



THE THIRTEENTH ANNUAL ELKIN R. ISAAC STUDENT RESEARCH SYMPOSIUM

ALBION COLLEGE
APRIL 17-18, 2002

Schedule of Events

Wednesday, April 17, 2002

7:30 p.m.

The Elkin R. Isaac Lecture: Joseph B. Serra, '56
"From Crawler to Walker to a Polio-Free World"

Welcome: President Peter T. Mitchell, '67

Opening Remarks: Thomas G. Schwaderer, '56, Elkin R. Isaac, '48

Speaker Introduction: President Mitchell

Bobbitt Visual Arts Center Auditorium

Thursday, April 18, 2002

8:30-10:15 a.m.

Symposium Platform Presentations

Refreshments will be served at each location listed below.

See also detailed schedule of presentations on pages 3-5.

Forum #1

Bobbitt Visual Arts Center Auditorium

Forum #2

Norris Center 109

Forum#3

Norris Center 101

Forum #4

Norris Center 103

10:40 a.m.-Noon

Honors Convocation

Goodrich Chapel

1:15-3:30 p.m.

Symposium Platform Presentations

See locations listed for morning session.

Refreshments will be served at each location.

3:00-4:30 p.m.

Symposium Poster Presentations

Gerstacker Commons, Kellogg Center

7:00 p.m.

Symposium Keynote Address: Kurt Vonnegut
"How to Get a Job Like Mine"

Welcome: Peter T. Mitchell

Remarks: Bethany A. Buchholz, '02

Conferral of Honorary Degree: President Mitchell and James W. Cook

Speaker Introduction: James W. Cook

Goodrich Chapel

Immediately following the address, a reception will be held in the Bobbitt Visual Arts Center.



The Elkin R. Isaac Lecture

JOSEPH B. SERRA, '56



Joseph Serra has devoted his life not only to his successful medical practice, but also to serving what may be the world's largest privately-funded public health initiative, Rotary International's global polio-eradication campaign. Serra's skills as an orthopedic surgeon have directly benefitted patients, college and professional athletes,

and African polio victims, and his efforts haven't stopped there. His involvement in community, regional, and global issues, both medical and non-medical, reflects his tireless commitment to the betterment of lives around the world.

Serra is past president of the Stockton, Calif., Rotary and past governor of District 5220. Through Rotary's PolioPlus program, Serra has served four tours of duty as a volunteer surgeon in Malawi, Africa, primarily treating polio victims. He is currently a member of the International PolioPlus Committee and its national speakers' bureau. Serra has received the Rotary Foundation Citation for Meritorious Service, the President's Citation, the Service Above Self Award, and the Foundation's PolioPlus Pioneer Award. He and his wife represented Rotary International in Liberia, Africa, during the first National Immunization Days in January 1999.

At home, Serra has served on several community boards, including Goodwill Industries and the University of the Pacific Athletic Foundation. He was named "Stocktonian of the Year" in 1987.

A Detroit native, Serra went to Korea as a Navy medical corpsman before attending Albion College. After earning his M.D. degree from Wayne State University, Serra moved to Stockton, where he co-founded the Stockton Orthopedic Medical Group. With a special interest in sports medicine, Serra has served as orthopedic team physician for the University of the Pacific, the Milwaukee Brewer farm system, and the Stockton Ports baseball team.

Serra and his wife, Dorothy McEvoy Serra, '59, have two sons and two grandchildren. Joe's favorite activities include skiing, mountaineering, travel, photography, and giving slide presentations about Rotary's legacy to the world—the eradication of polio.

Symposium Keynote Address

KURT VONNEGUT



Kurt Vonnegut is firmly established as one of the leading figures in 20th-century American literature, with seventeen novels, several plays, and scores of short stories to his credit. Vonnegut's works have been translated into several languages and reviewed and analyzed by critics and scholars worldwide. His work has also been adapted for or

influenced numerous television, theatre, and movie productions, and has inspired musicians, including the Grateful Dead, Ambrosia, and groups in Canada and the Netherlands.

Born and raised in Indianapolis, Vonnegut spent three years pursuing a degree in chemistry from Cornell University before joining the Army and being sent to Europe in 1944. He was captured by the Germans during the Battle of the Bulge, and survived the Dresden bombings as a POW, an experience that was the basis for his bestselling novel, *Slaughterhouse-Five*.

Upon his return to the U.S., Vonnegut received the Purple Heart. After attending the University of Chicago, he obtained a job as a reporter for the Chicago City News Bureau. Vonnegut later worked as a publicist for General Electric, taught English at a private school, and opened the second Saab dealership in North America. In 1971, he received an M.A. in anthropology from the University of Chicago.

His creative writing career began in the late 1940s, with short stories published in several large-circulation magazines, including *Collier's* and the *Saturday Evening Post*. Vonnegut's first novel, *Player Piano*, was published in 1951 and became a Doubleday Science Fiction Book Club selection in 1953. His later novels include *The Sirens of Titan* (1959), *Cat's Cradle* (1963), *God Bless You, Mr. Rosewater* (1965), *Breakfast of Champions* (1973), and *Hocus Pocus* (1990).

Vonnegut has held prestigious teaching appointments at the University of Iowa Writers' Workshop, Harvard University, and the City University of New York (where he served as Distinguished Professor of English Prose). He is the past recipient of a Guggenheim Fellowship (to research *Slaughterhouse-Five*) and a National Institute of Arts and Letters grant. Vonnegut was elected vice president of P.E.N. American Center, and vice president of the National Institute of Arts and Letters. In 2000, he was appointed State Author of New York. He resides in New York City.



Schedule of Presentations—Thursday, April 18, 2002

FORUM #1—Bobbitt Visual Arts Center Auditorium

8:30	Jason Worms (Ankli)	British Colonial Economic Policy and Its Effects after Independence in Africa
8:45	Sarah Pike (Chambers)	The Search for the Truth: Thomas Jefferson and Sally Hemings
9:00	Jennifer Zink (Dick)	JFK and The Camelot Myth: Its Significance in Michigan
9:15	Gabrielle Raemy Charest (Grossman)	Cyprus: A Reasonable Solution?
9:30	Nathaniel Warren (Brand)	The European Union and Spain: The Effect of European Economic Integration on Industrial Development in Border Regions of Spain
9:45	Nathan Piwowarski (Grossman)	Reintegrating the Estranged Nation-State: Applications in Antebellum America
10:00	Andrew Ansell (Chambers)	Funereal Practices during the Civil War
1:15	Sabrina Friedline (McCauley)	Changing Scenery: An Artistic Library on Urban Sprawl
1:30	Anna Krecic (Goering)	Explorations in Large Format Photography
1:45	Alexis Snyder (AuFrance)	Divas of the American Musical Theatre
2:00	Sean Hackney (Crupi)	Fiction to Film: An In-Depth Look at Francis Ford Coppola's Screen Adaptations
2:15	Emily Thompson (Murphy)	I Keep My Ghosts
2:30	Dana Lee (Bethune)	A la table de mes amis: The Surviving Folksongs of Francophone Detroit
2:45	Leah Kohler (Wickre)	The Evolution of Plague Symbols in Italian Renaissance Art, 1350-1650
3:00	Bethany Buchholz (Chavez)	Learning to Drown
3:15	Anne Starr (Wyss)	Gender and Mark Twain

FORUM #2—Norris Center 109

8:30	Larry Lloyd (Cocks)	Redemption and Resurrection: How a Friendship Transformed a Faith
8:45	Kurt Medland (Madhok)	Framing the Conflict: Establishing an Ethical Hierarchy for the Israeli-Palestinian Peace Process
9:00	Madolene Page-Wood (Cocks)	Palestinian Perceptions of the Holocaust
9:15	Whitney McCleneghan, Benjamin Riegler (Chambers)	Measuring Economic and Gender Change in Albion, Michigan, 1840-1880
9:30	Elizabeth Kenyon (Dick)	Overcoming the Odds: Success of Albion's African American Youth in the '50s and '60s
9:45	Marnie Harte (Stroud)	The Unpunished Crime: Passive Abuse and the Law
10:00	Douglas Meyer (Schippers)	Believing Is Seeing: Constructing Gender in Film
1:15	Amanda Goff (Otto)	The Effect of Death Qualification on the Application of Aggravating and Mitigating Circumstances in Capital Punishment Juries
1:30	Angela Baeckeroot, Mira Wood (Berkey)	Service Learning and Establishing Trust in a Mentoring Relationship
1:45	Elizabeth Kenyon, Alyssa Montgomery (Berkey)	The Struggle Within: African American Female Identity at Albion Middle School
2:00	Caroline Cangelosi (Togunde)	Access to and Attitudes of Hispanic Women toward Family Planning: A Case Study at Two Clinics in Grand Rapids, Michigan
2:15	Katie McCabe (Mullin)	Men Are from Mars, Genetic Counselors Are from Venus: Gender Segregation in the Field of Genetic Counseling
2:30	Abigail Brown, Lisa Lewandowski (Berkey)	Body Image: More Than Meets the Eye
2:45	Sarah Leicher (Franzen)	The Separatist Game: Challenging the 'Women Born Women' Policy at the Michigan Womyn's Music Festival

(continued on next page)



3:00	Rebecca Anderson (Otto)	Influence of Relational Variables and Participant Perspective on Perceptions of Fairness in the Justice System
3:15	Dana Lobelle (Keyes)	Female Self-Description as Related to Self-Identification as a Feminist

FORUM #3—Norris Center 101

8:30	Jessica Zamborsky (Walter)	The Effect of Parental Involvement on the Social and Behavioral Development of Disabled and Non-Disabled Preschoolers
8:45	Holly Sprunger (Anes)	Emotional Expression Recognition
9:00	Victoria Kuo (Christopher)	Perceptions of Questionable Consumer Behaviors: The Effects of Perceiver and Actor Attributes
9:15	Stacey Burnaford (Walter)	The Impact of Family Functioning on the Self-Conscious Emotions of College Students
9:30	Jessica Kruer (Anes)	Processing Emotion Words and Emotional Expressions
9:45	Tanya Kuprianiak (Keyes)	Looking into Children's Gender Schemas and Their Relationship to Occupational Choice
1:15	Paul Garabelli (Klarr)	Effect of Cortical Vascularity on a Rat Encephalomyosynangiosis Model
1:30	Lindsay Miller (Klarr)	The Analysis of the Effects of Benzamil, EGTA, and N ^w -nitro-L-arginine methyl ester (L-NAME) on the Blood Pressure of Sprague-Dawley Rats
1:45	Julia Ogg (Wilson)	The Effect of Ginkgo Biloba on Acquisition of Spatial Alternation in Rats
2:00	Heather Linz (Wilson)	Experimental Neurosis in the Rat: Ability of Diazepam to Reduce Maladaptive Behavior Caused by Difficult Discrimination of Auditory Stimuli
2:15	Nicholas Gilpin (Wilson)	The Effects of Clomipramine and Imipramine on the Running Speed of Rats in a Modified "Crespi Effect" Study
2:30	Amy Fogler (White)	Using Macroinvertebrates to Determine Non-point Sources of Pollution in the Rice Creek Watershed
2:45	Lisa Carmichael (White)	Pipes, Treated Water, and Environmental Regulation: Finding a Best Management Plan for the Rice Creek Watershed
3:00	Sarah Hepinstall (Wilch)	Characterization of the Hydrology and Geomorphology of the Rice Creek Watershed

FORUM #4—Norris Center 103

8:30	Kami Marsack, Nathaniel Sowa (Kennedy)	Comparing Methods of Extracting DNA from Feathers of Nestling House Wrens (<i>Troglodytes aedon</i>)
8:45	Jennifer Tobin (Seely)	Designing a LabVIEW Program to Determine the Electrical Properties of New Superconducting Materials
9:00	Nicole Lake (Mortensen)	Investigation of Microanatomy of Blue-Sac Disease in Lake Trout Fry
9:15	Jennifer Wolf (Mortensen)	Gas Chromatography/Mass Spectrometry Analysis of Pesticide and PCB Loads in Lake Trout Embryos, <i>Salvelinus namaycush</i>
9:30	Valerie McCarthy (Bieler)	<i>Ab initio</i> Potential Energy Surface of C ₂ O ₄
9:45	Tammy Calvin (Kennedy)	Songs Used in Mate Communication in House Wrens
10:00	Sarah Hudson (Erbeznik)	Chemiluminescence-based DNA Detection: The Search for <i>xylG</i> in <i>Thermoanaerobacter ethanolicus</i>
1:15	Rany Aburashed, James Jostock (Harris)	Adventures in Boron-Land: Hydroboration/Oxidation of Alkenes Using ASPP
1:30	Bradford Slaughter (Skean)	Comparison of a Cedar Swamp and a Tamarack Swamp at Pierce Cedar Creek Institute, Barry County, Michigan, with an Annotated Checklist of Vascular Plant Species
1:45	Amanda Boye (French)	Reactivity of Hypervalent Iodine Reagents with Aryl Alkenoic Acids
2:00	Keven Clawson (Bieler)	Photophysical Properties of MALDI Matrix Compounds
2:15	John R. McAtee (Reimann)	The Magic of Web-based Database Systems
2:30	Shannon McKenny (Skean)	DNA Evidence for the Origin of <i>Mecranium latifolium</i> (Melastomataceae), a Puerto Rican Endemic
2:45	Sheila Santa (Schmitter)	A Survey of Stalked Ciliates (Peritrichia) from Lake Winnipeg, Calhoun County, Michigan



3:00	Elise Schultz (Bieler)	The Study and Optimization of the Photochemical Oxidative Polymerization of Pyrrole
3:15	Mark Ams (Harris)	The Total Synthesis of New Potential Metallomesogens

POSTER PRESENTATIONS — Gerstacker Commons, Kellogg Center, 3:00-4:30 p.m.

Alicia Costas, Anne Dafoe, Emily Deveau, Shari Gross, Kimberly Hiatt, Sarah Pike (Sacks)	Searching for the African American Past: The Story of James A. Welton, 1904
Kristin Degel (McCurdy)	Impacts of Elevated Temperatures and Exposure to Tributyltin Oxide on Production of Trematode Parasites by a Marine Snail
Paul Garabelli, Kim Illg, Margaret Menoch (Lewis)	Photodegradation of CCl ₄ Using Modified and Unmodified TiO ₂
Sarah Greko, Julie Woolworth (Saville)	Repair Mechanisms of DNA Double-Stranded Breaks Caused by Excision of the <i>hobo</i> Transposable Element in <i>Drosophila melanogaster</i>
Dustin Hill (Brumfiel)	Ceramic Analysis at Xaltocan, Mexico
Daniel Holland (Bieler)	A Study of Z-Scheme Photosynthesis
Crystal Ingison (French)	Progress toward the Synthesis of a New Chiral Hypervalent Iodine Reagent: Effect of Cerium Chloride on Regioselectivity of Addition
Kyle Kidder (Ludington)	Radioanalytical Determination of Radon in Water
Joshua Konzer (French)	Computational Analysis of Iodine Compounds with Emphasis on Hypervalent Iodine Compounds
Emily McCarthy (Wilch)	An Integrated Eruption/Depositional Model of Ice-Volcano Sequences at Mt. Takahē, Antarctica
Katherine Niesen (Kennedy)	Comparison of Song Patterns in House Wrens
Thomas Sikma (Reimann)	Human Assessment of Computer Monitor Fidelity

**RANY ABURASHED, '02**
JAMES JOSTOCK, '02**Adventures in Boron-Land:
Hydroboration/Oxidation of
Alkenes Using ASPP**

Faculty Sponsor: Clifford Harris

Rany Aburashed, '02
Major: Psychology
Hometown: West Bloomfield, Mich.James Jostock, '02
Major: Biology
Hometown: Rochester, Mich.

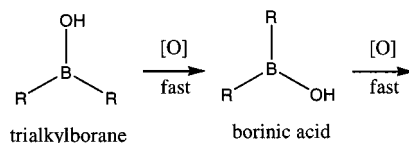
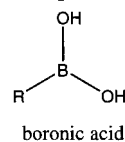
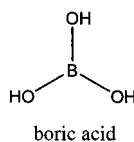
Aburashed



Jostock

The main objective of our research was to more effectively produce a compound called boronic acid. This compound is essential in the Suzuki reaction, which is an important and environmentally friendly method for the synthesis of pharmaceuticals. The first step of our process was to react terminal alkenes with borane in tetrahydrofuran to yield trialkylboranes. We then oxidized the trialkylborane using alumina-supported potassium permanganate—which is recyclable on a large scale and reduces the water pollution associated with many oxidations. This oxidation produces three sequential products: borinic, boronic, and boric acids, respectively. Our goal was to terminate the reaction at a certain point, in order to yield the highest amount of boronic acid, preventing over-oxidation to boric acid.

The main objective of our research was to more effectively produce a compound called boronic acid. This compound is essential in the Suzuki reaction, which is an important and environmentally friendly method for the synthesis of pharmaceuticals. The first step of our process was to react terminal alkenes with borane in tetrahydrofuran to yield trialkylboranes. We then oxidized the

**Our Desired Compound****Usual Product**[O] = oxidation by $\text{KMnO}_4 / \text{Al}_2\text{O}_3$

After a series of experiments revealed a more detailed picture of the overall oxidation process, we developed several different procedures in order to optimize the amount of the desired product. We also developed a better way to isolate the boronic acids using a simple test tube procedure. We hope these methods will prove useful to synthetic organic chemists.

Supported by: FURSCA

MARK AMS, '02**The Total Synthesis of New Potential Metallomesogens**

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: Almont, Mich.

Metallomesogens are a type of liquid crystal that contains one or more metal ions. In the liquid crystalline state, magnetic interactions between these metal centers may lead to useful chemical applications. We are presenting the total synthesis and characterization of a new potential metallomesogen containing only one diamagnetic center, based on a salphen unit that can be further functionalized. This process will serve as a model for the synthesis of our second proposed metallo-

mesogen, where one metal ion links two catecholate-functionalized salphen units. This latter trimetallic complex can have up to five paramagnetic centers upon oxidation of the catecholate moieties to semiquinones. Preparation of these complexes is dependent on the multi-step synthesis of functionalized multidentate ligands. An overview and our synthetic progress will be presented.

Supported by: FURSCA, National Science Foundation, University of Michigan
Research performed under the supervision of Steven Malinak

REBECCA ANDERSON, '02**Influence of Relational Variables and Participant Perspective on Perceptions of Fairness in the Justice System**

Faculty Sponsor: Amy Otto

Majors: Psychology, Speech Communication
Hometown: Royal Oak, Mich.

Eighty percent of Americans believe that our justice system is the best in the world (American Bar Association, 1999). But what influences this positive evaluation of our system? A wealth

of research has demonstrated the importance of a procedure's perceived fairness on overall ratings of fairness and satisfaction. More specifically, Lind and Tyler (1988) identified three relational variables that significantly affect perceptions of fairness. These variables are: (1) neutrality—the belief that the judge is honest, impartial, and unbiased, (2) trustworthiness—the belief that the judge is sincere, caring, and has good intentions, and (3) status recognition—the feeling that one is being treated politely and with respect.

The past research in this area has almost exclusively used these items as dependent variables and has looked only at the disputants' perceptions of fairness. The present study adds to this body of literature by manipulating the relational variables. The



design of this study was a 3 (perspective: disputant, jury member, outside observer) x 2 (neutrality) x 2 (trustworthiness) x 2 (status recognition) factorial. Participants read a written scenario of a civil trial and completed questionnaires that assessed their attitudes and experiences with the justice system and their perceptions of the case's fairness. The relative effect of the relational variables and prior attitudes was investigated.

Supported by: FURSCA-Metalonis Fellowship

ANDREW ANSELL, '02

Funereal Practices during the Civil War

Faculty Sponsor: Thomas Chambers

Major: History
Hometown: Kalamazoo, Mich.



My research deals with death and death care during and after the Civil War. The purpose of my research is to study how our country was logistically and socially set up to deal with death

during and after the Civil War. There is no more tangible symbol of war than that of a dead soldier. Death and the treatment of the remains of a person, along with the way people grieve, reflect the attitudes, mores, and values of the time.

The war dead had to be properly laid to rest before the country could begin to reconstruct society. Through the death of these veterans we see governments taking action and people demanding commemoration. We also see a rise of an industry that saw a demand and met its need. As embalming grew in frequency and popularity, the masses were afforded the luxury of preservation, a service relatively unattainable by past standards.

My research also looks at how the country transformed itself through dealing with the more than 620,000 deaths of the Civil War. The health concerns and logistical

problems of dealing with so many dead led to the building of a national veterans cemetery. President Lincoln's and General Lee's funerals had a great effect on people's attitudes and practices in dealing with death in America. The elaborate measures that the country went through to commemorate these two men show the need to remember and gain closure over the violence and emotional strain the country went through.

ANGELA BAECKEROOT, '04 MIRA WOOD, '02

Service Learning and Establishing Trust in a Mentoring Relationship

Faculty Sponsor: Leonard Berkey

Angela Baeckeroot, '04
Majors: Anthropology, German
Hometown: Ferndale, Mich.

Mira Wood, '02
Major: Sociology
Hometown: Holland, Mich.



Baeckeroot



Wood

Service learning is a valuable way for students to acquire skills and knowledge about themselves and others that would not normally be attained through classroom experiences alone. The Building Assets in Middle School Girls program has provided a service learning environment that has been both successful and enriching. Through this mentoring and research program, college women learned what it

means to truly become a mentor and how to give of themselves, their time, and their

talents. They have faced many challenges and had both positive and negative experiences, which have been helpful tools on their journey of growth as a student and a person.

One of the challenges the women faced was establishing trust in their mentor/mentee relationships. Trust, the foundation of a meaningful relationship, can be difficult to build when age, race, and class lines must be crossed. This presentation outlines some basic approaches, attitudes, and practical activities that can aid in establishing trust in a mentor/mentee relationship.

Supported by: FURSCA

AMANDA BOYE, '02

Reactivity of Hypervalent Iodine Reagents with Aryl Alkenoic Acids

Faculty Sponsor: Andrew French

Majors: Chemistry, German
Hometown: Howell, Mich.

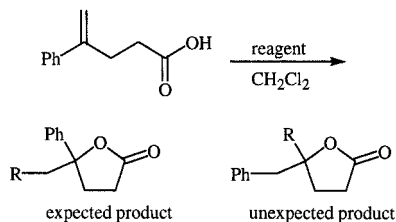


Although hypervalent iodine reagents have been known since 1886, they have recently become of increasing interest due to their versatility in a variety of organic reactions, including ligand additions,

lactonizations, sulfide oxidations, oxidative cleavage, rearrangements, Diels-Alder reactions, and oxidations of benzylic ethers to esters. Asymmetric lactones can be generated by the reactions of chiral hypervalent iodine reagents with unsaturated carboxylic acids, and therefore the goal of this research project was to test the reactivity of various hypervalent iodine reagents with aryl alkenoic acids. Both phenyl- and naphthal-pentenoic acids were synthesized for use as starting materials and reacted with (diacetozyiodo)benzene (DIB),



hydroxy(tosyloxy)iido-benzene (HTIB), and [Bis(trifluoroacetoxy)iido]benzene (BTI), as well as o-iodoxybenzoic acid (IBX). Results of this study yielded an unexpected, yet mechanistically explainable, concentration-dependent rearrangement product.



Supported by: FURSCA-Bethune Fellowship

ABIGAIL BROWN, '02 LISA LEWANDOWSKI, '02

Body Image: More Than Meets the Eye

Faculty Sponsor: Leonard Berkey

Abigail Brown, '02

Major: Psychology

Hometown: Comstock Park, Mich.

Lisa Lewandowski, '02

Major: Sociology

Hometown: Arlington Heights, Ill.



Brown



Lewandowski

Building Assets in Middle School Girls is a project that pairs Albion College females with Albion Middle School girls in a mentoring relationship.

During the course of the academic year our goal as mentors and researchers was to gain an understanding of what life is like for these middle school girls in Albion, Michigan. Our particular focus of research was on how body image is formed

and used to construct identity. There are several aspects of body image that impact girls in many different ways, but for the sake of this project we have chosen to focus on issues of weight, skin tone, and hair—three issues that are particularly relevant in the lives of Albion's middle school girls. Through the use of surveys, discussion groups, and field notes compiled by the Building Assets mentors, we learned how girls utilize their physical beings to create an image of themselves, and, more importantly, why they chose to create those specific images of themselves. Through research and hands-on mentoring, we have also developed several practical methods of building positive body image as an asset in middle school girls.

Supported by: Albion Community Foundation, Anna Howard Shaw Center for Women's Studies and Programs, Anthropology/Sociology Department

BETHANY BUCHHOLZ, '02

Learning to Drown

Faculty Sponsor: Lisa Chavez

Major: English (Creative Writing)

Hometown: Midland, Mich.



The purpose of my senior project was to create a collection of original poetry. Within this collection, I have tried to examine the complex boundaries between life and death, as well as challenging other issues such as sexuality, history, and the creation process itself. As part of this process, I spent a significant amount of time researching details of my topics before beginning the lengthy task of writing and rewriting. Poems from the final collection, *Learning to Drown*, were included in my portfolio for graduate schools and are currently being submitted for publication.

Supported by: FURSCA

STACEY BURNAFORD, '02

The Impact of Family Functioning on the Self-Conscious Emotions of College Students

Faculty Sponsor: Jamie Walter

Major: Psychology

Hometown: Harrison Township, Mich.



Adolescence is a period when individuals experience major physical and emotional changes, and become more focused on the peer group. Specifically, adolescents become more self-focused

and more self-conscious. However, research has consistently shown that family factors continue to influence adolescents' social and emotional functioning, even during late adolescence. It was the goal of this study to examine how different aspects of family functioning, such as divorce/separation, family conflict, and family closeness, affect the self-conscious emotions of guilt and shame in older adolescents. First-year college students were studied to see how these factors affect their emotions as they transition from high school to college.

Four questionnaires were administered to the college participants. It was hypothesized that shame-prone participants would report higher levels of family conflict, whereas participants who are guilt-prone would report lower levels of family conflict. In addition, guilt-prone participants would report higher levels of family closeness, whereas shame-prone participants would report lower levels of family closeness. It was also hypothesized that family functioning would predict participants' guilt- or shame-prone responses. Of all the variables studied, it was expected that family conflict and family closeness would emerge as the best predictors of shame- and guilt-prone responding. Results are discussed in terms of the role of the family in adolescents' emotional development.

Supported by: FURSCA



TAMMY CALVIN, '03

Songs Used in Mate Communication in House Wrens

Faculty Sponsor: E. Dale Kennedy

Major: Biology
Hometown: Sears, Mich.



Some species of songbirds use different types of songs in different contexts. I examined whether songs that male house wrens sing during the incubation and nestling period

when the female is on the nest differ in composition from songs that they sing while the female is out of the nest. I recorded songs of 18 males, all colorbanded for individual identification, at different times during the breeding season. Each male was recorded on audiotape shortly after arriving on the study site while still unmated. Nest boxes used by males that obtained mates were videotaped four times after pairing: once during the incubation period, and on days two, six, and ten of the nestling period. From the videos, I examined male singing behavior with respect to female behavior (entering or exiting a nest box). Songs were analyzed using Avisoft SASLab Pro.

More songs with introductions of ≥ 1.0 second were sung when the female was present than when the female was absent, and the majority of songs sung when the female was absent had introductions of ≤ 0.5 seconds ($X^2 = 26.11$, $df = 1$, $P < 0.01$). A few songs, only sung when the female was absent, appeared backwards from the other songs, and one male repeated a single introductory syllable many times before singing the rest of his songs when the female was absent.

Supported by: FURSCA-Bethune Fellowship

CAROLINE CANGELOSI, '02

Access to and Attitudes of Hispanic Women toward Family Planning: A Case Study at Two Clinics in Grand Rapids, Michigan

Faculty Sponsor: Dimeji Togunde

Major: Sociology
Hometown: Grand Rapids, Mich.



Hispanic women, and especially recent immigrant Hispanic women, have been shown to have a higher fertility rate than other ethnic and racial groups. Although there are many reasons for

this, access to and use of family planning services plays a role. The purpose of this study was to determine barriers Hispanic women face in obtaining family planning services, their attitudes toward family planning, and factors influencing their decisions about family size.

The study was conducted in the form of written surveys, which were distributed by nurses to Hispanic women of childbearing age attending two clinics in Grand Rapids, Michigan. The clinics provide medical services, including family planning, on a sliding scale fee to low-income people, including a large Hispanic population. The questionnaire, which was two pages and was written in Spanish, asked women about their past and present use of family planning services, potential barriers to its use, their attitudes toward family planning, influences on family size, and demographic characteristics. The results of the study will be used to improve services to Hispanic women at the clinics. Given the growing number of Hispanics in Grand Rapids and around the country, access to health care services is an important area of study.

Supported by: FURSCA

LISA CARMICHAEL, '04

Pipes, Treated Water, and Environmental Regulation: Finding a Best Management Plan for the Rice Creek Watershed

Faculty Sponsor: Douglas White

Major: Public Policy
Hometown: Oscoda, Mich.



As a team member on a federally-funded Watershed Planning Grant awarded to Albion College and the Calhoun County Conservation District, I evaluated a proposal to incorporate the

Rice Creek watershed into a regional sewage treatment network. Calhoun County Community Development proposed the network to address increasingly stringent environmental regulations facing smaller municipalities operating lagoon-based sewage treatment plants and the discharge of lagoon-treated wastewater by the Village of Springport into Rice Creek, a tributary of the Kalamazoo River, located north of Albion.

The network would add 9-17 miles of underground pipes to carry raw sewage from Springport and other scattered residential areas to the underutilized treatment plant in the City of Albion. Rural residents who formed the Rice Creek Basin Association to protest Springport's laying of pipe across their property and the discharge of wastewater into the creek now see the proposed sewage network as a necessary long-term solution for towns and villages to keep up with area growth and still protect the health of the creek.

When a policy emerges to address an issue, analysis must balance the benefits and costs in order to determine the preferred course of action. For the proposed sewage network, I evaluated the potential for urban sprawl, construction and operating finances, county and town government cooperation, public acceptance, and the need and potential



to improve the treatment of sewage within the watershed. Although funding construction remains a major obstacle, I recommend continued planning for the regional sewage network.

Supported by: Institute for the Study of the Environment-Rice Creek Project

GABRIELLE RAEMY CHAREST, '02

Cyprus: A Reasonable Solution?

Faculty Sponsor: Andrew Grossman

Major: Political Science
Hometown: Livonia, Mich.



This thesis examines the current political situation on Cyprus, divided between an internationally recognized Greek Cypriot government and an unrecognized

Turkish Cypriot government. A careful examination of the history and geopolitics that have contributed to the Cyprus situation leads to the conclusion that there is no easy answer. Various types of reasonable solutions are explored by attempting to define the conflict in terms of an ethnic conflict, an international relations question, and a federalism dilemma. Acceptance of the status quo seems to be the most workable plan, but, in light of current developments with Cyprus' potential European Union membership, even this may prove to be unreasonable.

KEVEN CLAWSON, '02

Photophysical Properties of MALDI Matrix Compounds

Faculty Sponsor: Craig Bieler

Major: Chemistry
Hometown: Jenison, Mich.



While many species can be used as MALDI matrices, there is currently no reliable method for predicting the effectiveness of a given compound for a specific analyte. Two families of

compounds frequently used as MALDI matrices are the salicylic acid derivatives and the cinnamic acid derivatives. In this study, the absorption and fluorescence properties of a series of salicylic acid and cinnamic acid derivatives were studied in solution. The main focus was the determination of fluorescence quantum yields with quinine bisulfate as the reference compound. This study will help characterize the photophysical behavior of these two important matrix families, so that a better understanding of the energy deposition and redistribution in these systems can be obtained.

Supported by: FURSCA-Bethune Fellowship, Chemistry Department

ALICIA COSTAS, '03
ANNE DAFOE, '02
EMILY DEVEAU, '04
SHARI GROSS, '04
KIMBERLY HIATT, '02
SARAH PIKE, '04

Searching for the African American Past: The Story of James A. Welton, 1904

Faculty Sponsor: Marcy Sacks

Alicia Costas, '03
Major: History
Hometown: Adrian, Mich.

Anne Dafoe, '02
Major: Speech Communication
Hometown: Ludington, Mich.

Emily Deveau, '04
Majors: Spanish, English
Hometown: St. Johns, Mich.

Shari Gross, '04
Major: Biology
Hometown: Troy, Mich.

Kimberly Hiatt, '02
Major: History
Hometown: Albion, Mich.

Sarah Pike, '04
Major: History
Hometown: Indianapolis, Ind.



Costas



Dafoe



Deveau

This poster presentation will display the range of materials and information we uncovered while conducting research on the history of James A. Welton, '04, the first African American alumnus of Albion College. In our effort to reconstruct the history of a man who left no personal records (to our knowledge), we needed to find creative ways of tracing his life. Our poster will represent this endeavor, demonstrating the variety of sources we utilized: vital records, city directories, federal censuses, Albion College archives, Albion City



Gross

archives, Alabama State archives, Internet resources, and archives from the Montgomery Normal School (where he was both alumnus and later teacher and football coach).

This research project is very important on two levels. It has helped us learn the process of discovering, recapturing, and recreating the past. At the same time, by finding out about the first person of African descent to graduate from Albion College, we gain insight into the enormous challenges overcome by Mr. Welton specifically and African Americans of this era more generally as they sought to acquire



Hiatt



Pike

an education. The College community also benefits from our work as we share a rich piece of Albion's history.

Supported by: CIS in History and Culture, CIS in Ethnic, Gender, and Global Issues

ANNE DAFOE, '02

(See Alicia Costas, '03, Anne DaFoe, '02, Emily Deveau, '04, Shari Gross, '04, Kimberly Hiatt, '02, Sarah Pike, '04)

KRISTIN DEGEL, '02

Impacts of Elevated Temperatures and Exposure to Tributyltin Oxide on Production of Trematode Parasites by a Marine Snail

Faculty Sponsor: Dean McCurdy

Major: Biology
Hometown: Macomb, Mich.



There is increasing evidence that climate change and pollutants have direct impacts on biological systems. In particular, ecologists are concerned that environmental change may lead to

increased production and transmission of parasites. Using laboratory studies on the marine snail *Ilyanassa obsoleta*, I observed that snails collected from a population in Maine were infected by six species of trematode (flatworm) parasites. In experiments, I found that snails were more likely to release parasites when temperatures were elevated more than 7 C above normal. I also assessed trematode production in snails exposed to tributyltin oxide, an anti-fouling compound that commonly leaches from boat paint. My results have implications for individuals and populations of numerous marine animals (e.g., clams, baitworms) that become infected by trematodes shed by snails.

Supported by: FURSCA

EMILY DEVEAU, '04

(See Alicia Costas, '03, Anne DaFoe, '02, Emily Deveau, '04, Shari Gross, '04, Kimberly Hiatt, '02, Sarah Pike, '04)

AMY FOGLER, '03

Using Macroinvertebrates to Determine Non-Point Sources of Pollution in the Rice Creek Watershed

Faculty Sponsor: Douglas White

Major: Biology
Hometown: Rochester, Mich.



In the summer of 2001, Albion College received a 319 planning grant from the Michigan Department of Environmental Quality to study the Rice Creek watershed. Rice Creek has long

experienced pollution problems such as dredging, a large-scale hog farm, and a new sewage outfall pipe. The health of the watershed is very important to the surrounding community and also to the health of the Kalamazoo River of which Rice Creek is a tributary.

Last summer I collected samples of benthic macroinvertebrates from seven areas on Rice Creek and one area on Spring Brook and then analyzed them in the lab. The collection sites were either suspected pollution entry points or sites of high habitat quality chosen for comparison. I identified and counted the organisms and interpreted the results according to the Great Lakes Environmental Assessment System Procedure 51 Survey Protocol.

My study confirmed that Rice Creek has experienced adverse effects from pollution. Five of the seven sites I sampled on Rice Creek were given a rating of poor. Studies of macroinvertebrates will continue in the summer of 2002. My data will be incorporated with the data of collaborating research teams and used to design management plans to increase the health of Rice Creek and to provide public awareness of water quality issues across the watershed.

Supported by: Institute for the Study of the Environment-Rice Creek Project

**SABRINA FRIEDLINE, '02****Changing Scenery: An Artistic Library on Urban Sprawl**

Faculty Sponsor: Anne McCauley

Majors: Art, Biology
Hometown: Howell, Mich.

My hometown of Howell, Michigan has been a center of development and urban sprawl for many years. However, the level of growth seems to be accelerating to the point where changes are easily

noticeable from month to month. In *Changing Scenery: An Artistic Library on Urban Sprawl*, I have created a series of three artist's books focusing on the impacts and results of urban sprawl in Howell, integrating traditional printmaking and bookbinding techniques with computer technology. "Local Voices," an accordion-fold book, is the result of dialogues with over twenty Howell residents in combination with drawn images of the city. "Perspectives on Progress," a Chinese screen structure, is an exploration of some of the benefits and adverse consequences that result from urban sprawl. "Constructing Landscapes," a three-part accordion-fold book, is a visual exploration of several phases of development that occur within a community. The images used throughout my books are adapted from a photographic library of Howell that I compiled using a digital camera.

Supported by: FURSCA, CIS in Contemporary Expression in the Arts

**PAUL GARABELLI, '02
KIMBERLY ILLG, '04
MARGARET MENOCH, '02****Photodegradation of CCl_4 Using Modified and Unmodified TiO_2**

Faculty Sponsor: Lisa Lewis

Paul Garabelli, '02
Major: Chemistry
Hometown: Novi, Mich.

Kimberly Illg, '04
Major: Chemistry
Hometown: Naperville, Ill.

Margaret Menoch, '02
Major: Biology
Hometown: West Bloomfield, Mich.



Garabelli

The photodecomposition of carbon tetrachloride in aqueous solution by TiO_2 and modified TiO_2 was studied using gas chromatography-mass spectrometry with headspace equipment.



Illg

Previous work on TiO_2 suggests that the addition of an electron donor (such as an alcohol) to aqueous solution enhanced the degradation rate of CCl_4 to CO_2 and HCl . In our experiment, 1-propanol was used as the electron donor at concentrations of 2.50%, 16.7%, and 33.30%. Our results demonstrate a decreased degradation rate of CCl_4 with increased concentrations of 1-propanol. The



Menoch

discovery of a byproduct, propionaldehyde, suggests that there is a competing reaction that may explain the decreased rate of degradation. Ion chromatography was used to monitor the mass balance of the reaction. In addition, researchers have found that Fe_2O_3 , tin oxides, and molybdenum oxides can be useful substrates for photo-degradation of organic pollutants. Specific results on $\text{SnO}_2/\text{TiO}_2$ composite systems suggest that, when combined, semiconductors differing in size and band gap increase the photo-degradation rate as compared to each individual semiconductor. We studied the photodegradation rate of carbon tetrachloride in aqueous solution with equal ratios of $\text{TiO}_2/\text{Fe}_2\text{O}_3$ and with the addition of 16.7% ethanol. When compared to each individual semiconductor and a new substrate, $\text{Mo}_6\text{Cl}_{14}$, our results did not show any significant difference in degradation rate.

Supported by: FURSCA

PAUL GARABELLI, '02**Effect of Cortical Vascularity on a Rat Encephalomyosynangiosis Model**

Faculty Sponsor: Susan Klarr

Major: Chemistry
Hometown: Novi, Mich.

New methods of increasing cerebral blood flow are needed for patients in danger of suffering a stroke. Encephalomyosynangiosis (EMS) is a technique where a muscle flap is placed over the brain and collateral blood vessels form between the muscle and brain. It is effective in some children but not adults. This study sought: (1) to create a model of EMS in the adult rat, (2) to examine whether it would result in increased vascularity in the underlying cortex, and (3) to examine whether application of vascular growth factors to the muscle would promote such increased vascularity. Vascularity was examined seven days after muscle placement, with or without growth factor, using cryostat sections. EMS was well tolerated by the rats, but there was no increase in cortical



vascularity in either group when compared to sham-operated controls in our initial adult trials.

Supported by: *FURSCA-Hyde Fellowship*

NICHOLAS GILPIN, '02

The Effects of Clomipramine and Imipramine on the Running Speed of Rats in a Modified "Crespi Effect" Study

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychology
Hometown: Horton, Mich.



Groundbreaking work done by Crespi (1941) suggested that a change in reward magnitude could elicit changes in behavior, most noticeably running speed. He found that, when rats

were given a high magnitude of reward and shifted to a low magnitude of reward, the time it took for the rats to negotiate a runway was significantly higher after changing the reward magnitude. He called this the "depression effect."

It was suggested previously that administering anti-depressants to the rats might reduce—or altogether eliminate—the "depression effect." However, anti-depressants actually enhanced the effect of reward change. This finding allowed us to reject Crespi's effect as a model of clinical depression in humans.

In the present study, four groups of eight rats (32 total rats) received drugs affecting serotonin (clomipramine) and norepinephrine (imipramine), either alone or together, on the day of the reward shift. Running speed of the rats was determined by having each rat run approximately five sessions on a runway (one session = twelve trials up and down the runway). After each trial, the rats received eight sugar pellets as a reward. On the critical test session, the rats were injected with the drug, and then received only one sugar pellet per trial for

the latter half of the session. The effect of the reward shift on running speed should vary depending on whether the Crespi effect relies mostly on serotonergic mechanisms, noradrenergic mechanisms, or a combination of both.

Supported by: *FURSCA, Psychology Department*

AMANDA GOFF, '02

The Effect of Death Qualification on the Application of Aggravating and Mitigating Circumstances in Capital Punishment Juries

Faculty Sponsor: Amy Otto

Major: Psychology
Hometown: Dundee, Mich.



Death qualification is a unique jury selection procedure for capital cases, through which potential jurors are screened for their death penalty attitudes as a way of determining their eligibility for

service on the jury. Potential jurors who are strongly opposed and strongly in favor of the death penalty are eliminated to ensure a fair and impartial jury, and, in deliberation, these juries are asked to evaluate the aggravating circumstances (arguments for the death penalty) and mitigating circumstances (arguments for life in prison) that have been brought forth in the trial. If the aggravating circumstances outweigh the mitigating circumstances, then the jury is to recommend the death penalty; if the mitigating circumstances outweigh the aggravating circumstances, then the jury is to recommend life in prison. Many psychologists have found, however, that in their attempts to simulate the deliberation of these juries, biasing effects still arise.

The purpose of this study was to investigate this issue, examining the processes of both jury selection and deliberation, with participants revealing their personal opinions regarding capital punish-

ment and viewing a video simulation of a capital punishment trial. It was hypothesized that jurors would respond differently to evidence in the trial depending on their death penalty beliefs, with participants being influenced more by mitigating circumstances than by aggravating circumstances. It was also hypothesized that participants would not remain consistent in their death penalty opinions and that, in general, all participants would show a bias toward the death penalty.

Supported by: *FURSCA*

SARAH GREKO, '02 JULIE WOOLWORTH, '02

Repair Mechanisms of DNA Double-Stranded Breaks Caused by Excision of the *hobo* Transposable Element in *Drosophila melanogaster*

Faculty Sponsor: Kenneth Saville

Sarah Greko, '02
Major: Biology
Hometown: West Bloomfield, Mich.

Julie Woolworth, '02
Major: Biology
Hometown: Columbiaville, Mich.



Woolworth

DNA, a double-stranded molecule that carries the genetic information of an organism, can be damaged in a variety of ways. The repair of DNA damage is critical to the survival of the cell and the avoidance of excess

mutations. The inability to repair DNA leads to a number of human diseases, including various pre-dispositions to cancer. We studied the repair of DNA damage in the fruit fly, *Drosophila melanogaster*. The specific type of damage is called a double-stranded break (DSB). In these experiments, the DSBs were caused when a mobile DNA element called *hobo* jumped out of the DNA. Our experiments were designed to analyze the mechanism by which these breaks were



repaired. Two repair mechanisms, homologous recombination (HR) and non-homologous end joining (NHEJ), are commonly used to repair such breaks. Based on previous studies on the repair of *hobo*-induced breaks, we hypothesize that the repair mechanism in this case will be NHEJ. To test this hypothesis, the original DNA and the broken/ repaired DNA were amplified using a technique called the polymerase chain reaction (PCR). The DNA sequence of each type of DNA was then determined and compared. These experiments should contribute to our understanding of the NHEJ repair mechanism and therefore our understanding of various DNA repair-based diseases.

Supported by: FURSCA. Julie Woolworth received a Hyde Fellowship.

SHARI GROSS, '04

(See Alicia Costas, '03, Anne DaFoe, '02, Emily Deveau, '04, Shari Gross, '04, Kimberly Hiatt, '02, Sarah Pike, '04)

SEAN HACKNEY, '02

Fiction to Film: An In-Depth Look at Francis Ford Coppola's Screen Adaptations

Faculty Sponsor: Charles Crupi

Major: English
Hometown: Trenton, Mich.



Francis Ford Coppola began his career as a screenwriter. Since then, he has become one of the leading filmmakers in Hollywood. As with all directors, Coppola is interested in a good

story. Many of Coppola's films are based on popular books, ranging from adult fiction to adolescent fiction. "Fiction to Film" aims to look at Coppola's adaptations with clear analysis of the jump from popular novel to popular movie. "Fiction to Film" looks at

issues such as auteur theory, the editing process, and character development. Thematic and other issues arise from the changes made by Coppola. Other issues brought about by the concept of theme arise in the director, warranting a look at the auteur theory. I have chosen three films to focus on: *The Godfather*, *The Godfather, Part 2*, and *Apocalypse Now*. By taking an in-depth look into these three films and two supporting films, I will reveal what Francis Ford Coppola does with another author's work to make it an independent product.

MARNIE HARTE, '02

The Unpunished Crime: Passive Abuse and the Law

Faculty Sponsor: Joe Stroud

Major: English
Hometown: East Lansing, Mich.



When a bank is robbed and the culprit is apprehended, more often than not, his or her "get away driver" will have engaged in activity sufficient to convict him or her of aiding and abetting.

Unfortunately, it is not as easy to identify secondary offenders in all crimes as it is in the aforementioned situation. Since 1991, over 10,000 American children have died from child abuse, and the numbers continue to rise. As disheartening as this may be, evidence suggests that these statistics fall far short of telling the whole story. What figures can't tell us are the number of children whose plight goes unnoticed—those children who are sexually and physically abused each and every day. In many cases, child abusers are allowed to continue their practices by at least one other knowing adult, and it is with them that my research is concerned. Because these individuals don't take an "active" role in the abuse, it has been very hard to convict them of aiding and abetting. "Passive abusers," however, play an active role in their own way and should be dealt with accordingly. Appropriate statutory

enactment is necessary at this time, as it would clarify the applicable law tremendously.

SARAH HEPINSTALL, '02

Characterization of the Hydrology and Geomorphology of the Rice Creek Watershed

Faculty Sponsor: Thomas Wilch

Major: Geological Sciences
Hometown: Midland, Mich.



As part of an EPA-funded watershed management planning grant, research was done on the Rice Creek watershed to establish a water quality-monitoring network. Rice Creek is a tributary to the

Kalamazoo River, located in south central Michigan. Over a period of about eight weeks during the summer of 2001, stream flow was monitored, along with pH, turbidity, total suspended solids, dissolved oxygen, nutrient levels, and water temperature at selected sites along Rice Creek. Then, a geographical information system (GIS) database was developed to record and compare water discharge variables across the watershed. As the summer progressed, the discharge of Rice Creek decreased. This was expected due to the lack of precipitation during this time. As the creek's discharge fell, its sediment load fell as well. In terms of nutrient levels, Rice Creek did not exceed recommended guidelines, but an effort needs to be made to monitor Rice Creek during different times of the year to see if the nutrient level fluctuates with seasons and precipitation patterns.

Supported by: FURSCA, Michigan Department of Environmental Quality Grant

KIMBERLY HIATT, '02

(See Alicia Costas, '03, Anne DaFoe, '02, Emily Deveau, '04, Shari Gross, '04, Kimberly Hiatt, '02, Sarah Pike, '04)



DUSTIN HILL, '03

Ceramic Analysis at Xaltocan, Mexico

Faculty Sponsor: Elizabeth Brumfiel

Majors: Biology, Anthropology
Hometown: Berrien Springs, Mich.



During the 1999 field season in Xaltocan, Mexico, a very dense layer of ceramic sherds was found in excavation unit X2. The purpose of this study, which was conducted over the summer of 2001,

was to determine the mode of deposition of this pottery. A survey of the pottery was taken to determine the approximate age of the sherds, vessel type, completeness of vessels, usewear, and erosion due to exposure. A ratio of sherds to bones (or fragments) was also calculated to compare with that found at other units with known modes of deposition.

Supported by: FURSCA

DANIEL HOLLAND, '03

A Study of Z-Scheme Photosynthesis

Faculty Sponsor: Craig Bieler

Majors: Chemistry, Physics
Hometown: Canton, Mich.



A quantitative analysis of the Z-scheme theory of photosynthesis has been conducted in order to rigorously test the hypothesis. Studies were carried out on the algae strain *Chlamydomonas*

reinhardtii 137c and various mutants of the strain: PS I-deficient mutants FUD26 and F8, and the PS I-deletion mutant B4-Psa A- Δ 2.

These studies included oxygen evolution measurements for photosynthetic rate determination, fluorescence-induction curves for relative quantum yields for the PS II reaction centers, and kinetic measurements of [P700] under weak actinic light for PS I antenna size calculations. In addition, photospectroscopic measurements for PS I content and pulsed-light H₂ production yields (via the ferredoxin/hydrogenase pathway) were studied. Oxygen evolution at various light intensities was normalized to that of the wild-type algae and compared with the normalized product of relative antenna sizes and the amounts of PSI per chlorophyll.

Relative O₂ production rates somewhat closely match H₂ relative production amounts. Discrepancies exist between O₂ and H₂ production results and both the PS I content and antenna sizes, which are likely due to problems in the experimental design, as explained in the report.

This work is fundamental research into the accepted model of photosynthesis. Although proposed long ago, a thorough analysis with as many factors being simultaneously examined, and on the same samples at the same time, has not been pursued. Procedural and equipment modifications suggested by the authors should benefit future work.

Research performed under the supervision of Elias Greenbaum and James Lee, Oak Ridge National Laboratory

SARAH HUDSON, '02

Chemiluminescence-based DNA Detection: The Search for *xyIG* in *Thermoanaerobacter ethanolicus*

Faculty Sponsor: Luti Erbeznik

Major: Biology
Hometown: Petoskey, Mich.



Chemiluminescence is the emission of light via a chemical reaction. Detection of nucleic acids by chemiluminescence-based methods is more sensitive, less expensive, and safer than similar

methods using radioisotopes. This non-radioactive approach is also advantageous because it has longer stability, it requires a relatively short amount of time to complete (less than one hour), and the DNA that has been hybridized with a chemiluminescently labeled probe can be exposed to x-ray films multiple times as compared with the radioisotope-based procedures.

Thermoanaerobacter ethanolicus converts fibrous organic materials, such as plant hemicellulose, into sugars fermentable to ethanol, an alternative fuel. *T. ethanolicus* uses an ABC-type (ATP-binding cassette) transporter of the sugar xylose. *XylG* is an ATPase that, as part of the ABC-type xylose transport system, supplies energy to the transport system to translocate the xylose into the cell. Xylose fermentation by *T. ethanolicus* yields ethanol as a major by-product. A chemiluminescently-labeled *xyIG*-specific probe has been developed and will be used to detect the complementary DNA sequence in recombinant clones in the genomic library. When hybridized against the bacterial chromosomal DNA, the probe is expected to bind to the gene of interest (*xyIG*) with highest affinity.

The chemiluminescent detection kit employs an enzyme-catalyzed reaction. The *xyIG* probe is biotinylated (meaning biotin is associated with the DNA that has been applied and UV-crosslinked to a membrane). The biotinylated *xyIG* probe hybridizes with the target DNA. Streptavidin is then added to



bind the biotin associated with the DNA hybrid. Next, a biotinylated alkaline phosphatase is added, which binds the streptavidin. Finally, the chemiluminescent reagent is added to react with the bound alkaline phosphatase. The alkaline phosphatase catalyzes a reaction removing a phosphate from the chemiluminescent substrate. This intermediate decays and emits light. The light emission can be captured on an x-ray film to help identify clones from the library that contain the gene of interest.

Supported by: FURSCA-Hyde Fellowship, Blanchard Faculty Fellowship, Faculty Development Grant

KIMBERLY ILLG, '04

(See Paul Garabelli, '02, Kimberly Illg, '04, Margaret Menoch, '02)

CRYSTAL INGISON, '03

Progress toward the Synthesis of a New Chiral Hypervalent Iodine Reagent: Effect of Cerium Chloride on Regioselectivity of Addition

Faculty Sponsor: Andrew French

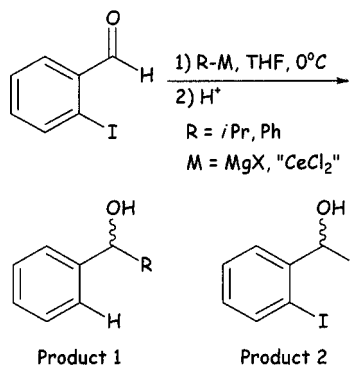
Major: Chemistry
Hometown: Marquette, Mich.



In an effort to access chiral, nonracemic ortho-iodobenzhydrols, we investigated the role of cerium (III) chloride on the alkylation of ortho-iodobenzaldehyde. Literature precedent suggested that

significant halogen exchange (Product 1) would be observed in Grignard or lithium alkylation, and that the addition of cerium trichloride would minimize halogen exchange and maximize alkylation (Product 2). We tested this hypothesis with a model compound, shown below, before trying the reaction on our desired, albeit expensive, starting material. Our efforts to control this halogen exchange by addition of anhydrous

cerium chloride showed that, for the addition of phenyl Grignard reagents, the presence of cerium chloride was unnecessary to obtain excellent yields of the iodo alkylated product. In fact, when we tried the reaction on expensive 8-iodo-1-naphthaldehyde, significant halogen exchange resulted. Without cerium added, halogen exchange was not observed in any significant yield.



Supported by: FURSCA, Faculty Development Grant

JAMES JOSTOCK, '02

(See Rany Aburashed, '02, James Jostock, '02)

ELIZABETH KENYON, '02 ALYSSA MONTGOMERY, '04

The Struggle Within: African American Female Identity at Albion Middle School

Faculty Sponsor: Leonard Berkey

Elizabeth Kenyon, '02
Major: History
Hometown: Adrian, Mich.

Alyssa Montgomery, '04
Major: Sociology
Hometown: Southfield, Mich.

African American adolescent females experience complex identity issues, which arise from the devaluation of their race and gender in their environments. The structural and cultural limitations and conflicts they encounter push them toward certain distinct behavioral patterns. These issues were explored in a program, conducted between Albion College and Albion Middle School,



Kenyon



Montgomery

that paired eleven college mentors with twelve middle school girls. Observations of the girls' behavior include many attitudes and behaviors that express emotional frustration and aggression. The observations were used to identify identity issues and examine their relations to the girls' environments. They were also used to identify resources the girls had, or could develop, that would

assist them in overcoming the labeling they experience on a daily basis. Observations were made via one-on-one interactions, group activities, a focus group, and a survey. Finally, we looked at ways in which a mentoring program similar to ours could help the girls overcome the labels.

Supported by: FURSCA, Albion Community Foundation, Anthropology/Sociology Department

ELIZABETH KENYON, '02

Overcoming the Odds: Success of Albion's African American Youth in the '50s and '60s

Faculty Sponsor: Wesley Dick

Major: History
Hometown: Adrian, Mich.

This research project examines the African American community in Albion that produced a series of successful graduates from Albion High School in the late 1950s and early 1960s. Spring-boarding off of an article written in the early '80s in the *Detroit Free Press*, the research probes several factors including the community created in Albion's black neighborhoods and churches, the sense of hope generated by the great migration, and



the middle-class values spread in a working class town with a small liberal arts college. The study then goes on to look at changes affecting Albion since that time period. These changes include urban renewal, deindustrialization, and the deterioration of community structures. The thesis argues that Albion did contain certain ingredients that led to the success of the students in the 1950s and '60s and that the economic base of the community dropping out when the industries left town, combined with the timing of black success, caused the decline that followed.

Supported by: CIS in History and Culture

KYLE KIDDER, '02

Radioanalytical Determination of Radon in Water

Faculty Sponsor: Martin Ludington

Major: Physics

Hometown: Royal Oak, Mich.



The purpose of the research was to develop an accurate method for determining the amount of radon in water samples by detecting gamma rays. Radon content has been traditionally measured by

detecting the alpha particles given off in the decay. However, alpha particle detection has a large number of sampling errors associated with it that are not present when detecting gamma rays.

There were two main problems to solve in this study. The first of these problems was the type of container to use for collection and analysis. Both plastic and glass containers were tried. Some research suggests radon tends to stick to plastic, which would cause problems with radon staying uniformly distributed in the sample. There are also problems with glass. Glass is made up of elements found in the soil, which can produce radon. This would increase the background level of radon and therefore the sensitivity of the method. In the end, though,

the glass container gave us a better seal to keep the radon from escaping the jar and thus a more accurate result. The second problem was developing a method for calibrating the system for radon. Because we do not have a standard radon source for this purpose, we substituted a cesium-137 source that we do have and made appropriate corrections.

With these obstacles overcome, we were able to develop a system that determines the amount of radon in a water sample using gamma-ray detection. Results will be given for various tap water samples obtained on campus.

Supported by: FURSCA-Kresge Fellowship

LEAH KOHLER, '02

The Evolution of Plague Symbols in Italian Renaissance Art, 1350-1650

Faculty Sponsor: Bille Wickre

Major: Chemistry

Hometown: Rochester Hills, Mich.



The 300-year period known as the Italian Renaissance posed a battle between life and death—the rebirth of the classical Roman style in art, literature, and architecture countered by the

unmerciful spread of the bubonic plague among the people. This Black Death dramatically altered Italian civilization and culture, and from this emerged a new art theme—plague art.

Artists of the time, fueled both by a supportive and innovative cultural environment and by a need to understand and describe the living nightmare in which so many Europeans found themselves, adapted already existing artistic themes to depict their situation. These themes initially took shape in forms of votive commissions (the trinity, virgin, and saints). With each passing plague epidemic, however, religious images and symbols gradually gave way to a more

physical and secular rendering of the Black Death and its victims. The face of plague paintings was again drastically altered following the rulings of the Council of Trent.

The purpose of this research was to investigate the evolution of plague symbols in Renaissance art, focusing particularly on the pictorial and architectural pieces produced during and immediately following the major epidemics. The majority of this research was conducted in Venice and Rome during the fall and winter of 2001. The presentation will include a brief background on the Renaissance and cultural environment of Italy, the Black Plague, and critical evaluations of specific paintings that best capture the changing face of plague art.

Supported by: Sebald Gift for Off-Campus Study

JOSHUA KONZER, '02

Computational Analysis of Iodine Compounds with Emphasis on Hypervalent Iodine Compounds

Faculty Sponsor: Andrew French

Majors: Chemistry, Physics

Hometown: Davison, Mich.



Atomic and molecular modeling is an important part of understanding and advancing chemistry. A viable model of any mechanism, molecule, etc., adds efficiency to research and

development. My research was focused on better understanding the models of iodine compounds with a special emphasis on hypervalent iodine. Our goal was to understand the structural biases of hypervalent iodine reagents in hopes of determining an optimum reagent that could be synthesized in the lab. The research was strictly computational and involved advanced calculations using Gaussian '98. Geometry, energy values,



and applicability to known compounds were the goal of the calculations, and are presented.

*Supported by: FURSCA-Kresge Fellowship
Research performed under the supervision of
Olaf Wiest, University of Notre Dame*

ANNA KRECIC, '02

Explorations in Large Format Photography

Faculty Sponsor: Douglas Goering

Major: Photography
Hometown: Dexter, Mich.



The idea for this project came from a semester of studying photography on the New York Arts Program during the fall of 2001. While on the program I was given an 8 x 10 inch view camera, so I

decided to make the project of repairing the camera and shooting film with it the subject of my senior thesis. It has long been a tradition within large format photography to shoot landscapes because of the quality and size of the negative. Therefore, I have chosen to make American landscapes my photographic focus for this project. As well as fixing the camera to a working order, I researched the company it was made by and studied the role of large format photography in history.

Supported by: FURSCA

JESSICA KRUER, '02

Processing Emotion Words and Emotional Expressions

Faculty Sponsor: Michael Anes

Major: Psychology
Hometown: Ada, Mich.



This study examined hemispheric specialization using a lateralized Stroop task. A 2 (task: identify word or identify expression) x 2 (side of presentation: left or right) x 2 (emotion of

task-relevant stimulus: happy or angry) x 3 (emotion of distractor: happy, angry, or blank) factorial design was used with the intention of placing in maximum conflict the right hemispheric specialization for emotional expression processing and the left hemispheric specialization for the processing of words. This was accomplished through the use of brief displays of standardized Ekman faces and emotion words on a computer monitor. Participants responded with a key press that corresponded to the task-relevant stimulus. Accuracy and reaction time of participants on their 288 trials were measured. It was hypothesized that the greatest Stroop effect would occur when there was an incongruent display of facial expression in the left visual field and emotion word in the right visual field. Additionally, it was hypothesized that females would exhibit less Stroop-like interference on this particular task.

VICTORIA KUO, '02

Perceptions of Questionable Consumer Behaviors: The Effects of Perceiver and Actor Attributes

Faculty Sponsor: Andrew Christopher

Majors: Economics and Management,
Psychology
Hometown: West Bloomfield, Mich.



Only a few studies have examined perceptions of ethically questionable consumer behaviors (e.g., drinking a can of soda in the supermarket and not paying for it). Such investigations

have focused on how individual differences in the perceiver (e.g., materialistic values) are related to perceptions of such behaviors. Further, the relationship between perceptions of ethically questionable behaviors and the individuals performing them has not been investigated. The focus of the present study is to understand how individual differences in perceivers' materialistic values, in combination with their socioeconomic status and sex, affect perceptions of judgments related to ethically questionable consumer behaviors performed by a relatively affluent or less affluent target person.

Two hundred and thirty-four undergraduate students from introductory psychology classes at Albion College (Michigan) and Anderson College (South Carolina) completed a survey based on a brief, manipulated scenario depicting a male or female target person in an affluent or less affluent setting. Levels of affluence were depicted through the target person's material possessions, such as furniture, cars, food, and pets. Participants indicated the extent to which they found each of Muncy and Vitell's (1992) 20 ethically questionable consumer behaviors (e.g., taping a movie off the television) and also completed the 18-item Richins and Dawson (1992) materialism scale. Results revealed that participants generally found proactive, passive, and deceptive consumer behaviors to be unacceptable.



However, participants also found all but one of the no harm/no foul consumer behaviors acceptable. Overall, materialistic participants were more likely to find ethical consumer behaviors acceptable. The relationship and interactions between the four predictor variables and four questionable consumer behaviors were also examined. Further research directions are suggested as well.

TANYA KUPRIANAK, '02

Looking into Children's Gender Schemas and Their Relationship to Occupational Choice

Faculty Sponsor: Barbara Keyes

Major: Psychology
Hometown: Troy, Mich.



The study investigated children's responses to pictures of men/women involved in gender typical or atypical occupations and whether their memory varied as a function of type of occupa-

tion. Children were also shown pictures of individuals engaging in activities carried out correctly or incorrectly. It was predicted that children would respond similarly to the gender atypical and the incorrect pictures, describing both as surprising. For the memory task, it was predicted that children would remember the gender atypical pictures less accurately than any of the other picture sets. Other variables that were investigated included the age of the participant, the sex of the participant, and the occupation of that participant's parent(s).

Participants were shown a total of eighteen pictures (six gender typical, six gender atypical, three correct activities, and three incorrect activities) over a span of ten minutes. The participants were then asked to identify anything in the picture that "surprised" them. After one week, the participants were re-tested. The original eighteen pictures were each presented along with a second picture in which the gender of the worker or correctness of the activity was

changed (e.g., original picture: male plumber; comparison picture: female plumber). Participants were then asked to identify the picture that they had originally seen.

The results from this study were examined using a multiple regression analysis and interpreted in terms of Bem's gender schema theory.

Supported by: FURSCA

NICOLE LAKE, '02

Investigation of Microanatomy of Blue-Sac Disease in Lake Trout Fry

Faculty Sponsor: Richard Mortensen

Major: Biology
Hometown: Mio, Mich.



Savelinus namaycush (lake trout) in the Great Lakes have been plagued by a deformity known as blue-sac since the late 1950s. They are unable to successfully reproduce in their

natural environment and have been raised in hatcheries, then released into the wild. Prepared slides of normal and blue-sac fry of *S. namaycush* were observed to note characteristics of the deformity. Abnormal fry samples were taken from the Great Lakes Science Center in Ann Arbor, Mich. and were histologically prepared into slides. The observations of the slides focused on the axial skeletal system and the kidney. Abnormally large, distorted tubules were found in the kidney, along with disorganized muscle fibers in the skeletal system. This information supported the hypothesis that blue-sac caused serious damage to the kidney and axial skeletal system in *S. namaycush* embryos and fry. It is suggested a failure to osmoregulate produces the swollen yolk sac characteristic of blue-sac fry.

Supported by: FURSCA

DANA LEE, '02

A la table de mes amis: The Surviving Folksongs of Francophone Detroit

Faculty Sponsor: Andrew Bethune

Majors: French, English
Hometown: Wixom, Mich.



Music is one of the most tangible and basic elements that define a culture. People take great pride in making music together, especially when that music is unique to them and their community.

Folk music that is handed down through strong oral tradition has a special importance to its people and their heritage. This is true of the French presence in the Detroit River region, which for this study encompasses not just twenty-first century metropolitan Detroit but also areas north and south of the city and across the river in Windsor. While Detroit has a national reputation as a home to varied musical styles—Motown, jazz, and blues, for example—its rich history of French and French-Canadian folksong is not quite as famous. In fact, unlike the widely-researched folk songs from the francophone communities of Louisiana, Quebec, Northern Ontario, and New England, the Detroit area French folk songs were largely unknown until the late 1980s. This study investigates this crucial aspect of the Detroit area's rich history of French presence.

Recovering this musical heritage began largely with the labors of Marcel Bénéteau, a Canadian who has gone to great lengths to gather the many French folk songs of this region. His work began in 1988, and since then he has collected over 2,000 versions of approximately 700 songs through written notebooks, a few cherished manuscripts, and countless personal interviews with a tape recorder in hand. By using his materials as my primary resources, I've examined these



songs and their contexts, with special attention to lyrics, in order to discover how and why they were originally sung among the people of the Detroit River area.

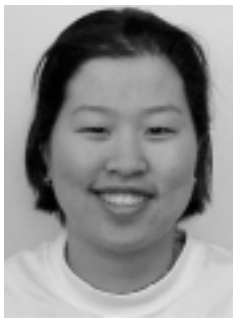
Supported by: CIS in History and Culture

SARAH LEICHER, '02

The Separatist Game: Challenging the 'Women Born Women' Policy at the Michigan Womyn's Music Festival

Faculty Sponsor: Trisha Franzen

Major: Women's Studies
Hometown: Ann Arbor, Mich.



Six thousand women. Six days. Freedom. Every year women from all over the United States and the world flock to the Michigan Womyn's Music Festival. It's a week of workshops, networking, music,

and celebration. Within the last few years, two hot debates have surfaced at the festival. Should men be allowed on the historically 'women only' land? What about the current policy that prohibits the transsexual community from attending? Attendees of Michfest, as it is commonly referred to, and feminist scholars remain at a standoff. Why exclude? Why permit? These questions will be explored through the presentation of field research and feminist theoretical approaches.

Supported by: FURSCA

LISA LEWANDOWSKI, '02

(See Abigail Brown, '02, Lisa Lewandowski, '02)

HEATHER LINZ, '02

Experimental Neurosis in the Rat: Ability of Diazepam to Reduce Maladaptive Behavior Caused by Difficult Discrimination of Auditory Stimuli

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychology
Hometown: Okemos, Mich.



The purpose of experiment 1 and experiment 2 was to investigate whether difficult discrimination of auditory stimuli had an effect on the number of trials initiated by a rat in a runway situation,

and evaluate the effect of diazepam on this measure. Two separate experiments were included, and in each experiment twelve female Sprague-Dawley rats were used as the subject pool. The rats were randomly placed in either the experimental group (n = 6) or the control group (n = 6). For both experiments 1 and 2, the experimental rats were conditioned to pair a high tone (3600 Hz) with food and a low tone (2400 → 3000 → 3300 → 3450 → 3525 → 3563 Hz) with an absence of food, whereas the control group was rewarded on 50 percent of the trials with no paired associations. The tones were moved closer together during the course of the experiment by halving the distance between the high and low tone. In addition, in the second experiment all rats received all doses of the anxiolytic, diazepam, (0 mg/kg, 0.5 mg/kg, and 2 mg/kg) when the distance between the tones was at a minimum (3563 vs. 3600 Hz).

The experimental rats were expected to initiate more trials when the discrimination was easy compared to control rats and fewer trials when the discrimination was more difficult. Also, diazepam was expected to increase the number of trials initiated for the experimental rats, and have no effect on the control rats.

Supported by: FURSCA

LARRY LLOYD, '02

Redemption and Resurrection: How a Friendship Transformed a Faith

Faculty Sponsor: Geoffrey Cocks

Major: Holocaust Studies
Hometown: Dundee, Mich.



Christianity is a faith that is based on the idea of revelation, principally the revelation of God's love for humanity in the form of Jesus Christ. It is also a religion that provides us with a

meaning for history, most importantly the notion of a God that directs history. For many of today's Christians, then, many questions arise. What does the Holocaust reveal to us, as men and women of faith? What does it mean to be a post-Holocaust Christian? Is Christianity still relevant in a post-Holocaust world?

In the past decade scholarship on the Holocaust has begun to branch out into several new areas of that horrific time in history. One of the most prevalent among these is the prime position that Christianity played in the events of the Holocaust. Such discussions usually center on anti-Semitic theology and language in the Gospels. Nevertheless, comparatively little has been written about the impact of the Holocaust upon Christianity.

The Holocaust can be for some and perhaps should be for all Christians a second Reformation of both thought and doctrine. The "saints" of this second Reformation for me are Bishop George Bell and Reverend Dietrich Bonhoeffer. These two men wrestled with the evil of Nazism from the very beginning and did so from the foundation of their faith. Their legacy is a challenge but more so a source of hope for all people of faith.

Supported by: FURSCA, CIS in Meaning and Value



DANA LOBELLE, '03

Female Self-Description as Related to Self-Identification as a Feminist

Faculty Sponsor: Barbara Keyes

Majors: Psychology, English
Hometown: Georgetown Township, Mich.



The purpose of this research is to study the social changes that have occurred since 1960 in a new way. Other studies have correlated women's attitudes and beliefs about gender roles with their self-concepts,

but none have correlated level of feminist activism with self-description.

My study is designed to look at young adult women ages 18 to 24 and their mothers in terms of how they describe themselves, as a function of self-identification as a feminist. The data for this study was collected in Venice, Italy in the fall of 2001. The results will be analyzed during the spring semester 2002 both as an independent study and as a pilot for the self-description surveys developed in the summer of 2001. My senior thesis project will then ask American women to take the same self-description surveys, combined with an additional survey designed to determine involvement in the women's movement without asking for explicit self-identification as a feminist.

My hypothesis is that mothers and daughters will differ from each other in significant ways. I think that the daughters will use more words traditionally associated with men to describe themselves than will their mothers. However, I believe that, due to the widespread impact of the women's movement, there will be no significant differences between the self-descriptions of women who self-identify as feminists (or, as related to future research, are actively involved in the women's movement) and those who do not.

Supported by: FURSCA, Benjamin Gilman Scholarship for Off-Campus Study

KAMI MARSACK, '02 NATHANIEL SOWA, '03

Comparing Methods of Extracting DNA from Feathers of Nestling House Wrens (*Troglodytes aedon*)

Faculty Sponsor: E. Dale Kennedy

Kami Marsack, '02
Major: Biology
Hometown: Lenox Township, Mich.

Nathaniel Sowa, '03
Major: Biology
Hometown: Clifford, Mich.



Marsack



Sowa

Recent advancements in molecular biology have led to a relatively easy method for sexing birds using DNA. The CHD gene is found on the sex chromosomes (ZZ in males, WZ in females) of all birds except ratites. This gene can be amplified using the polymerase chain reaction (PCR) and used to sex both nestlings and adults. Many ornithologists use blood as a source of DNA in avian studies, but there

are a variety of potential problems in collecting, handling, and storing blood. Concerns about exposure to avian blood have increased recently with the introduction of West Nile virus. Feathers are more easily collected and less intrusive to take than blood and can be stored indefinitely at room temperature. Field ornithologists interested in sexing birds could benefit from development of a relatively quick, inexpensive, but reliable method of extracting DNA from feathers.

We compared three methods of extracting DNA from feathers of nestling house wrens for relative cost, time, and yield. The first method made use of Qiagen

DNeasy™ Tissue System Kits, to which we added DTT (to break down keratin). The second method, involving Chelex 100 and distilled water, is widely used for DNA extraction from a variety of tissues. The third and simplest method used phosphate-buffered saline (PBS) and distilled water. For all three methods, we used breast feathers plucked from ten-day-old nestling house wrens. After extraction, the CHD-1 gene was amplified by PCR, and the amplified gene from each extraction technique was run on agarose gels to determine sex. As compared with the DNeasy Kit and Chelex procedure, DNA extraction by PBS and water was less expensive and less time-consuming.

Supported by: FURSCA

JOHN R. McATEE, '02

The Magic of Web-based Database Systems

Faculty Sponsor: David Reimann

Majors: Computer Science, Economics and Management
Hometown: Clinton Township, Mich.



A common practice for professional entertainers is keeping track of clients and details of past performances. In my personal experience as a professional magician, I had at one point over ten

binders holding every piece of information about my past performances. With the advent of the Internet, I realized that there must be a more efficient method to keep track of an entertainer's business information.

Although rarely noticed by Internet users, the integration of databases into the Internet has substantially benefited Web users. Common Gateway Interface (CGI) allows Web pages to be created dynamically allowing customization of pages that would not be possible with static pages. Structured Query Language (SQL) database servers store data in a standardized fashion. One such



database server is MySQL. MySQL is the world's most popular open source database, designed for speed, power, and precision in mission critical, heavy load use. MySQL separates itself from its competitors because MySQL is free.

My research has led to the development of a product that has the potential to revolutionize how entertainers conduct business. This software uses MySQL, CGI, and the Perl programming language to hold all of the information an entertainer has regarding past performances and client information. Additionally, it can serve as a calendar. Most amazingly, the user has no software to install, as the product is 100 percent Web-based, allowing the user to access the information from any computer anywhere in the world. This business solution has the versatility to be equally useful for professionals in any field of entertainment.

KATIE McCABE, '02

Men Are from Mars, Genetic Counselors Are from Venus: Gender Segregation in the Field of Genetic Counseling

Faculty Sponsor: Molly Mullin

Major: Biology
Hometown: Allen Park, Mich.



With rapidly growing knowledge regarding the genetic components to disorders, the usage of genetic testing and genetic screening is likewise on the rise. Genetic counselors are increasingly

being used to interpret these test results, convey the information to patients, and provide any support or additional resources necessary. Although the demand for genetic counselors is growing, knowledge of the field as a possible career is often minimal, limiting the diversity of the field. A 2000 survey of the members of the National Society of Genetic Counselors showed that 94 percent of all genetic counselors are women.

In my Honors thesis, I examine gender segregation in the field of genetic counseling. I explore the qualities necessary for good genetic counselors, the presence of these qualities in women and men, and possible differences between male and female genetic counselors. I also consider the reasons for choosing a career in genetic counseling, the barriers to sex desegregation, and the implications of having a field comprised mainly of women. The gender makeup of genetic counselors is compared with that of other health care fields. The ideas for the thesis were explored using an ethnographic approach. I spent a summer interning with genetic counselors, which included observing genetic counseling sessions. Additionally, I interviewed the genetic counselors and received questionnaire responses from five others. I hold that men and women have the potential to be equally good genetic counselors, but men are discouraged from showing empathy, which is crucial in genetic counseling.

Supported by: FURSCA

EMILY McCARTHY, '02

An Integrated Eruption/Depositional Model of Ice-Volcano Sequences at Mt. Takahe, Antarctica

Faculty Sponsor: Thomas Wilch

Major: Geological Sciences
Hometown: Allen Park, Mich.



Rock thin section, hand sample, and field observations are integrated to characterize the depositional environments of Mt. Takahe, an active shield volcano in the Marie Byrd Land

Volcanic Province, West Antarctica. Mt. Takahe is of particular interest because of its implications for West Antarctic Ice Sheet (WAIS) history. Understanding the response of the ice sheet to climate change in the past will provide information about how the ice sheet may respond to future climate change.

Past field investigations suggest that the WAIS has grown and shrunk several times. Three large volcanic outcrops (approximately 1 x 2 km) show evidence of lava flows that were erupted into ice at an elevation of 400-600m above the present WAIS. The rock sequences contain both subaqueous (emplaced below ice level) and subaerial (erupted and emplaced above ice level) volcanoclastic rocks. Systematic descriptions of thin sections and hand samples indicate how changes in environment are reflected at micro- and macro-scales. The petrographic study focuses on quantifying the vesicularity, angularity, and grain size of volcanic rock fragments and characterizing alteration minerals in the rocks from the two depositional environments. Large outcrop maps that incorporate both field and lab observations have been created to assist in the visualization of the sequence of events surrounding Mt. Takahe.

Supported by: National Science Foundation

VALERIE McCARTHY, '02

Ab initio Potential Energy Surface of C₂O₄

Faculty Sponsor: Craig Bieler

Major: Chemistry
Hometown: Sterling Heights, Mich.



The purpose of this research project is to find a pathway for the creation and decomposition of 1,2-dioxetane-3,4-dione (**1**). (**1**) is an unstable intermediate in peroxyate chemiluminescence, and an understand-

ing of the properties of this molecule is crucial to understanding the chemiluminescence process. Past experimental investigations have not been able to isolate this molecule. Gaussian 98 was applied to (**1**) first using the Hartree-Fock level of theory and then the B3LYP density functional method. The energy of the molecule was calculated as the C-C and O-O bond lengths were manipulated, and a three-dimensional PES



was then created to visualize the decomposition energetics. It is found that the transition state is a 'butterfly' structure and the decomposition products are two carbon dioxide molecules. This finding suggests that the molecule may dissociate first by breaking the O-O bond, then by breaking the C-C bond.

Supported by: FURSCA

WHITNEY McCLENEGHAN, '05 BENJAMIN RIEGLER, '04

Measuring Economic and Gender Change in Albion, Michigan, 1840-1880

Faculty Sponsor: Thomas Chambers

Whitney McCleneghan, '05
Majors: History, Anthropology
Hometown: Park Ridge, Ill.

Ben Riegler, '04
Major: History
Hometown: Crystal Lake, Mich.



McCleneghan



Riegler

In 1880 the city of Albion was distancing itself from its agrarian and rural traditions and moving closer to an industrial-mercantile based economy. We set out to measure the economic changes and how they affected gender roles and relations in the city of Albion, Michigan from the year 1840 to the year 1880. Last semester Dr. Chambers' Gender and the Market Revolution class compiled and

analyzed the original census data for Albion from 1840 and 1880 and compared and contrasted the results with their knowledge of the change in gender roles occurring across America at the time. The class entered

the data into Excel and then analyzed it using the SPSS statistical analysis program.

We concluded that men in Albion were still working in much greater numbers than the women in 1880, although some women were beginning to work outside of the home. Examples include dressmakers, chambermaids, servants, teachers, and milliners, jobs that were highly gendered and reminiscent of the work that many women continued to do inside the home. The 1880 census also shows a marked decrease in the number of individuals working in agriculture, showing the shift away from an agrarian economy that was happening in Albion at that time. The number of unskilled laborers and also commercial dealers and shop-owners increased greatly in the 1880 census at the same time that the number of farmers and farm laborers decreased. The changing world of work was not accompanied by any sea change in distribution of civil status or average age of first marriage. The great majority of men and women who were of marrying age were married, and the marrying age remained relatively young.

SHANNON McKENNY, '02

DNA Evidence for the Origin of *Mecranium latifolium* (Melastomataceae), a Puerto Rican Endemic

Faculty Sponsor: J. Dan Skean

Major: Biology
Hometown: Marquette, Mich.



Mecranium latifolium (Cogn.) Skean is a shrub or small tree in the melastome family that is endemic to Puerto Rico. It is suspected that it originated as a peripheral isolate of a Hispaniolan

species in the *Mecranium multiflorum* complex. In order to test this hypothesis, fieldwork was conducted on Hispaniola to obtain silica-gel-dried leaf specimens of members of the complex [*M. multiflorum* (Desr.) Triana, *M. integrifolium* (Naudin)

Triana, *M. septentrionale* Skean] and other species in the genus *Mecranium* J.D. Hook. [*M. acuminatum* (DC.) Skean, *M. amygdalinum* (Desr.) C. Wright, and *M. puberulum* Cogn.], as well as species in the sister genus *Sagraea* DC. [*S. fuertesii* (Cogn.) Liogier, and *S. scalpta* (Vent.) Liogier]. *Meriana involucreta* Naud. was collected to use as an out-group. DNA from *M. latifolium* was obtained during previous fieldwork on Puerto Rico. DNA was extracted using commercial kits from Qiagen. Standard primers were used to amplify ITS regions. Sequences were aligned using Sequencher 3.0 and used in cladistic analyses with PAUP v. 4.0b6 to form trees illustrating the phylogenetic relationships of the species. Although the ancestor of *M. latifolium* cannot be known with certainty, it appears that *M. multiflorum* and *M. septentrionale* are the two most likely candidates.

Supported by: FURSCA, A. Merton Chickering Professorship

KURT MEDLAND, '02

Framing the Conflict: Establishing an Ethical Hierarchy for the Israeli-Palestinian Peace Process

Faculty Sponsor: Bindu Madhok

Majors: Political Science, Philosophy
Hometown: Lapeer, Mich.



The Israeli-Palestinian peace process is one of the most intractable international relations questions of our time. Traditional methods of negotiation have led to some short-

term success, but ultimately have failed to bring everlasting peace to Israel and Palestine. My goal is to develop a new ethical hierarchy that can be used as a framework for continuing negotiations, a framework that will help protect the rights of all while favoring none.

This framework will be derived from the work of Abraham Maslow and his Hierarchy of Needs, with support from an exercise



performed by the Great Lakes Jerusalem Program in the fall of 2000. It will rank rights for the purpose of solving the rights conflicts that plague the peace process.

The second key goal of my thesis is to describe the implementation of an ethically justified hierarchy in Israeli and Palestinian society. As it stands, such a hierarchy will not solve the Israeli-Palestinian problem. In fact, it needs expert negotiators to internalize and use it during talks. This internalization process is key to the success of the framework.

I do not pretend to be able to solve the Israeli-Palestinian conflict with this project. Instead, I simply seek to create more meaningful conversations between the two parties, with the hope that some time in the near future sustainable peace can be achieved.

MARGARET MENOCH, '02

(See Paul Garabelli, '02, Kimberly Illg, '04, Margaret Menoch, '02)

DOUGLAS MEYER, '02

Believing Is Seeing: Constructing Gender in Film

Faculty Sponsor: Mimi Schippers

Majors: Sociology, Political Science
Hometown: Grand Haven, Mich.



The goal of this project is to discover the extent to which individuals use beliefs about gender when interpreting film. It is also an examination of the ways in which film images can reflect, distort,

confirm, or challenge these societal gender beliefs and how individuals respond to these differing images. One primary area of interest, for example, is the manner in which respondents react to violence depending on the gender of the individual. Each respondent is part of a focus group, in which he/she will answer questions regarding his/her established gender attitudes and with respect

to his/her interpretation of two different films. Because of the study's focus on how individuals rely on societal gender beliefs in order to better understand onscreen images, the showing of two thematically different films, with regard to their ideas about gender, is necessary. A textual analysis, independent of the respondents in the focus group, is also completed. In order to identify the respondents' established beliefs about gender, quantitative survey methods are used. Furthermore, qualitative data are used to connect an individual's ideas about gender with his/her reading of the film. Finally, this project analyzes the gender attitudes of each individual respondent and how those beliefs correspond to his/her reading of the films.

Supported by: FURSCA

LINDSAY MILLER, '02

The Analysis of the Effects of Benzamil, EGTA, and N^w-nitro-L-arginine methyl ester (L-NAME) on the Blood Pressure of Sprague-Dawley Rats

Faculty Sponsor: Susan Klarr

Major: Biology
Hometown: Plymouth, Mich.



Conventionally, studies have focused on the role that sodium ions play in the facilitation of hypertension. In contrast, this study focused on the involvement of calcium ions.

Specifically, we looked at how calcium ions affect blood pressure by interacting with nitric oxide synthase (NOS), a calcium-dependent enzyme. Nitric oxide is a molecule released by endothelial cells that stimulates vasodilation, which in turn leads to a decrease in blood pressure. It has been shown that animals treated with an inhibitor of NOS, N^w-nitro-L-arginine methyl ester (L-NAME), undergo a significant increase in blood pressure. We hypothesized that inhibition of calcium by EGTA administra-

tion would mimic this condition while administration of benzamil, a blocker of Ca⁺⁺ efflux, would attenuate the increase in blood pressure. In this study, Sprague-Dawley rats were used to examine the effects of administering these three drugs to the lateral ventricle of the brain through intracerebroventricular infusion for fourteen days. Systolic blood pressure was measured using a tail cuff.

EGTA and L-NAME infusion did increase blood pressure compared to control rats; however, only the increase in the L-NAME group was significant. By day fourteen, the average systolic blood pressure of the control group was 121.85 mmHg and the EGTA group was 126.00 mmHg, whereas the L-NAME group was 136.17 mmHg. Contrary to our hypothesis, benzamil administration did not significantly lower blood pressure in either group. The L-NAME with benzamil group increased to 135.7 mmHg, and the EGTA with benzamil group increased to 125.48 mmHg by day fourteen.

Supported by: FURSCA-Kresge Fellowship

ALYSSA MONTGOMERY, '04

(See Elizabeth Kenyon, '02, Alyssa Montgomery, '04)

KATHERINE NIESEN, '05

Comparison of Song Patterns in House Wrens

Faculty Sponsor: E. Dale Kennedy

Major: Biology
Hometown: Lapeer, Mich.



House wrens sing complex songs made up of two parts: a relatively low-amplitude introduction and a relatively high-amplitude terminal section. The terminal section generally consists

of repeated syllables, or trills. Previous studies on wrens have found that neighbors



often share more syllables than do birds separated in space. I used AviSoft SASLab Pro to examine trill syllables found in songs recorded in 2001 from twelve house wrens in Albion, Mich., and three wrens from near Normal, Ill. For each bird in this study, I examined the pattern of trill syllables found in ten consecutive songs. I made a library of syllables, primarily using shape, frequency, and length to distinguish different syllable types. I examined overlap in sharing of trill syllable types among different birds and sequences of identical syllable types in songs.

Individual birds sang between 2 and 5 trill syllable types, with a mean of 2.9 types. All syllable types found among the birds in Illinois were also found among birds in Albion. The total number of trill syllables per song ranged from 4 to 17, with a mean of 10.1. At least twenty different song types (combinations of trill syllables) were given, with the most common type sung at least once by five birds, including a bird from Illinois.

Supported by: Student Research Partner Program

JULIA OGG, '02

The Effect of Ginkgo Biloba on Acquisition of Spatial Alternation in Rats

Faculty Sponsor: W. Jeffrey Wilson

Majors: Psychology, Biology
Hometown: Clare, Mich.



Previous research has suggested that ginkgo may have an enhancing effect on memory in healthy and non-healthy subjects. This study focused on examining these claims by looking at the effect of ginkgo

on the acquisition of a spatial alternation task in rats using a phi-maze. This task measures both memory and decision-making. Rats were administered either no ginkgo, a low dose of ginkgo, or a high dose of ginkgo beginning five days before and continuing

throughout the behavioral sessions. Acquisition was evaluated by various time and accuracy measures. It is hypothesized that rats on ginkgo, especially at the high dose, will acquire the maze task more rapidly and accurately than the rats receiving no ginkgo. Elevated decision-making speed is also hypothesized for the rats on ginkgo.

Supported by: FURSCA

MADOLENE PAGE-WOOD, '02

Palestinian Perceptions of the Holocaust

Faculty Sponsor: Geoffrey Cocks

Majors: Holocaust Studies, Religious Studies
Hometown: Portage, Mich.



The premise for my research is a result of my semester study abroad in Israel-Palestine in the fall of 2000, where I encountered various attitudes within the Palestinian population

regarding the Holocaust. This thesis looks at the variety of attitudes toward the Holocaust held by various Palestinians, from official statements of the PLO to the comments of average Palestinian civilians, and it frames these attitudes within the context of the Israeli-Palestinian conflict. Because a number of the Palestinian attitudes reported in this thesis fall within the realm of anti-Semitism and Holocaust denial, the subject of Holocaust denial is also seriously discussed. Certain Palestinian attitudes are contrasted against the trends of Holocaust denial among other groups and movements, as the unique relationship between the Palestinians and the Jewish population of Israel stands as an integral element in shaping the assorted Palestinian perceptions of the Holocaust.

SARAH PIKE, '04

(See Alicia Costas, '03, Anne DaFoe, '02, Emily Deveau, '04, Shari Gross, '04, Kimberly Hiatt, '02, Sarah Pike, '04)

SARAH PIKE, '04

The Search for the Truth: Thomas Jefferson and Sally Hemings

Faculty Sponsor: Thomas Chambers

Major: History
Hometown: Indianapolis, Ind.



This presentation will encompass the long asked and debated question of whether or not Thomas Jefferson and his slave, Sally Hemings, had children together. The range of materials and

information I uncovered while conducting research includes information on the life of Jefferson, his immediate family, and his slaves. I utilized a great deal of work by other historians, from older scholarship to the most recent DNA evidence, and determined that the truth behind whether or not Jefferson had a liaison with one of his slaves still remains unknown.

I feel that through this presentation I am not justifying the actions that a great man may or may not have taken. I am confirming that, even if he did have a liaison, he was still the man who helped write part of the Declaration of Independence and helped to form our great nation. I do not condone the fact that he owned slaves and yet wrote, "All men are created equal." Nevertheless, this man deserves to be honored for his contributions and not be tarnished for his human failings. Regardless of what really happened, Jefferson is not any less of the man he was. He was just as human as the rest of us.

**NATHAN PIWOWARSKI, '02****Reintegrating the Estranged Nation-State: Applications in Antebellum America**

Faculty Sponsor: Andrew Grossman

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

The nation-state lies at the center of contemporary political inquiry, as it has been the dominant form of government during the nineteenth and twentieth centuries. Our understanding of the

state largely relies on the work of the German sociologist Max Weber and those who have rearticulated his work in the New Institutionalism. This study finds that the New Institutionalism reads Weber selectively, analytically pulling the state out of the rich web of social relations in which it operates. Doing so limits social scientists' understanding of the total capabilities and limitations of the state. Antebellum American expansion policy, and U.S. policy during the Mexican War in particular, is utilized to illustrate this shortcoming while providing a richer understanding of Weber's work.

Supported by: FURSCA; CIS in History and Culture; Institute for Humane Studies, Arlington, Va.

BENJAMIN RIEGLER, '04

(See Whitney McCleneghan, '05, Benjamin Riegler, '04)

SHEILA SANTA, '02**A Survey of Stalked Ciliates (Peritrichia) from Lake Winnipeg, Calhoun County, Michigan**

Faculty Sponsor: Ruth Schmitter

Major: Biology
Hometown: Columbus, Ohio

Phytoplankton and zooplankton communities were studied from Lake Winnipeg, Calhoun County, Michigan. The study examined the attachment patterns and seasonal cycling of different species of

stalked ciliates, family Peritrichia. Peritrichs were collected by standard water sampling techniques using a 26-micrometer mesh plankton net and from surfaces of certain species of attached aquatic plants. Identifications were made by using compound light microscopy and recording data with digital imaging. The genus *Vorticella* was the most abundant and displayed unique attachment patterns, being found most frequently on the cyanobacterium *Anabaena*. Members of the genus *Vorticella* were also found on copepods, diatoms, other cyanobacteria, detritus, and so forth. In some cases, no attachment was evident. The branched peritrichs *Epistylis* and *Carchesium* were also present, as was the unstalked *Trichodina*. Lake Winnipeg supports diverse species of *Vorticella* and other peritrichs.

Supported by: FURSCA-Robson Fellowship, Biology Department

ELISE SCHULTZ, '02**The Study and Optimization of the Photochemical Oxidative Polymerization of Pyrrole**

Faculty Sponsor: Craig Bieler

Major: Chemistry
Hometown: Saginaw, Mich.

Of the many ways that the conductive polymer polypyrrole can be synthesized, the use of light-induced polymerization holds promise as a simple, easy way to create conducting films.

In an effort to understand and optimize the conditions under which this synthesis can occur, we studied the solvents, concentration, and the wavelength of light necessary to create a conductive polymer. It was found that the reaction proceeds by a solvent-induced electron transfer process that initiates the polymerization. Additionally, the conditions under which the synthesis takes place were varied to maximize product yield, conductive quality, and material stability. The reported solution phase synthesis produced insoluble polypyrrole. Current work is directed toward creating direct surface coatings using this method.

Supported by: FURSCA-Hyde Fellowship, Chemistry Department



THOMAS SIKMA, '02

Human Assessment of Computer Monitor Fidelity

Faculty Sponsor: David Reimann

Majors: Computer Science, Psychology
Hometown: Roselle, Ill.



The increased use of computers in medicine has made possible new ways of displaying medical images. While the cathode ray tube is the most common device for the display of computer images,

other forms of display such as liquid crystal displays are becoming increasingly popular.

A display's performance is affected by several factors, with the number of bits used to represent the image, ambient lighting, and the luminosity range of the display having the biggest influence in the presentation of an image. In medical imaging it is important that very subtle variations of images be clearly seen. Failure to see a clear image can cause a misdiagnosis, which in turn can be costly to both the physical and fiscal health of the patient. Using a program created in Java, the just-noticeable difference of computer monitors is studied as a function of the factors described above using four-choice forced tests. These tests present a 256-bit grayscale sinusoidal pattern to the user in which the visibility of successive changes to the display factors is determined.

Preliminary results indicate that the visibilities of the presented patterns are matched by theoretical visibility predicted by the physical factors of the display. Through this research, it is hoped that better ways to ensure the highest possible image quality in medical image display systems can be developed.

BRADFORD SLAUGHTER, '02

Comparison of a Cedar Swamp and a Tamarack Swamp at Pierce Cedar Creek Institute, Barry County, Michigan, with an Annotated Checklist of Vascular Plant Species

Faculty Sponsor: J. Dan Skean

Major: Biology
Hometown: Walker, Mich.



Vascular plant species composition, standing water, and soil pH were measured for two different swamp communities at the Pierce Cedar Creek Institute, a 258-hectare property

located ca. 12 km S of the city of Hastings. In each community a 4900 m² plot was established in which vegetation was sampled using the point-quarter method and 1m² quadrats for woody and herbaceous species respectively. Woody vegetation was sampled in September and October 2001. Herbaceous vegetation was sampled in May and July 2001 to observe spring and summer seasonal changes.

In the cedar swamp, the three woody species with the highest importance values [rel. density + rel. frequency + rel. coverage] were *Thuja occidentalis* L. (152), *Fraxinus nigra* Marsh. (60.8), and *Betula alleghaniensis* Britton (32.0). In the tamarack swamp the three woody species with the highest importance values were *Larix laricina* (DuRoi) K. Koch (106), *Ulmus americana* L. (70.9), and *Toxicodendron vernix* (L.) Kuntze (19.6). The standing water in May averaged 2.7% in the cedar swamp and 58.5% in the tamarack swamp (p<0.01) and in July averaged 9.8% and 36.8% respectively (p<0.05). The pH values averaged 6.95 in the cedar swamp and 6.97 in the tamarack swamp and were not different statistically.

Specimens of vascular plants were collected from the plots and surrounding Institute property from April 1999 to October 1999, and again from May 2001 to

October 2001. A total of 558 collections, representing 388 species and infraspecific taxa were made, including 18 free-sporing tracheophytes, seven conifers, and 363 angiosperms.

Supported by: FURSCA, The Willard G. Pierce and Jessie M. Pierce Foundation, A. Merton Chickering Professorship

ALEXIS SNYDER, '04

Divas of the American Musical Theatre

Faculty Sponsor: Robert AuFrance

Major: Theatre
Hometown: Coldwater, Mich.



With her rendition of "There's No Business Like Show Business" in Irving Berlin's classic musical, *Annie Get Your Gun*, Ethel Merman not only executed one of the greatest performances in American

musical theatre, but she also facilitated the evolution of the role of the female artist in contemporary musical theatre as well as becoming an icon of musical theatre through her vocal style and larger-than-life image. Along with Mary Martin, Julie Andrews, and Gwen Verdon, Merman nurtured, defined, and embodied the role of the American musical diva. This brief presentation will examine the lives of these women, their major roles, and their contributions to and lasting impact on American musical theatre as we know it.

Supported by: FURSCA

NATHANIEL SOWA, '03

(See Kami Marsack, '02, Nathaniel Sowa, '03)

**HOLLY SPRUNGER, '02****Emotional Expression Recognition**

Faculty Sponsor: Michael Anes

Majors: Psychology, Speech Communication
Hometown: Hudson, Mich.

The purpose of this study was to look at the effects of motion and inversion on emotional expression recognition. We investigated three expressions (anger, smile, and surprise), two

orientation conditions (upright and inverted), two presentation conditions (moving or static), and five positions throughout the visual field (which were collapsed over three positions—central, near, and far). In this study, subjects viewed a set of randomized movies and made decisions about the emotional expressions being displayed by using key presses. Results showed that, in general, anger was more difficult to identify than happiness and surprise, and motion only helped the identification of happiness. Additionally, inversion depressed accuracy, and recognition suffered in the periphery for all emotions. New directions for the research along with problems we encountered will be discussed.

Supported by: FURSCA

ANNE STARR, '03**Gender and Mark Twain**

Faculty Sponsor: Hal Wyss

Majors: English, Secondary Education
Certification
Hometown: Albion, Mich.

Many of Mark Twain's female characters—Aunt Polly, Aunt Sally, Miss Watson, Widow Douglas, and Becky—are rather flat, stereotypical beings. These women are usually

too old or too young to be sexual, and most act in the capacity of the moral reformer of men. Some critics would argue that Twain broke this mold with his character of Sandy in *A Connecticut Yankee in King Arthur's Court* and Roxy in *The Tragedy of Pudd'nhead Wilson*. Unlike the Aunt Polly's and Aunt Sally's, both Sandy and Roxy are young, beautiful, and sexual. Both of these women are main characters in the stories, but I argue that Twain was unable to sustain these unique characters. Sandy ends up married, maternal, and moral reformer of her husband, and Roxy ages so quickly that she slips into the non-sexual realm and ends up helpless to support herself.

It isn't until Eve of Twain's little-known book, *Eve's Diary*, that Twain breaks his mold and creates a unique female character who stands in stark contrast to his typical female characters. Eve maintains the role of main character throughout this story. She is young, sexual, intelligent, and has emotional depth clearly lacking in Adam. When asked what he thought of *Eve's Diary*, Twain remarked, "A gem if I do say so myself."

Supported by: FURSCA

EMILY THOMPSON, '02**I Keep My Ghosts**

Faculty Sponsor: Daryl Murphy

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

My thesis is experimental fiction through which I work away from plot and focus more on structure. It's a story of loss, discovery, and acceptance. By re-visiting her most painful losses and

analyzing the boundaries between life and death, the narrator discovers what it means to stand alone and be alive, happily.

JENNIFER TOBIN, '03**Designing a LabVIEW Program to Determine the Electrical Properties of New Superconducting Materials**

Faculty Sponsor: David Seely

Major: Physics, Chemistry
Hometown: Middleville, Mich.

Superconductivity has the ability to revolutionize the distribution of energy in the form of electrical power. The negligible resistance in superconductive materials makes them much more

efficient than existent materials as carriers of electricity. Currently, materials found to be superconductive do so at low temperatures (near or below the boiling temperature of liquid nitrogen, 77K). A cryocooler is a mechanical device with the ability to reach and maintain these low temperatures using compressed helium gas. In a cryocooler, superconductivity was measured through a



four-terminal reading on the sample (current, voltage, voltage, current).

LabVIEW (a graphical programming language) was used to develop a program to control the temperature, evaluate the amount of current applied to and forced through the superconductive film sample, and measure the voltage across the sample. These values were stored in LabVIEW, transformed into resistance readings, and stored in data files. The program was customized to provide a sufficient density of recorded and plotted values during the abrupt resistance decrease that occurs at the superconducting transition temperature, T_c , below which the resistance is zero.

Data were taken for a thin film sample of irradiated Hg1212/LaAlO₃ that yielded a T_c of 113.142 K when cooling and a T_c of 114.015 when warming due to thermal hysteresis. When compared to data of the sample before radiation, it was found that resistance had increased in the irradiated sample at comparable temperatures. After radiation, the T_c was lowered from 117.55K to 113.142K.

Supported by: FURSCA-Bethune Fellowship, U.S. Department of Energy-Energy Research Undergraduate Laboratory Fellowship

NATHANIEL WARREN, '02

The European Union and Spain: The Effect of European Economic Integration on Industrial Development in Border Regions of Spain

Faculty Sponsor: Hendrikus Brand

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



The idea of a united Europe has existed for many centuries. However, until the early 1950s, military conquest had been the only method that was used in attempts to unite Europe. Since the early 1950s,

most of Europe has evolved into what is known today as the European Union (EU). To achieve this unprecedented level of unifica-

tion Europe has used a community method for integration. The basic principles that compose the community method are the key to why Europe has been able to integrate successfully into the European Union. The finality of the EU would be a United States of Europe, which would be similar in structure to the United States of America.

From an economic perspective, the EU provides many exciting possibilities. International trade and economies of scale are two economic principles that are central to the EU. In theory, both principles demonstrate the possible benefits that can be realized by countries that are members of the union. My objective is to test the theories underlying these principles through an empirical analysis. To do this, I will use a case study that involves Spain and its border regions with Portugal and France. By using a traditional contiguity analysis and a Core, Adjacent, Periphery model for regions, I will show that industrial integration has occurred within these border regions. In doing this, I will be able to draw conclusions for the credibility of theory supporting international trade and the level of economic success that is inherent in the EU.

JENNIFER WOLF, '02

Gas Chromatography/Mass Spectrometry Analysis of Pesticide and PCB Loads in Lake Trout Embryos, *Salvelinus namaycush*

Faculty Sponsor: Richard Mortensen

Major: Biology
Hometown: Sterling Heights, Mich.



Previous studies have linked chemical contamination, such as pesticides and PCBs (polychlorinated biphenyls), to developmental abnormalities and reproductive failure in aquatic, avian, and mammal species. This study focuses on the reproductive failure of lake trout in the Great Lakes and a common developmental abnormality called blue-sac syndrome.

Blue-sac syndrome is a fatal abnormality characterized by the gross edema of the yolk sac. Microscopic analysis reveals lesions in the circulatory system and underdeveloped renal, nervous, muscular, and gastrointestinal systems. The outward symptoms of blue-sac occur two weeks before hatching.

In conjunction with U.S. Department of Fish and Wildlife Services of the Department of the Interior in Ann Arbor, Mich., lake trout eggs were removed from sexually mature female adults in Sturgeon Bay, Lake Michigan, and fertilized with sperm from mature male adults. The embryos were raised and monitored daily in incubation trays. Samples were taken periodically for histological and chemical analysis.

Histological analysis showed the characteristic signs of blue-sac syndrome in blue-sac fry, while the normal fry did not show any microscopic abnormalities. Chemical analysis was done by extracting pesticides and PCBs from the embryos. The extracted chemicals were then run through mass spectrometry/gas chromatography to quantify the type and amount of chemical present in the embryos. The chemical analysis displayed a large number of pesticides and PCBs in the embryos.

Supported by: FURSCA

MIRA WOOD, '02

(See Angela Baeckeroot, '04, Mira Wood, '02)

JULIE WOOLWORTH, '02

(See Sarah Greko, '02, Julie Woolworth, '02)



JASON WORMS, '02

British Colonial Economic Policy and Its Effects after Independence in Africa

Faculty Sponsor: Robert Ankli

Major: Economics and Management
Hometown: Hillsdale, Mich.



My thesis looks at economic policies enacted by Great Britain during the colonial era in Africa, and how those policies affected three colonies, Ghana, Nigeria, and Zambia, after they

achieved independence. Four distinct policies are analyzed for each country: the use of marketing boards, the policy of industry diversification, the education policies for the Africans, and the import and export policies of the colonial era. The overarching goal of the thesis is to determine if these policies contributed to the decline of these countries after they gained independence, or fostered their indebtedness to Europe and the United States.

JESSICA ZAMBORSKY, '02

The Effect of Parental Involvement on the Social and Behavioral Development of Disabled and Non-Disabled Preschoolers

Faculty Sponsor: Jamie Walter

Majors: Psychology, Sociology, Human Services Concentration
Hometown: Rochester Hills, Mich.



In many ways, parents influence their children's social and emotional development, either directly or indirectly. In particular, parents who feel more stress in the parenting role and

are less involved in their child's preschool experience may influence the child's adjustment to the preschool. These parenting factors may be particularly important for disabled children.

This study examined the role of parental stress and parental involvement on the social and emotional functioning of preschoolers with and without developmental disabilities. Three measures were used to investigate this effect. Teachers completed the Social Competence and Behavioral Evaluation—Preschool Edition (SCBE). Parents completed two questionnaires: the Parenting Stress Index (PSI) and the Family Involvement Questionnaire (FIQ).

It was hypothesized that parents of developmentally disabled children would have higher levels of parental stress compared to parents of preschoolers without developmental disabilities. In addition, it was hypothesized that parents with higher levels of involvement in their child's preschool would score higher on the SCBE summary scale of social competence. Finally, it was hypothesized that social competence could be predicted by parental involvement and parental stress, regardless of whether the

child is disabled or non-disabled. Results are discussed in terms of implications for practice in preschools that service a disabled population.

Supported by: FURSCA

JENNIFER ZINK, '02

JFK and The Camelot Myth: Its Significance in Michigan

Faculty Sponsor: Wesley Dick

Major: History, Public Policy Concentration
Hometown: Edgewood, Ky.



For the past forty years, people have viewed John F. Kennedy as the first member of the royalty of America. With his charming personality, flashing looks, and beautiful family, Kennedy's presi-

dency has been christened the "New Camelot." In many aspects, such as his personal life, his ideals, and his goals for the nation, he can be directly compared to King Arthur. Yet, how much of this image is true, and how much was fabricated by his advisors, friends, and family?

My research takes a critical look at the "reign" of John F. Kennedy, using the state of Michigan as a case study. With its concentration of African-Americans and union workers, Michigan became an important focal point for the Kennedy campaign. My thesis explores the responses of the Michigan voters, interest groups, and press to JFK's candidacy and presidency; it also evaluates Kennedy's response to Michigan.

Supported by: FURSCA, CIS in History and Culture



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 became athletic director at University of the Pacific and retired there in 1984. He now lives in Kalamazoo, Mich., 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 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.

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