hypervalent iodine reagents have been investigated by a small number of research groups. These reactions are of particular interest in organic synthesis, because not only do hypervalent



iodine reagents have the advantage of being much more environmentally friendly than their heavy-metal counterparts, but also in catalytic reactions little of the precursor is needed and the active catalyst is generated as a part of the reaction. However, to date, no one has attempted to perform these reactions in a stereoselective manner. The research that is presented here is an initial investigation into enantioselective reactions with a variety of chiral hypervalent iodine reagents, which was begun during a summer of research at Cardiff University in Wales and has continued throughout the year at Albion. A review of the "state of the work" will be included with special emphasis placed on new work done at Albion College and with collaborators in Wales.



Supported by: FURSCA-Hyde Fellowship, National Science Foundation

KELLY PARSELL, '07

“Static”: A Collection of Poems and Prints

Faculty Sponsor: Anne McCauley

Major: Art, Psychology
Hometown: La Grange Park, Ill.

“Static” is a creative project combining my interests in visual art, creative writing, and psychology. Each of the seven poems included focuses on a relationship between two people in which there is a sense of loss—a loss of innocence, the death of a loved one, the end of a relationship. The speakers of the poems are fixed in their current mental states, but the spaces between them and the other people are filled with unique energies that transcend physical and temporal boundaries.



For this project, I handset the text of the poems on a letterpress and printed an edition of broadsides. I also created a textural image for each poem that illustrates the space/energy between the two people. The images were completed as relief prints and then compiled with the broadsides into portfolios. The poems and images were constructed as an edition of artist’s books as well. Together, the different aspects of the project investigate existing intra- and inter-personal relationships, while encouraging viewers to do the same.

Supported by: FURSCA

BENJAMIN PASSAVANT, '08

The Automobile Refueling Emissions Controversy

Faculty Sponsor: Wesley Dick

Major: History
Hometown: Tecumseh, Mich.

Due to their large population and the huge number of annual miles traveled, gasoline-powered cars and trucks have always been major contributors to air pollution. This was recognized early in the national effort to improve ambient air quality. In the 1977 Clean Air Act Amendments (CAAA), Congress turned its attention to the last of the four major sources of air pollution from these vehicles: refueling emissions. This created a new dynamic for both the politicians and the regulators, since refueling emissions occur at service stations and could be controlled either by modifying the vehicle or through installing new hardware at the service station. The auto industry pushed hard for controls at the service station while the oil industry heavily favored controls onboard the vehicle. When the 1977 CAAA directed the U.S. Environmental Protection Agency (EPA) to study and decide the best approach, rather than prescribing an outcome, this put into motion an intense process pitting the two biggest U.S. industry sectors against one another. The issue was not resolved in over 15 years of technical assessment, public policy study, and rulemaking work. In the 1990 CAAA, Congress directed limited gasoline pump controls and also directed the EPA to implement vehicle controls through a rulemaking process in consultation with the Department of Transportation regarding safety issues.



Drawing from the voluminous public record, this project documents the intense public policy proceedings of the 18 years leading to the EPA regulation in 1994. This rule was among the longest and most contentious ever considered by EPA. The environmental stakes were high, and the long and storied record is illustrative of the power politics and machinations behind how environmental policy decisions occur in our government.

Supported by: FURSCA

LINDSAY PINGEL, '07

Nonverbal Coding of Roommate Conflict

Faculty Sponsor: Karen Erlandson

Major: Communication Studies
Hometown: St. Johns, Mich.

Every year tens of thousands of students go to college and live in residence halls. It has been reported that aspects of dormitory living, including roommate conflict, have academic and psychological impacts on the students.



Nonverbal variables such as attitudes toward personal space and relational involvement have also been linked to various outcomes measures such as roommate adjustment and satisfaction. However, there has not been much research looking directly at nonverbal aspects of roommate interactions. In an attempt to observe and analyze nonverbal behavior of roommates, the current study videotaped 102 roommates from Albion College discussing a recent conflict. After the taped interactions were completed, students were separated into different rooms and completed survey measures assessing territoriality.

Researchers hypothesized that territoriality was negatively related to nonverbal involvement. Results of the data indicate that the hypothesis was partially supported. These findings are pertinent to both entering students and administrators at colleges as they attempt to maximize roommate satisfaction and college retention.

Supported by: FURSCA

SARAH RICHARDSON, '08**Children's Educational and Occupational Aspirations in Urban Nigeria: Implications for Policy Development**

Faculty Sponsor: 'Dimeji Togunde

Major: Sociology

Hometown: Saginaw, Mich.

My research uses data from interviews with 1,535 children and their parents in urban Nigeria to examine children's educational and occupational aspirations, and parents' aspirations for their children. The findings indicate that an overwhelming majority of children plan to attain postsecondary college/university qualifications and engage in professional occupations such as medicine, education, law, etc. Parents' aspirations for children are similar to children's goals. There is no difference between male and female children regarding educational desires or career aspirations. Also, there is no significant variation in parents' aspirations for male and female children. Furthermore, the results demonstrate that several factors, including parental socio-economic variables such as education, occupation, and income, strongly determine children's educational and occupational aspirations. These findings have implications for policies aimed at strengthening human capital formation and development in Nigeria.

*Supported by: FURSCA*

PAUL ROBERTS, '07**Field Analysis of Volcanism and Glaciation at Minna Bluff, Antarctica**

Faculty Sponsor: Thomas Wilch

Major: Geology

Hometown: Dimondale, Mich.

Modern global climate change can only be understood in the context of past climatic change. The behavior and stability of the Antarctic Ice Sheet are important factors in global climate change both today and in the past. This field project involves reconstructing past Antarctic ice-levels at Minna Bluff, a 50-km-long volcanic peninsula that extends into the Ross Embayment along the South Victoria Land coast of Antarctica. Minna Bluff is composed of many overlapping volcanoes that are 7-12 million years old, dating to a time when the earth was significantly warmer than it is today.



Geological mapping of the southeast end of Minna Bluff during January 2007 revealed several sequences of volcanic and glacial deposits that provide a proxy record of former ice-levels. Stratigraphic units were characterized and sampled in vertical exposures, and important features that reflect ancient environments were determined including clast-generation processes, volcanic depositional processes, and glacial conditions.

These volcanic sequences alternated from oxidized welded vesicular lavas and breccias to glassy hydrated lavas and breccias. The transition from oxidized vesicular flows and breccias to glassy flows and breccias is interpreted as a change in environmental conditions during eruption from ice-present to ice-free. Multiple massive trachytic domes occur throughout the sequence associated laterally with carapace breccia. Basaltic lava sheets, flows, and cones also occur. Planed tops of units with parallel-oriented erosional grooves provide evidence of overriding by glacial ice during the construction of Minna Bluff. Muddy sediments containing polished

and striated gravel were commonly associated with these planed surfaces and also indicate ice overriding.

Supported by: National Science Foundation

KEVIN RYAN, '07**The Life, Music, and Legacy of Howard Hanson and His Influences on American Classical Music and the American Music Education System**

Faculty Sponsor: David Abbott

Major: Music Performance

Hometown: Allen Park, Mich.

Howard Harold Hanson (1896-1981) was an American composer of classical music who refused to follow his contemporaries into the realm of serialism and atonality. His music is characterized as deeply romantic, in both form and style, and intensely melodic, filled with lush chromaticism and harmony derived from the full palette of Western tonality. His pieces are both beautiful and striking and are immediately accessible to any listener. Often described as an American symphonist, Hanson composed a total of seven symphonies that are considered the pinnacles of his work. Hanson's only opera, *Merry Mount*, is an American opera masterpiece that garnered 50 stage calls during its opening performance. Besides writing for the symphony orchestra, Hanson also wrote many pieces for the piano, choir, wind ensemble, chamber ensemble, and for solo instrument, as well as for combinations of the aforementioned. Perhaps more important than his compositional versatility is the fact that Hanson was one of the first American composers of the twentieth century to create an entire literature of classical music that could be labeled as "American."



Despite a lifetime of service to the betterment of music in the United States, his enormous influences on American classical music, his unwavering support of music education, and his own extraordinary compositional achievements, Howard Hanson has largely been forgotten. This project takes

an in-depth look into the life, music, and legacy of Howard Hanson and his many lasting influences on American classical music and the American music education system through both performance and musicological research.

Supported by: FURSCA

RASLEEN SALUJA, '08

Designing a Novel Genetic Assay to Measure Reverse Transcriptase Fidelity

Faculty Sponsor: Kenneth Saville

Majors: Chemistry, Biology
Hometown: Darien, Ill.

Retroviruses are responsible for a number of serious diseases including the development of certain tumors, neurological disorders, and acquired immunodeficiency syndrome (AIDS), which is caused by the human immunodeficiency virus (HIV). In the context of a worldwide effort to contain these disorders, retroviral research has become very significant in the last few decades. The goal of this project was to create a novel assay, or scientific test, that measures the replication fidelity, or faithfulness, of reverse transcriptase, an enzyme essential to the replication of retroviruses. The fidelity of retroviral enzymes has become of interest to researchers because as the number of therapies for rapidly mutating retroviruses increases, so does the number of resistant strains. Increasing the fidelity of retroviruses decreases their mutation rates, thus making existing therapies more effective. In this project, the SacRB gene isolated from *B. subtilis* is transcribed into RNA, and reverse transcribed with a reverse transcriptase (RT). The DNA products will be amplified using the polymerase chain reaction (PCR) and analyzed for mutations that cause loss of function in the SacRB gene using a novel selection scheme we have designed that utilizes the pUC vector. To make the selection as effective as possible, transformation rates need to be high. Thus far, they have been measured to be consistently 1 million cfu/ μ g plasmid, with a peak efficiency of 3.75 million cfu/ μ g plasmid. The sensitivity of the



plasmid to the sucrose used in the selection scheme was also measured. Additionally, restriction enzymes for the reverse transcription have been selected, and the required primers have been designed.

Supported by: FURSCA

JACOB SAUSER, '07

Chunking and Context Effects and Their Effects on Media Recall

Faculty Sponsor: Mareike Wieth

Major: Psychology
Hometown: Chattanooga, Tenn.

Chunking and context effects have been shown to help people increase the capacity of their short-term memory by enabling them to group together related items. However, previous research was typically limited to word or letter memorization. Chunking and context effects have not been investigated using more complex materials. This study examined whether chunking and context effects can help people remember more quotes, in this case, from popular movies. It was hypothesized that people will remember more quotes coming from the same movie than quotes from different movies.

Thirty-four students participated in the study. For condition A, 10 quotes from the movie *Anchorman* (2004) were spliced together with approximately one second between movie clips. For condition B, quotes from each of 10 different movies were spliced together for a total of 10 quotes. I showed participants the first movie condition, then asked them to recall as many of the quotes as possible. I then showed them the second movie condition, after which they again recalled as many of the quotes as possible. To control for possible interference effects, some people were shown condition A first, while others were shown condition B first.

A paired-samples t-test showed that the hypothesis that people would remember more movie quotes from the same movie ($M = 5.56$, $SD = 2.39$) than quotes from different movies ($M = 4.56$, $SD = 1.89$) was supported, $t(33) = 2.33$, $p = .026$.



JACOB SAUSER, '07

The Relationship between Job Security and Job Satisfaction in College Professors

Faculty Sponsor: Andrew Christopher

Major: Psychology
Hometown: Chattanooga, Tenn.

Job security is related to job satisfaction in several different career tracks. However, no research has been conducted regarding the effect that job security could potentially have on job satisfaction in the education profession. This research examined this potential effect among college professors. It was hypothesized that those professors with higher levels of job security would also have higher levels of job satisfaction.

A modified version of the Spector Job Satisfaction Scale was used to measure job satisfaction. Two one-way analyses of variances were used to analyze the data. The hypothesis that professors with tenure would have higher levels of job satisfaction than professors without tenure was not supported, $F(1, 24) = 1.75$, $p = .195$. The hypothesis that professors of a higher rank would have higher levels of job satisfaction than professors of a lower rank was also not supported, $F(3, 23) = 1.60$, $p = .217$.

Despite non-statistically significant results, some interesting trends emerged. Tenured professors had slightly lower levels of job satisfaction than untenured professors. Typically, tenured professors had been employed by the institution longer than untenured professors. Thus, this trend could be explained by the fact that the untenured professors have not been at the institution long enough to learn the nuances of the organization. This result implies that the longer professors stay employed by the institution, the more they learn about the operations of the institution, and they may need to take on responsibilities that could negatively affect their job satisfaction levels.

JASON SEBACHER, '08**An “Uncouth Swain” Tells an Uncouth Poem: John Milton and the Duality of *Lycidas***

Faculty Sponsor: Deborah Kanter

Major: English Literature
Hometown: Sturgis, Mich.

John Milton's *Lycidas* is a poem inextricably linked to an author whose intention was to be understood by the public. It was also published twice at two importantly different points in his life, which is significant because



the two publications had different audiences, platforms, and motivations for publication. I contend, therefore, that the *Lycidas* of 1638—as the last of 33 poems contained in *Justa Edovardo King naufrago*—has different themes than the *Lycidas* of 1645—as the penultimate entry in the first half of *Poems of Mr. John Milton*. The former publication's platform is *expressive* and the latter *forensic*; thus, they are indeed two different poems in the significances of their respective messages.

In the 1638 *Lycidas*, the young Milton's fears and anxieties regarding his poetical career are powerfully expressed; these include his fear of premature death (as in King's case) before fully achieving the public fame he unabashedly desired. The poem, though, resolves in the uniquely Miltonian fashion in using pagan motifs to arrive at a Christian moral: here, “fame in Heav'n expect thy meed,” as well as the solace in the seventeenth-century notion of the “Circle of Perfection.” The 1645 *Lycidas* has a markedly different motivation for publication. In republishing the poem nearly 10 years after resolving to write only political prose, Milton delivers a polemical statement about the importance of preaching as the only way to grace (which the Anglican clergy shamefully ignored) in both St. Peter's speech of lines 113 to 131 and in what I have termed the “Pagan-Christian Continuum.”

Supported by: Newberry Library

GRACE SHIN, '07**Widows as Portrayed in South Korean Media: 1950s to the Present**

Faculty Sponsor: Yi-Li Wu

Major: Biology
Hometown: Livonia, Mich.

The images of women in South Korean media have been shaped and reshaped in the last 50 years. Political legitimization, exploitation, and commercialization of women's sexuality, public condemnation of the nation's



socioeconomic structure, and later, technological advances have influenced the portrayal of Korean women in both films and on television. Some recent texts on Korean cinema address the significance of women's roles as depicted in melodramas of various time periods. Women represent modesty, class, and political obedience in 1950s and '60s Golden Age films. Since the late 1990s, women in films represent autonomy, exertion, and a new sense of righteousness.

However, not all women are created equal in melodramas. It came to my attention that widows were employed as especially important (and popular) icons for Koreans in the post-war era as well as in the years following the 1997 International Monetary Fund (IMF) economic crisis. Altered portraits of widows reflect greater changes within the society since Korean widows have historically and unequivocally stood as symbols of virtue.

My work examines the changes and continuities influencing how Koreans have presented and viewed their widows on the screens since the 1950s. It compares the portrayal of a representative post-war widow to the portrayal of a representative post-IMF crisis widow. It investigates the emergence of erotic widows in the '80s Korean cinema, as well as the most recent depiction of voluntary single motherhood (analogous to widowhood), attributable to modern medicine.

Supported by: FURSCA-Irwin Fellowship

DORELA SHUBONI, '09**The Effect of Alcohol and Pheromones on the Reentrainment Rate of *Octodon degus***

Faculty Sponsor: Tammy Jechura

Majors: Biology, Chemistry
Hometown: Troy, Mich.

Circadian rhythms are biological functions that follow a 24-hour cycle and occur even without external cues. Though circadian rhythms do not rely on these cues to exist, *Zeitgebers* (like light and temperature) influence the way in which the cycle is expressed. When there is a disruption in the rhythm by either an advance or delay in an external cue, the subject will phase shift, entraining to the new conditions presented. Jet lag is an example of phase shifting. As individuals cross time zones, the period in which they are exposed to light shifts; the internal clock is tuned to the light:dark (LD) cycle of the original location while the body is actually experiencing the LD cycle of the final destination. Slowly, the traveler will shift to the new light pattern, entraining to the new environment. By measuring the amount of time that it takes for the individual to become accommodated to the new LD cycle, a rate of entrainment can be determined. The subjects we used are degus (*Octodon degus*), diurnal Chilean rodents that share many similar circadian characteristics with humans. We are phase-advancing the degus six hours under different conditions (control, alcohol, pheromones, and alcohol with pheromones) and observing how each affects the rate of reentrainment. By conducting this experiment, we are examining the effects of alcohol and pheromones on the reentrainment rate and the interaction between the two, alcohol and pheromones.



Supported by: FURSCA-Irwin Fellowship

SIMONA SHUBONI, '07

Rock 'n' Roll and the Nationalities Question: Creating a Yugoslav Culture, 1960-1992

Faculty Sponsor: Geoffrey Cocks

Majors: History, Public Policy
Hometown: Troy, Mich.

Focusing on Yugoslavia during the height of "Yu Rock," from its humble beginnings with the nation's first rock artist Karlo "Matt Collins" Metikoš in 1960 to the coinciding dissolution of the rock industry and the nation in 1992, my research explores the impact that rock music had in answering the centuries-old nationalities question. Specifically, my project focuses on the implications of "Yu Rock" in aiding the creation of an overall Yugoslav culture and identity. I examine how Yugoslavia's unique historical, cultural, and economic position within the East-West Cold War divide allowed its domestic rock industry to inadvertently develop as a way, outside the state apparatus, of dealing with the country's ethnic divisions. I contend that because Yugoslav rock 'n' roll was allowed to develop virtually unchecked under the ethos of Josip Broz Tito's brand of socialist self-management it became one of the truest representations of a uniquely Yugoslav culture and a reflection of a shared Yugoslav identity. This project also considers the subsequent collapse of Yugoslavia and its united rock music industry, and through its analysis of "Yu Rock's" relationship to Yugoslav identity and culture provides a more complex view of the ethnic fighting that eventually destroyed the nation. Rather than reinforcing the prevalent stereotype of "ancient Balkan hatred" as the cause of the collapse, my examination of Yugoslav rock, which suggests the existence of a trans-ethnic Yugoslav cultural identity, facilitates a deeper, multifaceted, and re-politicized look at the Balkan conflict of 1992.

Supported by: FURSCA



LESLEY SIMANTON, '09

Training in Astronomical Spectroscopy

Faculty Sponsor: Nicolle Zellner

Major: Physics
Hometown: Niles, Mich.

Spectroscopy is the primary research method of astronomers. Spectra obtained from the light of stars, galaxies, and other astronomical objects allow for the analysis of the universe from the comfort of Earth. This presentation reveals what is involved in learning how to collect spectra using the University of Toledo's 40-inch reflecting telescope and analyzing spectra using the Image Reduction and Analysis Facility (IRAF) software. The creation of an atlas of the spectrum of Alpha Cygni, commonly known as Deneb, in the visible band using IRAF and the discovery of mass loss in this supergiant star are discussed in detail along with additional information on the applications of spectroscopy in astronomy.

Supported by: FURSCA, National Science Foundation



WENDY SIMANTON, '07

(See Paul Beach, '08, Wendy Simanton, '07)

REBEKAH SIMMONS, '07

"The Aviary": A Collective Series of Poems with Corresponding Works of Art

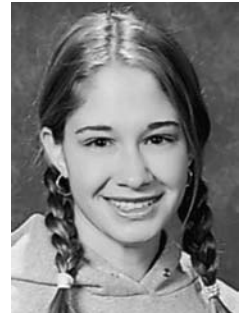
Faculty Sponsor: Julie Stotz-Ghosh

Major: English
Hometown: Dexter, Mich.

My grandmother had always been terrified of birds, but, nevertheless, she enjoyed watching them from afar. When she became diagnosed with stage four pancreatic cancer, it tore my world apart, but my grandmother, being the unshakable, faithful woman that she was, never let death sway her. As Hospice came into her home to aid her in her last few weeks, she requested that her hospital bed be placed on the porch so that she could watch the birds at their feeders. My grandmother is gone now, but the memory of her is alive and takes flight upon the spirit of the birds that she so treasured.

"The Aviary" is comprised of five sub-projects that join together to form a cohesive whole. Each project is comprised of one or more poetic works and is accompanied by a piece of artwork. I chose to work with a wide variety of media, such as photography, printmaking, and pastels, in order to create the conglomerate quality present in aviaries, where birds of every shape and size reside. I tried to emulate this aesthetic in my poetry as well, utilizing varieties of narrative and lyric poems. While creating this collection, I pushed myself to reinvent my poetic style and to use the power of words and art to create a lasting memorial to my grandmother.

Supported by: FURSCA

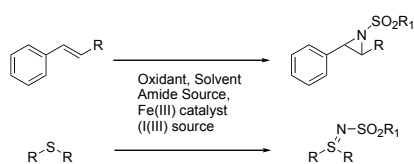


SARAH SIMMONS, '07**Attempted Aziridinations and Sulfoniliminations Using Simple Iron Catalysts and Hypervalent Iodine Reagents**

Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Scotts, Mich.

Aziridines and sulfonilimines are among some of the most important functional groups in organic chemistry. We report here our work toward the synthesis of these molecules from alkenes using simple iron catalysts and hypervalent iodine reagents. Alkene, solvent, iron catalyst, hypervalent iodine source, and amide source were varied, but no appreciable amount of aziridine was obtained. The same reaction conditions were attempted for the sulfonilimation of sulfide or sulfoxide substrates, and a significant amount of product was obtained. The use of FeCl_3 in the reaction does seem to accelerate the formation of product, but oxidation is also seen in the absence of iron catalyst or hypervalent iodine source.



Supported by: FURSCA-Kresge Fellowship, National Science Foundation

ALICIA SIMON, '07**Conservative Ideology and Attitudes toward Fat People**

Faculty Sponsor: Andrew Christopher

Major: Psychology
Hometown: Trenton, Mich.

The goal of this research was to investigate the predictive power of social dominance orientation (SDO), right-wing authoritarianism (RWA), and Protestant work ethic (PWE) on different anti-fat attitudes. SDO refers to the belief that certain groups are innately superior to other groups. RWA promotes the idea that it is best to adhere to traditional conventions held by society and to submit to legitimate authorities (Kreindler, 2005). Finally, PWE embraces the idea that hard work is a central-life calling. Those who endorse this ideology despise laziness and are prejudiced against those who appear to be violating this value (Crandall, 1994). It was expected that SDO, RWA, and PWE would differentially predict three attitudes toward fat people: dislike of fat people, fear of becoming fat, and the belief that fat people lack willpower.



A survey was distributed to 94 undergraduate students. The survey contained measures of each conservative ideology and anti-fat attitude of interest in this study. General political leaning, age, and sex were included as covariates. To examine the individual effects of RWA, PWE, and SDO on dislike of fat people, fear of becoming fat, and the belief that fat people have no willpower, we conducted multiple linear regression analysis on each criterion.

Regression analysis revealed that SDO was a marginally significant predictor of dislike of fat people ($p = .055$) and that PWE was a robust predictor of the belief that fat people lack willpower ($p < .001$).

Supported by: FURSCA

DYLAN SIMONS, '08

(See Catherine Game, '08, John Cawood, '08, Mike Eggleston, '08, Adam Hashimoto, '08, Jason Lindberg, '08, Kapil Mandrekar, '07, Dylan Simons, '08)

JENNIFER SMITH, '07**Behavioral Studies and Investigations of Acoustic Nerve Pathways in Nurse Sharks (*Ginglymostoma cirratum*)**

Faculty Sponsor: Jeffrey Carrier

Major: Psychology
Hometown: Ann Arbor, Mich.

Studies of the sensory physiology of the nervous system in living organisms have revealed important relationships between sensory input and behavior. These relationships have been largely unexplored in nurse sharks



(*Ginglymostoma cirratum*). Preliminary research for the present study investigated the relationship between sensory physiology and behavior of the acoustical system in nurse sharks. In order to study shark electrophysiology, microscale silicon- and polymer-substrate neural probes were designed in collaboration with the University of Michigan Biomedical Engineering Department to measure neural activity. These electrodes were implanted into the temporal lobe of the brain to measure neural signals and to characterize basic sensory system responses and their correlation to shark behavior. Neural units were identified and localized in sharks restrained in small isolation chambers. Stimulation of these nerves while the sharks were free-swimming and unrestrained in larger holding tanks was not successfully measured and requires further study to correlate the neural activity with behavioral responses.

A parallel study was conducted using Pavlov's classical conditioning in order to train the nurse shark. To understand what attracts and repels sharks effectively in their natural environment, it is important to understand their behavioral responses to acoustical and visual stimuli. Using squid and

shrimp as the reward, nurse sharks were successfully conditioned to touch a visual target, a yellow and black stick, and return for the reward. These results indicate that sharks are able to discriminate between visual and auditory stimuli and have the ability to be trained.

Supported by: FURSCA, Defense Advanced Research Projects Agency

HANNAH SPRAGUE, '09

Effects of Bright Light Treatment on Sleep Consolidation and Entrainment of Circadian Rhythms

Faculty Sponsor: Tammy Jechura

Major: Economics and Management
Hometown: Jackson, Mich.

Sleep is critical for everyone's physical and mental well-being. College students are known for irregular sleeping. Then as people age, many complain about a lack of sleep quality. Sleep is a circadian rhythm; it should occur on about a 24-hour cycle. When this rhythm is disrupted, the body's internal clock becomes altered and other circadian rhythms, such as body temperature, hormone production, and levels of alertness, also suffer. Numerous studies have shown that exposure to bright light is very effective in adjusting the circadian clock. This can be useful to counteract and perhaps prevent the effects of jet lag. Therefore, we will use bright light treatment to help readjust circadian rhythms to encourage sleep consolidation in both college students and a group of senior citizens in the Albion community. This could be very useful, since many elderly suffer from microarousals, waking them for just a few seconds but occurring between 200 to 1,000 times a night, seriously affecting their sleep rhythms and resulting in additional sleep loss and symptoms. A goLITE (Appolo, Inc.) will be used to encourage sleep consolidation. It will be used at 8:00 a.m., and the participants will sit in front of the light for 15 minutes.



The light is a 10,000-lux full-spectrum light, found to be very effective at treating circadian rhythm disorders. The effectiveness of the light will be assessed by body temperature monitors showing the overall circadian rhythm, Actigraph watches to determine how well their sleep was consolidated, and daily journals completed by the participants.

Supported by: FURSCA

JEFF STEPHENS, '09

Reproductive Behavior of Intersexes in an Intertidal Amphipod, *Corophium volutator*

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Grosse Pointe, Mich.

The phenomenon of intersex, defined as having both male and female secondary sexual characteristics, occurs in many crustacean species. In most cases, intersexes are sterile or function as females. However, in the intertidal amphipod *Corophium volutator*, previous studies have shown that intersexes function as males under laboratory conditions, which could be important because of male-limitation which occurs in *Corophium* populations. Using field collections, I observed that intersexes frequently engaged in mate-searching behavior, although less than actual males. Furthermore, all intersexes were paired with females, suggesting that they function as males in natural populations of amphipods. In the laboratory, intersexes placed in competition with males had fewer and shorter contacts with receptive females, although body size was the key determinant of success in guarding and mating with females. Because intersex amphipods are often mistaken as females, the percentage of functional males in amphipod populations may be underestimated.

Supported by: FURSCA

EMILY SWANSON, '07

The Influence of Aging Stereotypes on Recovery Projections

Faculty Sponsor: Mary Jenson

Major: Psychology
Hometown: Lake Orion, Mich.

In making health decisions, people often turn to a network of friends, family, and acquaintances for guidance. This group is referred to as a "lay network." Lay network recommendations can be quite influential in a person's health care decisions (Bailey 1988). Additionally, lay network recommendations are instrumental in the quality of care that a person receives, especially with the elderly (Coe, Wolinsky, Miller, et al., 1985; Greenberger and Litwin, 2003). Beliefs about a person's age group can affect lay network advice; recommendations based on these stereotypes may not always be the most advantageous guidance for an individual.



Undergraduates ($N = 120$) participated in a study that examined how stereotypes of aging affected the suggestions they would offer as members of a lay network. A computer program was used to prime participants with positive or negative stereotypes about aging. The participants were presented with positive or negative images and words regarding the elderly, as well as a short scenario detailing a hypothetical elderly family member's recovery from a health problem. The participants then rated the elderly person's ability to recover from the event and made recommendations for this person's prescribed recovery program. It was hypothesized that the participants primed with negative stereotypes about aging would rate the patient as less likely to make a full recovery to their previous physical capacity. It was also hypothesized that the participants primed with negative stereotypes of aging would be less likely to recommend a prescribed recovery regimen to the patient.

Supported by: FURSCA

LAKE SWEET, '08**Fine-Scale Movement Patterns and Habitat Use by Wood Turtles, *Glyptemys insculpta***

Faculty Sponsor: Dean McCurdy

Major: Psychology

Hometown: Mackinac Island, Mich.

Wood turtles are endangered throughout their range because of habitat loss and degradation. A key factor in effective conservation for this species is learning more about how wood turtles use various types of habitats. This summer,



I worked as a field researcher in Nova Scotia with the goal of exploring fine-scale habitat use by wood turtles. To accomplish this goal, I used a thread-spool trailing technique to follow 12 turtles living on the St. Mary's River. By attaching spools of thread to the carapaces of turtles and re-tracking each of them two days later, I could follow the exact movement paths of turtles through various habitats (determining the direction and distance each turtle had traveled). Since last summer, I have used a geographical information system for the St. Mary's River to enter 60 movement paths of turtles onto electronic maps for further analysis. Fractal analysis of the trails will ultimately be used to assess how turtles perceive landscapes and to document important habitats for this species.

Supported by: FURSCA, Biology Department

RACHEL SZYMANSKI, '07**The Career Experiences of Instrumental Musicians**

Faculty Sponsor: Scott Melzer

Majors: Music Performance, Sociology
Hometown: Dexter, Mich.

I conducted a qualitative study on the work experiences of professional instrumental musicians and how educational background and family life have influenced these experiences.

This project is exploratory in nature because few sociologists have examined musicians over the past 30 years. Looking at the sociological literature as well as data from the National Endowment for the Arts, I found that many individuals pursuing a career in music have found it more difficult to "make a living" than those in other types of occupations. I explored this idea by doing semi-structured interviews with 13 instrumentalists working in Michigan. Topics discussed were educational experience, job satisfaction, identity, family life, and networking. Many interesting findings emerged, but probably the most significant is that, despite a common trend of financial strain, all musicians interviewed seemed content with their career choice and led fulfilling lives.

Supported by: FURSCA

AMANDA TILOT, '09**Examination of Unihemispheric Sleep in an Australian Lizard, the Bearded Dragon**

Faculty Sponsor: Tammy Jechura

Majors: Biology, Psychology

Hometown: Saginaw, Mich.

Unihemispheric sleep simply means letting one half of the brain sleep while the other half is awake in order to perform important behaviors. Unihemispheric slow-wave sleep (USWS) can be observed and defined



in multiple ways: through the simple observation of unilateral eye-closure, or through analysis of electroencephalographic (EEG) activity between hemispheres when compared with eye-states. In this study, eye-state recordings of four bearded dragons (*Pogona vitticeps*) will be made using a two-video camera setup during a 24-hour period, and scored by judging the eye-state in one-minute intervals. Presence of USWS will be defined as marked periods of sleep behavior in which one eye is open and the other closed. It is expected that USWS will be seen in the dragons, given that it has already been casually observed by the animal technicians and researchers. Should reptiles be capable of true unihemispheric sleep, then this behavior is possibly not a recent adaptation, but perhaps an ancient behavior lost by animals that do not require a consistently high level of vigilance or continuous activity as in the case of dolphins. Given that true unihemispheric sleep has been observed in aquatic mammals and birds, an evolutionary perspective on its presence in reptiles is warranted.

Supported by: FURSCA

VERONICA TUCKER, '07

The ImPACT of Concussions on the Neurological Factors of the Human Brain

Faculty Sponsor: Robert Moss

Major: Athletic Training
Hometown: Kalamazoo, Mich.

A blow or jolt to the head can cause traumatic brain injury. Some injuries are focal, or in one area of the brain. Others are diffuse, or in more than one area of the brain. Injuries can range from a mild concussion to severe injury, coma, and death. Many mild concussions may have no long-term side effects. The side effects of a moderate to severe brain injury can range from headache and confusion to acute personality changes and seizures. Fortunately, brain injuries are one of the most preventable brain disorders. Improved use of car safety belts and child car seats has helped reduce the number of brain injuries, as has greater use of helmets in biking and other sports.



Given the significance of head injuries, more sensitive neurodiagnostic assessment strategies have proven critical to the safe management of concussed athletes. Further, such techniques have provided a valuable research paradigm from which to gain a better understanding of this elusive injury. At the forefront of these approaches is the advent of computerized neuropsychological testing. The University of Pittsburgh Medical College Department of Orthopedic Surgery and Center for Sports Medicine has recently developed a computerized battery of neuropsychological tests called ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing) that is becoming widely used both nationally and internationally to better diagnose and manage sports-related concussions.

There have been several guidelines developed to assess brain injuries, but they have been based primarily upon the injured individual's perception. The computer-based program, ImPACT, was developed to assess minor to significant brain injuries utilizing both perception and cognitive tasks. With the utilization of ImPACT, physicians, athletic trainers, and other allied health professionals

have been able to better assess concussions and prescribe a more exacting course of treatment for concussions.

THERESA VINIC, '07

Trap, Neuter, Return: Feral Cat Management in Michigan

Faculty Sponsor: Bille Wickre

Majors: Anthropology, History
Hometown: Walled Lake, Mich.

Cat overpopulation is a serious concern worldwide, nationwide—and even right here in the city of Albion. Human companion cats, however, are not the main contributors to the overpopulation crisis. Rather, most litters are the offspring of feral cats. While some of these kittens may be socialized to humans (whereupon many simply enter already crowded shelters), most remain outside on the fringes of human society, grow to sexual maturity, and start the cycle of reproduction all over again. In response to this cycle, we humans have traditionally either: done nothing; fed the cats with good intentions, but done nothing else; scooped up the cute and helpless kittens (leaving intact and sexually mature mom and dad behind); or shunted the issue aside to be dealt with by animal control officers, whose policy is often that of “trap and kill.”



Recently, however, a humane alternative to these responses has been suggested and put into practice: Trap, Neuter, Return (TNR). Under this management system, entire colonies of feral cats are humanely trapped, vaccinated and sterilized by a veterinarian, and then returned to their territory where they are fed and monitored by a lifelong caregiver. TNR thus halts the growth of the colony population, alleviates the kitten burden in shelters, allows the cats to continue guarding their territory/food source, and then eventually decreases the population naturally through attrition.

My goal in researching feral cat issues is not only to educate myself, but also to spread awareness of the situation so that other concerned individuals can become part of the solution—even if it means tackling the problem one cat at a time.

Supported by: FURSCA

MEAGHAN WALTERS, '09

Radium Watch Dial Girls: Was the Price Worth the Watch?

Faculty Sponsor: Wesley Dick

Major: Economics and Management
Hometown: Lake Orion, Mich.

Americans in the early twentieth century were so fascinated by the benefits of science and technology that they were often blind to the costs. The young, female dialpainters of the Radium Luminous Materials Corporation in Orange, New Jersey helped promote this fascination with the production of the luminous watch. The dialpainters' repetitive, intricate process of lip-pointing their brushes placed their lips and teeth in direct contact with a radium-laced paste. Dialpainter Grace Fryer remembered: “It was a little strange . . . that when she blew her nose, her handkerchief glowed in the dark, but everyone knew that the stuff was *harmless*. The women even painted nails and teeth to surprise their boyfriends when the lights went out.” (Neuzil and Kovarik, *Mass Media & Environmental Conflict*) Radium, the “miracle elixir,” was a prescribed cure for cancer and other medical problems and was freely marketed to the public in many forms.



Radium's good reputation was called into question in the 1920s when the dialpainters began suffering from mysterious illnesses. Believing that the Radium Corporation was responsible for her sickness, Grace Fryer sued her former employer for pain and suffering. She received help from activist Alice Hamilton and famous journalist Walter Lippmann. Fryer and four other dialpainters who joined in the lawsuit would be caught up in a media frenzy that labeled the sick and dying women the “Radium Girls.”

This study examines the fate of the Radium Girls and the significance of their trial. Although this topic is not traditional environmental history, it moved me to view factory work in a different light and to see the Radium Girls' story as a case study illuminating the environmental justice movement.

SHANE WALTON, '07**Infrared Photon Transport in Biological Material**

Faculty Sponsor: Aaron Miller

Major: Physics
Hometown: Southfield, Mich.

Current methods of medical imaging are often dangerous for certain types of patients. Infants, for example, are not placed in MRI machines because the effects of exposure to strong magnetic fields on infants are unknown. In addition, X-rays can harm an unshielded fetus. A technique is thus proposed to provide a safe alternative, whereby infrared photons ($\lambda = 1000\text{nm}$ or longer) are used to create an image.



The optical properties (scattering, absorption, anisotropy coefficients) for a number of tissues have been previously documented in literature. Using these known parameters, photon propagation was simulated with the Monte Carlo method through materials of varying thickness. Monte Carlo simulations record individual particle paths (photons, in this case) as the particles are transmitted, scattered, or absorbed. The pathlength through which a photon travels before a scattering or absorption event is dependent upon a random number between 0 and 1, which is recalculated for each time step. At each interaction event, the weight of the photon is reduced. This weight represents a fraction of the photon energy deposited at that location in the material. Once the weight falls below a limiting value, the photon is terminated and the process is repeated for many (millions of) photons to enable the study of the photon transport process.

Photons that arrive at the detector within a specified time period are analyzed, since such photons have scattered minimally (thus producing a sharp image).

Specific methods and results will be discussed, including a discussion of the feasibility of experimentally demonstrating such an imaging system.

HALIE WATT, '07

(See Amanda Boundy, '07, Halie Watt, '07)

ELIZABETH WEAGE, '08**Temporal Changes in the Abundance and Distribution of Coliform Bacteria Populations in the Kalamazoo River**

Faculty Sponsor: Ola Olapade

Major: Biology
Hometown: Baroda, Mich.

Coliforms are gram-negative, facultatively anaerobic, and lactose-fermenting bacteria that generally inhabit human and other animals' intestinal tracts together with pathogenic organisms; therefore, their presence and quantity are typically utilized in monitoring the cleanliness and purity of public water supplies. Aquatic fecal coliforms are viewed as the most important indicator of infectious agents that have the potential to endanger public health. Coliform bacteria including *Escherichia coli*, *Streptococcus faecalis*, and *Clostridium perferingenes* usually originate from both animal and human wastes through sources such as storm drains, sewers, snowmelt, and runoff (Ufnar, 2006). Therefore, the main objective of this study is to determine the abundance of various coliform bacterial populations, especially in response to effluent discharge from the Albion City Sewage Treatment Plant over a six- to eight-week period. Two sites along the Kalamazoo River in Albion, Mich. near the sewage treatment plant have been selected for this study. The abundance of the different coliform bacterial populations at the collection sites is expected to change between sites and in response to varying environmental conditions along the river channel, especially in response to the rate of sewage discharge from the treatment plant. Additionally, the study will endeavor to characterize distinct isolates from the sites through various physiological and biochemical analyses. Finally, the sensitivity or susceptibility of the isolates to various commonly employed antibiotics will be determined using the Kirby Bauer Assay.



CARMEN WEDDELL, '08**Beethoven Concerto No. 3 for Piano and Orchestra, Op. 37**

Faculty Sponsors: David Abbott, James Ball

Majors: Music Performance, Mathematics
Hometown: Farmington, Mich.

Composed in 1800, this concerto was first performed by the composer himself three years later. The entire solo part, however, was not committed to paper until a year later. With this, his first piano concerto in a minor key, Beethoven sought to reject Mozart's style of piano concertos. According to the composer himself, performers of Mozart's concertos "only run up and down the keyboard with long-practiced passagework, putsch, putsch, putsch!" In contrast, Beethoven sought to produce an emotional and dynamic effect.

Beethoven's Piano Concerto No. 3 has three movements: I. Allegro con brio, II. Largo, and III. Rondo allegro. I will play the first movement, which is written in sonata form. After an orchestral introduction, the soloist enters with a striking motive, which is constantly expanded upon throughout the movement. The secondary theme is far more lyrical, briefly recalling the *galant* style of Mozart. The development features a constant dialogue between the piano and the orchestra. After the recapitulation, the cadenza revisits each of the major themes and expands them greatly. The movement closes with a light coda, the final runs giving one last testament to Beethoven's distinctive character.

In Beethoven's time, the most popular keyboard instrument was the fortepiano, a forerunner of our modern piano. The fortepiano was the first keyboard instrument with the capability of producing significant dynamic contrast, but where today's pianos employ iron to hold the strings taut, fortepianos of Beethoven's time were made entirely of wood. Because of this engineering difference, Beethoven's fortepiano had a softer and mellower sound than the brilliant sound of the modern piano.



MARK WEISMILLER, '07

Investigating Mechanisms of DNA Repair in *Drosophila melanogaster* by Analyzing Excision Events Using the Transposable Element *hobo*

Faculty Sponsor: Kenneth Saville

Majors: Biology, Chemistry
Hometown: Laingsburg, Mich.

The genetic information responsible for all life is contained within DNA. There are many ways that DNA can be damaged, including exposure to sunlight or X-rays. This DNA damage must be repaired.



Understanding mechanisms of DNA repair has applications in many aspects of medicine. A thorough knowledge of how cells can propagate their DNA countless times with near perfect precision, regulate its replication, and repair damaged DNA can lead to cures for presently incurable and debilitating diseases. Diseases known to be due to DNA repair deficiencies are many and include xeroderma pigmentosum, Fanconi's anemia, severe combined immunodeficiency (SCID), and cancer.

I have been studying mechanisms of DNA repair associated with the transposable element *hobo* inserted in the vestigial gene in the fruit fly, *Drosophila melanogaster*. By setting up and moderating carefully selected crosses, I can induce *hobo* to jump out of the genome of developing fly embryos, creating a DNA double-stranded break (DSB). In order for the fly to survive, the DSB must be repaired. By amplifying the area of the genome surrounding the repaired DSB and characterizing many excision events using molecular biology techniques, it can be

determined which mechanism of DSB repair is preferable *in vivo* given this particular *hobo* element. I have produced and characterized two such flies thus far. One fly displayed typical homologous recombination off the homologous chromosome, and the other displayed a more complex hybrid mechanism. These results are consistent with work performed previous to this project.

Supported by: FURSCA-Gardner Fellowship

DANAE WILLENBERG, '07

Something to Smile About: An Exploration of the Link between Oral Health and Cardiovascular Disease

Faculty Sponsor: Ruth Schmitter

Major: Biology
Hometown: Chesterfield, Mich.

For most people, a trip to the dentist is about as fun as, well, pulling teeth. However, it is a little-known fact that frequent trips to the dentist can do more than just produce healthy smiles. Most systemic diseases have visible manifestations within the mouth, putting the dentist in a prime position for early detection and diagnosis of diseases such as HIV, diabetes, and perhaps most importantly, cardiovascular disease. Periodontal disease, for example, increases the risk of atherosclerosis, heart attack, and stroke. In patients with periodontal disease or patients with compromised immune systems, routine tooth extractions may increase the risk of serious inflammation of the heart valves and tissues. A strong relationship exists between the mouth and the heart, and the purpose of this research was to compile literature regarding this relationship into an easy-to-understand thesis.



LAURA WILLOBEE, '07

Riam Nar Druid O Sbairn Lann: Factors in Recruitment for the Irish Brigade in the American Civil War

Faculty Sponsor: Geoffrey Cocks

Majors: History, Political Science
Hometown: Southfield, Mich.

The Irish Brigade, founded in November 1861, would in the course of its four-year history lose over 4,000 men, more than were ever in its ranks at any one time. Of these losses, 961 of the soldiers were killed or mortally wounded in action, giving the Brigade the third highest mortality rate in the Union army. This self-sacrificing attitude is reflected in the Brigade's motto, *Riam Nar Druid O Sbairn Lann*, which translates out of the original Gaelic to *they who never retreated from a clash of spears*. The question, then, is what led recent Irish immigrants in New York City to fill the ranks of the Brigade with such perseverance?



Using personal histories, diaries, letters, and recent articles and texts, I determined that there were five key factors that promoted recruitment to the Irish Brigade: (1) immigrants' Irish heritage and Irish nationalism; (2) their American nationalism; (3) their Roman Catholic faith; (4) their Democratic politics; and (5) their abject poverty.

Through an analysis of these five factors behind the recruitment of Irish immigrants, it becomes possible to better explore the far-reaching effects of the American Civil War on the Irish in the United States and in Ireland.

SARAH WINGO, '07**Contextualizing Shakespeare: Changing Views of Love and Courtship Investigated through Two of Shakespeare's Comedies**

Faculty Sponsor: Margaret Young

Major: Theatre
Hometown: Ferndale, Mich.

Althusser argued that mediated communication can be seen as a type of ideological state apparatus (ISA). In other words, people are influenced by the society in which they live and therefore produce works that reflect the views and values of their society. Today, Shakespeare's plays are considered a form of high culture, but what most people forget is that his work was in fact the Elizabethan form of popular culture. Playhouses could attract up to 3,000 spectators for each performance, while the overall population of London was only 200,000. This means that 1.5% of London's population could attend a single play. To put this in perspective, 2.6% of the North American population saw *Spiderman Two* in its opening weekend. Coupling the idea of ideological and social influences with a historical investigation into two of Shakespeare's comedies, one can uncover clues as to the social and political views held by Elizabethans.



When studying the influential power of Shakespeare, scholars have all too often focused on the historical plays (such as *Richard III*) or the dramas (such as *Macbeth* and *Hamlet*) rather than examine the societal commentary that can be found in Shakespeare's comedies. I argue that comedies, as a form of popular culture, have an even greater chance of influencing an audience. Like music videos and sketch comedy, theatrical comedy has the power to wash over an audience and leave the satisfied viewers unaware that they have been receiving messages that have ideological and political import.

Supported by: FURSCA

MARK WOJDA, '07**Right-Wing Authoritarianism, Social Dominance Orientation, and Attitudes toward Working Parents**

Faculty Sponsor: Andrew Christopher

Major: Psychology
Hometown: Alpena, Mich.

We examined how social dominance orientation (SDO) and right-wing authoritarianism (RWA) predicted prejudice toward working parents. SDO is a "... general attitudinal orientation toward intergroup relations, reflecting whether one generally prefers such relations to be equal versus hierarchical, that is, ordered along a superior-inferior dimension" (Pratto, et al., 1994). RWA consists of displaying high degrees of deference to established authority, aggression toward societal out-groups when authorities permit such aggression, and support for traditional values when authorities endorse those values. Previous research suggested that nontraditional parents are evaluated less positively than traditional parents (Brescoll & Uhlmann, 2005). For instance, such research showed that stay-at-home fathers were viewed as incompetent parents, and working mothers were viewed as selfish. Indeed, Doucet (2004) found that stay-at-home fathers reconstructed the meaning of "work" to involve masculine unpaid hobbies to avoid perceived public scrutiny. We hypothesized that working women would be evaluated less positively than working men and stay-at-home mothers, and stay-at-home fathers would be evaluated less positively than stay-at-home mothers. Additionally, we predicted that high RWAs would evaluate working women and stay-at-home men less positively than low RWAs. SDO was analyzed in an exploratory spirit.



One hundred twenty Albion College men read a scenario about a working parent or a stay-at-home parent and indicated their perceptions of the parent's agreeableness, conscientiousness, emotional stability, and competence. Respondents also provided their affective reaction to the parent. Finally, respondents completed self-report measures of RWA and SDO.

MARK WOJDA, '07**Social Dominance Orientation, Right-Wing Authoritarianism, Ambivalent Sexism, and Prejudice toward Women in the Workforce**

Faculty Sponsor: Andrew Christopher

Major: Psychology
Hometown: Alpena, Mich.

We examined how social dominance orientation (SDO) and right-wing authoritarianism (RWA) predicted prejudice toward working women. SDO is the extent to which one desires that one's in-group dominate and be superior to out-groups. RWA is the extent to which out-groups are viewed as threatening traditional values. Prejudice toward working women can manifest itself in two ways. *Employment skepticism* is the belief that women cannot handle workplace demands. *Traditional role preference* is the belief that men and women are best suited for stereotypical roles. *Hostile sexism* is a type of prejudice that views women in a blatantly negative manner. *Benevolent sexism* is a type of sexism that positions women in stereotypically restricted roles. We expected hostile sexism would mediate the relationship between SDO and employment skepticism, and benevolent sexism would mediate the relationship between RWA and traditional role preference.

Three hundred forty-nine American adults completed measures of SDO, RWA, employment skepticism, traditional role preference, hostile sexism, and benevolent sexism. We also collected data on a wide variety of demographic variables.

Mediational analyses revealed that hostile sexism significantly attenuated the relationship between SDO and employment skepticism. Additionally, benevolent sexism fully mediated the relationship between RWA and traditional role preference. Hostile sexism enables high SDOs to maintain the clear divide between men and women and justify feelings of employment skepticism. Likewise, the notion that women are "more moral" than men allows high RWAs to believe that women should be happy with stereotypically traditional roles.

Supported by: FURSCA, Faculty Development Committee

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 with his wife, Edith.

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
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 entered the banking profession shortly after graduating from Albion College in 1978, and he currently serves as senior vice president and director of risk management for Mercantile Bank in Grand Rapids. He has also held numerous leadership roles in professional organizations, including the Risk Management Association.

Active in the Republican Party on the state and national levels, Calvaruso is a member of the Gerald R. Ford Institute for Public Policy and Service Visiting Committee at the College.

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)

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)

THE 2007 ISAAC STUDENT RESEARCH SYMPOSIUM COMMITTEE

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Ruthie Spalding, '09
Michael Van Houten (Stockwell-Mudd Libraries)
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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.

