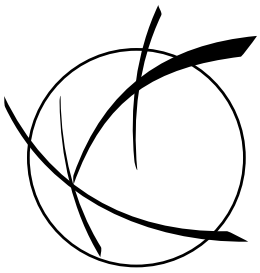
Elkin R. Isaac

Research Symposium



Honoring Outstanding Student Research

Symposium Sponsors

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Albion College

2001

The Twelfth Annual Elkin R. Isaac Student Research Symposium

Albion College
April 18-19, 2001

Schedule of Events

Wednesday, April 18, 2001

7:30 p.m.

The Elkin R. Isaac Lecture: John N. Vournakis, '61
"Serendipity—Just Plain Old Luck"

Welcome: President Peter T. Mitchell, '67
Opening Remarks: Elkin R. Isaac, '48
Speaker Introduction: Thomas G. Schwaderer, '56
Bobbitt Visual Arts Center Auditorium

Thursday, April 19, 2001

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 4-5.

Social Sciences Forum #1
Norris Center 103

Social Sciences Forum #2
Norris Center 108

Humanities and Fine Arts Forum
Bobbitt Visual Arts Center Auditorium

Natural Sciences and Mathematics Forum
Olin Hall 112

10:40 a.m.-Noon

Honors Convocation
Goodrich Chapel

1:15-3:15 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: Doris Kearns Goodwin
"The Moral Authority of the Presidency"

Welcome: Peter T. Mitchell
Remarks: Brigitte Dubois
Speaker Introduction: Myron A. Levine
Goodrich Chapel
Immediately following the address, a reception and book-signing will be held in the Kellogg Center.

The Elkin R. Isaac Lecture

John N. Vournakis, '61

A teacher and researcher of distinction, John Vournakis has published more than 150 research articles in the fields of biophysics, molecular biology, and biotechnology, and is an inventor on over 15 U.S. and foreign patents. After graduating from Albion, he continued his education at Cornell University, earning his M.S. and Ph.D. in biophysical chemistry in 1966 and 1968, respectively.

From 1970 to the present, Vournakis has held faculty appointments at several of the nation's most prestigious colleges and universities. After a year on the Amherst College faculty, he served at Syracuse University from 1973 to 1985 as assistant, associate, and full professor of biochemistry. From 1985 to 1988, he was professor of biology and director of the Molecular Genetics Center at Dartmouth College in Hanover, N.H. He left academia to become a senior executive in the biotechnology industry from 1988 to 1992 and returned to teach again at Dartmouth from 1992 to 1995. In 1995 he became a professor of medicine and associate director for the Hollings Cancer Center, Medical University of South Carolina (MUSC).

In 1992 Vournakis co-founded Marine Polymer Technologies, Inc., a start-up medical products company. He is the inventor of a polymer-based technology that has led to several FDA-approved products, including the SyvekPatch hemostat used for the rapid control of bleeding following medical procedures such as cardiac catheterization.

Vournakis was a predoctoral and postdoctoral Fellow of the National Institutes of Health, a National Academy of Sciences USA Fellow (1968), a European Molecular Biology Organization Fellow (1970), and received a National Science Foundation Senior Research Associate Award (1972-75). He currently holds six editorial positions, including editor of the *Genetic Engineering News,* and serves on the Hollings Cancer Center Board and the MUSC Foundation for Research Development. He is a member of the Tsintzina Society board and of the Greek Orthodox Church.

Vournakis received a Distinguished Alumni Award in 1996. He lives in Charleston, S.C., with his wife, Karen Munro Vournakis, '66. They have one son, Christopher.

Symposium Keynote Address

Doris Kearns Goodwin

Historian/author Doris Kearns Goodwin is acclaimed for her unique ability to illuminate the drama and the reality of the life and times of some of the twentieth century's most powerful figures. Her four books on Lyndon Johnson, Franklin and Eleanor Roosevelt, the Fitzgerald and Kennedy families—and herself—have won numerous awards and have made the *New York Times* bestseller list. Three have been or will be made into full-length movies.

Goodwin worked as an assistant to President Lyndon Johnson during his last year in the White House. The relationship lasted for the rest of Johnson's life, with Goodwin later assisting Johnson with his memoirs. A 10-year stint as professor of government at Harvard University, teaching a course on the American Presidency, led Goodwin to write *No Ordinary Time: Franklin and Eleanor Roosevelt: The American Homefront in World War II,* which won the 1995 Pulitzer Prize for history.

Along with politics, Goodwin is passionate about baseball, a lifelong obsession detailed in her bestselling memoir, *Wait Till Next Year,* described by the *Washington Post* as being "in the grand tradition of girlhood memoirs, dating from Louisa May Alcott to Carson McCullers and Harper Lee." Goodwin was a consultant for Ken Burns' PBS documentary, "The History of Baseball" and counts among her accomplishments being the first woman to enter the Red Sox locker room.

Goodwin writes regularly on politics and baseball, and often shares her views on such programs as "The News Hour with Jim Lehrer" and NBC and MSNBC news broadcasts.

A former Woodrow Wilson Fellow, Goodwin is also a winner of the Charles Frankel Prize from the National Endowment for the Humanities and the Sara Josepha Hale medal. A graduate of Colby College, Goodwin earned her doctorate at Harvard University.

Schedule of Presentations—Thursday, April 19, 2001

SOCIAL SCIENCES FORUM #1—Norris 103

8:30	My Lien (Keyes)	The Salience of Gender and Racial Cues on Children's Choice of Playmates: A Developmental Analysis
8:45	Lisa Schultz (Otto)	Resolving Organizational Conflict: The Effects of Rational versus Emotional Decision-Making
9:00	Angela Pierce (Franzen)	Evaluating the Effectiveness of Teenage Pregnancy Prevention Programs
9:15	Stacy Warner (Haugh)	The Effects of Media Presentation and Past Experience on Attitudes toward Mental Retardation: A Comparison of Video and Written Works
9:30	Jillian Weiss (Anes)	The Effect of Emotional Script Content on Memory
9:45	Lacey Sischo (Schippers)	How Fraternities Shape Gender Relations on the Albion College Campus
10:00	Elizabeth Kulhawik (Haugh)	Perceptions of Health, Stress, and Social Support
1:15	Chandra Thomas (Otto)	Judging a Book by Its Cover: Exploring How Ethnic Names Influence Employer Perceptions
1:30	Laura Gambone (Keyes)	When to Leave: Factors That Affect Women's Decision-Making in Domestic Violence Situations
1:45	Sheila Johnson (Schippers)	What's a "Normal" Girl? The Effects of Gender and Race on Labeling Adolescent Girls "At Risk"
2:00	Kelly Janowski (Barry)	How Conscious Are You? Gender and Media Literacy in College Students
2:15	Heidi Schurman (Franzen)	A Passion for Fashion
2:30	Heather Heintz (Cline)	Long-Term Effects of Hospitalization on the Development and Well-Being of Premature Infants
2:45	Jason Aagenas (Haugh)	Self-Reported versus Actual Problem-Solving Ability
3:00	Carolyn Winterich (Wilson)	Runway-Based Classical Conditioning

SOCIAL SCIENCES FORUM #2—Norris 108

8:30	Zachary Kleinsasser (Cocks)	Awareness Is Action: Rescuers of Jews during the Holocaust
8:45	Lynsey Kluever (Franzen)	Volunteerism in America
9:00	Tiffany McCall (Keyes)	Self-Perception of Children in Rural Kenya: A Developmental Analysis
9:15	Brigitte Dubois (Mullin)	Museum Education in the United States: Providing for a Diverse Public
9:30	Elizabeth Wood (Franzen)	Sheilas in Modern-Day Australia
9:45	Abigail Lindemood (Keyes)	An Analysis of Student and Alumni Giving
10:00	Isaac Kremer (Dick)	Albion, Michigan: Development and Challenge
1:15	Erik Love (Berkey)	The Changing Performance of Masculinity in Contemporary Israel: The Effects of Post-Zionism
1:30	John Molenda (Mullin)	Hong Kong since 1997: Current Views and Ideas
1:45	Nicole Schmeiser (Steinhauer)	Periphery versus Center: Migration of Industry in Spain and Its Cultural Impact
2:00	Yvette Girard (Perusek, Grossman)	The Industrialization of Detroit
2:15	Herman Blacksher, Andrea Smith (McCarley)	An Econometric Model of the Labor Force Participation Rate of Women for the Period 1970-2000
2:30	Tonya Zimmerman (Schippers)	The Effect of Off-Campus Programs on Views of Diversity: A Test of the Contact Hypothesis
2:45	James Gignac (Cline)	Citizen Environmental Activism: Three Case Studies in the Albion, Michigan Area
3:00	U.S. Gay and Lesbian History Class (Franzen) (includes Brooke Cummings, Shannon Dougherty, Sosi Hagopian, Allen Hearn, Tiffany Juliano, Sarah Leicher, My Lien, Kathryn Pritchard, Laura Scozzari and Paul Talbot)	Albion's Gay History

(continued on next page)

HUMANITIES AND FINE ARTS FORUM—Bobbitt Auditorium

8:30	Nathan Piwowarski (Grossman)	Mr. Polk's War: Executive Power and State Expansion during the Mexican War, 1846-1848
8:45	Kathrin Schwesig (Noordhoorn)	A Personal Odyssey: Reflections of a Multicultural Self
9:00	Christine Putnam (Sacks)	The Rise and Fall of the Antebellum Acadian Sugar Culture in Ascension Parish, Louisiana
9:15	Rebecca Linz (Guenin-Lelle)	Renée Vivien: Une Deuxieme Sapho
9:30	Eric Scott (Jordan)	Scottish Cultural Identity in Eighteenth-Century Literature
9:45	Jennifer Wells (Baumgartner)	100 Years of *Buddenbrooks*
10:00	Anne Holcomb (Kanter)	Narratives of Chicago and the Shifting Ideology of the American Sublime
1:15	Sarah Leicher (Franzen)	Female Iconography in the Music Industry: From the Women of Woodstock to the Ladies of Lilith Fair
1:30	Steven Sexton (MacInnes)	How Did T.V. Western Heroes Paladin and Matt Dillon End Up in Vietnam? Mapping Masculine Disorientation in Modern War Literature
1:45	Christine Byks (Chavez)	Waking Up
2:00	Leslie DuBois (Murphy)	A Day at a Time
2:15	Carl Gladstone (Chavez)	Gems and Unicycles
2:30	Jennifer Lau (MacInnes)	Esther Inglis and the Creation of Value
2:45	Stacy Davidson (Dick)	Water Is All Around Us
3:00	JoAnn Debo (Pereira Muro)	The "Bad Mother" in Spanish Transitional Cinema

NATURAL SCIENCES AND MATHEMATICS FORUM—Olin 112

8:30	Elizabeth Olgren (Erbeznik)	The Search for the *xylE* Gene in the Genomic DNA of *Thermoanaerobacter ethanolicus*
8:45	Andrew Frick (Reimann)	Fault-Tolerant Behavior Sets for Nomad200 Robots
9:00	Jennifer Willard (Lewis)	Biocomputing: *in vivo* AND Gate
9:15	Brad Cavinder (Saville)	A Genetic System to Study DNA Repair in *Drosophila melanogaster*
9:30	Sarah Burpee (French)	Progress in a Computational Investigation of Conformers of Chiral Hypervalent Iodine Compounds
9:45	Kyle Roslund (Wilch)	Field and GIS Mapping of Glacial Sediments and Landforms near Dowling, Michigan
10:00	Heather Schmidt (Klarr)	The Effect of Salt-Induced Hypertension on Leptin Transport in Rats
1:15	Holly Jacobs (Reimann)	Four Years at Albion—Just a Blur: The Imaging behind It
1:30	Bryan Kusiak (Steffenson)	Testing of Z-Scheme Photosynthesis Using PSI-Deficient Mutants of Green Algae
1:45	Kim Zuhlke (Saville)	The Molecular Analysis of DNA Repair in *Drosophila melanogaster*
2:00	Eric Weaver (Schmitter)	Ultrastructural Studies of *Lonicera* Species from the Whitehouse Nature Center
2:15	James Eberhardt (Harris)	Characterization of Glucose Dehydrogenase Immobilized on Acrylic Beads
2:30	Meridith Cleland (Skean)	Internal Transcribed Spacer DNA Sequences and Inflorescence Position in Species Traditionally Classified in *Clidemia* and *Ossaea* (Melastomataceae: Miconieae)
2:45	Crystal Shaw (Lincoln)	Rice Creek: The Hydrology of an Agricultural Drain in South Central Michigan
3:00	Michelle Henn (Lincoln)	Rice Creek: Nutrient Levels in an Environmentally Degraded Stream
3:15	Tara Simonds (Lincoln)	Rice Creek: Assessment of Habitat Quality Based on the Macroinvertebrate Population

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

Rebecca Anderson (Haugh)	Stress and Emotion: Exploring the Stability Hypothesis
Anton Bieliauskas (Harris)	Oxidation of Trialkylboranes Using Alumina-Supported Potassium Permanganate
Sarah Bone (Sedersten)	A Kinematic Description of Forefoot Stiffness in Running Shoes, Running Stride, and Knee Flexion Measured with Treadmill Running Gait Analysis
Treasa Gourlay (Johnson)	Relationship between Movement and Student Progress in Elementary School Classrooms
Daniel Holland (Bieler)	A Do-It-Yourself Molecular Beam Spectrometer (Some Assembly Required)
Sarah Hudson (Erbeznik)	Cloning of *xylG*, Encoding an ABC-Type Transporter of Xylose, in *Thermoanaerobacter ethanolicus*
Lynsey Kluever (Franzen)	The Creation and Sustenance of a College/Middle School Mentoring Program
Isaac Kremer (Dick)	Albion, Michigan: Creating an Interactive History
Bryce Marquis (Harris)	Alumina-Supported Potassium Permanganate Oxidations of 3-Heptanol and 1-Methyl-1-Cyclohexene
Jason Mussman (Harris)	Alumina-Supported Potassium Permanganate Oxidations of 1-Octanol and 1-Methyl-1-Cyclohexene
Eric Petroelje (Johnson)	Effectiveness of Physical Education in Elementary Schools
Kathryn Pritchard (Wilch)	Sedimentology of Glacial Deposits and Landforms near Dowling, Michigan
Kristi Reithel (Seely)	Modeling of Charged Particle Trajectories in a 50-Kilovolt Electrostatic Accelerator System Using SIMION
Erin Risser (White)	The Diet of Bats in the Albion Area Based on the Analysis of Guano
Elise Schultz (Bieler)	The Study and Characterization of Polypyrrole Made by Photochemical Oxidative Polymerization
Nathaniel Sowa (Kennedy)	Sexing Nestling House Wrens: A Protocol for Extracting DNA from Feathers
Jennifer Tobin (Seely)	A LabVIEW-Based Data Acquisition System to Study the Motion of Charged Particles in an Electrostatic Dodecapole Field
Danielle Willsie (French)	The Synthesis of Chiral Amine Ligands for Use in Halolactonizations
Catherine Clay, Juli DeLucia, Katherine Jones, Brianne Rains, Valerie Skaleski, Sarah Wall (Rubio)	Creating and Using Interactive Multimedia to Support Conceptual Understanding of Mathematics in Grades 2-7
Lindsay Franson, Paul Garabelli (Lewis)	Effect of the Addition of 1-Propanol on the Photocatalytic Decomposition of CCl_4 in Aqueous Solutions of TiO_2
Mark Ams, Jennifer Kuebler (Harris)	The Proposed Synthesis of New Metallomesogens
Environmental Geology Class (Wilch)	Evaluation of Stream Quality and Conditions of Rice Creek, near Marshall, Michigan

Jason Aagenas, '01

Self-Reported versus Actual Problem-Solving Ability

Faculty Sponsor: Jim Haugh

Major: Psychology
Hometown: Stevensville, Mich.

Problem-solving ability is one of the most important skills for people of all types. Research has shown that the ability to effectively solve problems reduces stress and enhances one's success rate overall. This study looks at a new component of problem-solving that has not been thoroughly studied. The focus of the experiment will be to compare the way that individuals self-report their problem-solving skills to how well they actually solve a problem. It is hypothesized that subjects will portray their problem-solving abilities as more favorable than they really are. This study will also explore other variables that can play an integral role in this interaction. Overall health, depression, anxiety, alcoholism, and eating disorders can all complicate and impede the problem-solving process. This investigation considers to what extent those variables affect the difference between self-reported and actual problem-solving ability.

Mark Ams, '02
Jennifer Kuebler, '02

The Proposed Synthesis of New Metallomesogens

Faculty Sponsor: Clifford Harris

Mark Ams, '02
Major: Chemistry
Hometown: Almont, Mich.

Jennifer Kuebler, '02
Major: Chemistry
Hometown: Alpena, Mich.

Ams

Kuebler

Metallomesogens are a type of liquid crystal that contains one or more metal ions. In the liquid crystalline state, magnetic interactions between these paramagnetic metal centers may lead to useful chemical applications.

We propose the syntheses of two new metallomesogens. The first will have only one paramagnetic center and will be based on a salphen unit that can be furthur functionalized. This will serve as a model for our second proposed metallomesogen, in which 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
Research performed under the supervision of Steven Malinak, Albion College.

Rebecca Anderson, '02

Stress and Emotion: Exploring the Stability Hypothesis

Faculty Sponsor: Jim Haugh

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

Previous research has demonstrated that changes in mood lead to a variety of changes in response and behavior. The goal of the current study was to determine whether changes in mood affect perceptions of stress and reporting of stressful events. To explore this topic, a two-part experiment was

designed. On the first day, 43 college students completed two mood scales and two stress scales. On the second day, the same participants completed the two mood measures followed by either a positive or negative film clip designed to induce mood. After watching the clip, participants again completed all four measures. It was hypothesized that participants whose mood decreased after watching the negative mood tape would report more perceived stress and daily hassles than they did before the video. The results are discussed in regard to their implications on stress and mood.

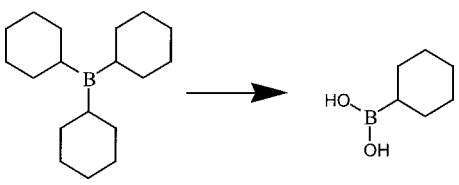
Anton Bieliauskas, '01

Oxidation of Trialkylboranes Using Alumina-Supported Potassium Permanganate

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: Ann Arbor, Mich.

Alumina-supported potassium permanganate (ASPP) was allowed to react with a series of trialkylboranes derived from internal alkenes. The heterogeneous oxidation proceeded in air, was monitored by ^{11}B-NMR, and was observed to be much slower than the traditional sodium peroxide oxidation. In addition, boronic acids appear to be nearly inert to the reaction conditions. The reaction appears to be general for a series of trialkylboranes. This reaction produces compounds extremely useful in the production of pharmaceuticals by non-toxic, low-impact methods.



Supported by: FURSCA

Herman Blacksher, '01
Andrea Smith, '01

An Econometric Model of the Labor Force Participation Rate of Women for the Period 1970-2000

Faculty Sponsor: James McCarley

Herman Blacksher, '01
Majors: Mathematics, Economics
Hometown: Southfield, Mich.

Andrea Smith, '01
Majors: Mathematics, Economics
Hometown: Highland, Mich.

Smith

One of the interesting phenomena in the American economy over the past century is the increased participation of women in the labor force. At the beginning of the century, 18.9% of women were employed. By the middle of the century, the percentage had increased to slightly over 30% and remained nearly constant until 1950. Since 1950, the labor force participation rate of women has increased from 31.4% to 60.4% in 2001. A more interesting aspect of this increase is the change in the participation rate of married women. In 1890, only 4.6% of married women worked outside the household. By 1950, the rate had increased to 24.8%, and, at present, 62.1% of married women with spouse present work outside the home. Much of this increase can be attributed to the entry into the work force of women with children less than six years of age.

Increases in the labor force participation rate of women can be explained by technological advancements that favored women; decreases in men's real wages resulting from foreign competition, and employment in energy-based industries; increases in real pension benefits; increased substitutes for the work previously done by women in the home; decreases in the fertility rate; the education level; availability of childcare; and increases in women's real wages.

Our study is an econometric investigation into the causes of the increased labor force participation of women. Our model is as follows:

$$WLPF = \beta_1 + \beta_2 WF + \beta_3 + \beta_4 WM + \beta_5 ED + \beta_6 FR + \beta_7 DR + \beta_8 PRP + \beta_9 SCH + U$$

where:

WLPF	=	participation rate of all women over 16
WF	=	real wages of females
WM	=	real wages of males in manufacturing
ED	=	years of education
FR	=	fertility rate
DR	=	divorce rate
PRP	=	real dollars held in private pension plans
SCH	=	children under six in households
U	=	error term

Sarah Bone, '01

A Kinematic Description of Forefoot Stiffness in Running Shoes, Running Stride, and Knee Flexion Measured with Treadmill Running Gait Analysis

Faculty Sponsor: Darrell Sedersten

Majors: Chemistry, Physical Education
Hometown: Adrian, Mich.

Eighteen female Albion College athletes wore three different running shoes with varying degrees of sole stiffness. Toe, ankle, and knee angles were quantified. Each participant was videotaped running on the treadmill in each of the three shoes at a constant 5 mph pace. The video was used with The NEAT System computer software program to measure the joint angles at the heel strike, support, and push-off phases of the running stride. Statistical analysis was performed on the data to determine the significance of variation between the joint angles measured for each of the shoes.

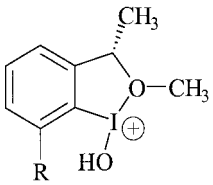
Sarah Burpee, '01

Progress in a Computational Investigation of Conformers of Chiral Hypervalent Iodine Compounds

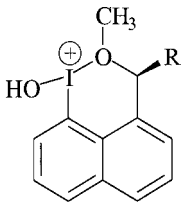
Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Grand Rapids, Mich.

In order to gain insight into the reaction of alkenes with chiral hypervalent iodine compounds, we have undertaken a computational study of the conformation of these molecules using the density functional basis set lanl2dz with Gaussian 98, a molecular modeling software package. Larger energy differences between the pseudo-equatorial and pseudo-axial conformation of the chiral moiety in **1 a-c** have been loosely correlated with greater observed enantiomeric excesses in alkene reactions using **1 a-c**. Results of calculations of **1 d-e** will be presented along with greater analysis of the correlation between pseudo-equatorial/pseudo-axial energy differences and observed e.e.'s. Energy differences in a second system, **2 a-e**, will also be explored. Comparison of the energy difference correlation in **1** and **2** will be presented.



1 a-e



2 a-e

Supported by: FURSCA, Chemistry Department, National Science Foundation, Research Corporation

Christine Byks, '01

Waking Up

Faculty Sponsor: Lisa Chavez

Majors: English, Geology
Hometown: Dryden, Mich.

My creative writing thesis is an exploration and reflection of recent changes and developments in my life through two writing genres, poetry and creative non-fiction. The pieces occur in the last two years, starting with my study abroad year in Aberdeen, Scotland, and ending with my final year of college and confrontation with life beyond graduation. Central themes include family and Scotland's landscape and history.

Brad Cavinder, '02

A Genetic System to Study DNA Repair in *Drosophila melanogaster*

Faculty Sponsor: Kenneth Saville

Major: Biology
Hometown: Tekonsha, Mich.

The repair of DNA damage is crucial to the survival of all organisms. Faulty repair can lead to cell death or to the accumulation of mutations that can lead to cancer. One type of DNA damage, double-strand breaks (DSB), results in DNA being broken into two or more pieces. These types of breaks are rare but are likely to lead to lethal results if not repaired properly.

In this study, I generated and isolated fruit flies (*Drosophila melanogaster*) that had DSBs in DNA caused by the excision of a *hobo* transposable element. The *hobo* element is a segment of DNA that can be cut out from a chromosome and inserted into a new position elsewhere in the genome. The excision creates a DSB that must undergo repair. In order to isolate flies with repaired DSBs, a genetic scheme was used to identify *hobo* excision followed by normal repair. Fifty experimental crosses were carried out, with a total of 5,071 flies examined. Of these, 188 matched the characteristics of a normally repaired DSB from the excision of the *hobo* element. Eight control crosses were set up so that no excision of the *hobo* element occurred. Out of 1,151 flies, none matched the repair phenotype.

In continuing studies, molecular techniques will be used to amplify, isolate, sequence, and compare *hobo* excision products from the isolated flies to determine if the genetic scheme is successful and investigate the mechanism by which these DSBs are repaired.

Catherine Clay, '01
Juli DeLucia, '01
Katherine Jones, '01
Brianne Rains, '01
Valerie Skaleski, '01
Sarah Wall, '01

Creating and Using Interactive Multimedia to Support Conceptual Understanding of Mathematics in Grades 2-7

Faculty Sponsor: Reuben Rubio

Catherine Clay, '01
Majors: Mathematics, English, Secondary Education Certification
Hometown: East Grand Rapids, Mich.

Juli DeLucia, '01
Major: English, Elementary Education Certification
Hometown: Trenton, Mich.

Katherine Jones, '01
Major: English, Elementary Education Certification
Hometown: Shelby Township, Mich.

Brianne Rains, '01
Major: Mathematics, Elementary Education Certification
Hometown: Novi, Mich.

Valerie Skaleski, '01
Major: English, Elementary Education Certification
Hometown: Sterling Heights, Mich.

Sarah Wall, '01
Major: English, Elementary Education Certification
Hometown: Essexville, Mich.

Clay

DeLucia

Jones

A teacher needs to be aware of the variety of ways a student learns in a classroom. Every child is a unique learner; therefore, a teacher must teach according to this diversity. We have gone one step further in support of conceptual understanding by integrating technology. With the software, Hyper Studio, we were able to create an interactive, game-like activity to help students in grades 2-7 understand different aspects of mathematics.

Before creating our programs, we needed to decide what aspects of mathematics gave students the most trouble. To find this out, we spoke with our cooperating teachers from our student-teaching experiences. Using this information, we created story boards, or an outline, of what we wanted our program to look like. Hyper Studio then allowed us to create various slides that could be linked together, depending on the needs that came with each respective grade level. The slides were linked


Rains


Skaleski


Wall

so that the student's actions would guide them through the program. Depending on individual needs, the program could be as interactive as we wanted, from the students typing in their names to getting a printout of their score. Hyper Studio has different options that allowed us to be as creative and colorful as we thought necessary.

Our programs were used in our student-teaching experiences. Hyper Studio allowed us to bring in highly stimulating interactive multimedia. The computer game quality of the program is very appealing to students and provides students who are visual learners a means for a better understanding of mathematics. Our Hyper Studio programs also integrate technology, giving our classroom yet another teaching and learning resource.

Supported by: FURSCA, Ameritech and the Ferguson Center for Technology-Aided Teaching.

Meridith Cleland, '01

Internal Transcribed Spacer DNA Sequences and Inflorescence Position in Species Traditionally Classified in *Clidemia* and *Ossaea* (Melastomataceae: Miconieae).

Faculty Sponsor: J. Dan Skean

Major: Biology
Hometown: Vashon, Wash.

Internal transcribed spacer (ITS) regions of DNA were sequenced and used to evaluate the relationships among certain species in the plant family Melastomataceae, tribe Miconieae. The genera *Clidemia* D. Don and *Ossaea* DC., are thought to be polyphyletic, or have more than one lineage. The two genera have both terminal and axillary placement of inflorescences and diverse floral morphology. A 1989 classification by Walter Judd placed axillary-flowered *Clidemia* and *Ossaea* in the genus *Sagraea* DC. In 1991 Judd and Skean placed most terminal-flowered West Indian *Ossaea* in the genus *Leandra* Raddi. Silica-gel-dried collections of nine species were made in the Dominican Republic in July 2000. Two additional species were collected in Belize in March 1999. Sequences from the ITS region were aligned using Sequencher 3.0 and used in cladistic analyses with PAUP v. 4.0b4a to form trees that illustrated the phylogenetic relationships of the species. *Meriania involucrata* (Desr.) Naud. was used as the outgroup. A branch-and-bound search yielded three equally parsimonious trees. The axillary-flowered species in the analysis, traditionally treated as *Clidemia rubra* (Aubl.) Mart., *Ossaea scalpta* DC., and *Clidemia fuertesii* Cogn., considered by Judd to be members of the genus *Sagraea*, form a monophyletic group, one with a single lineage. The terminal-flowered species form a paraphyletic group. Among the terminal-flowered species studied, those traditionally treated as *Ossaea lima* (Desr.) Triana [*Leandra lima* (Desr.) Judd & Skean], and *Ossaea limoides* Urban [*L. limoides* (Urban) Judd & Skean] from the Caribbean do not link closely with the continental *L. mexicana* Cogn.

Supported by: FURSCA-Hyde Fellowship

Stacy Davidson, '01

Water Is All Around Us

Faculty Sponsor: Wesley Dick

Major: English, Elementary Education Certification
Hometown: Leonard, Mich.

"Water Is All Around Us" is a children's story, created from my imagination: its foundation can be found within a love for the environment. This story is a product of that passion. I have always had compassion in my heart for children. I desire to teach the children of future generations. This project attempts to merge the two loves together: the environment and education. I would like to show children that they too could have an awareness and passion for the environment; it is the responsibility of children *and* adults to take care of this planet we live on. In my fondest hopes, I envision this story used in classrooms in order to teach responsibility and awareness of the environment. In part, this story is written for the children, but it is also written for the teachers (and parents too), so that they may model to their students an understanding and concern for the earth.

In general, adults often overlook children, especially in terms of their impact on the world, and I want to give children the credit and responsibility they deserve. The world's children have the power and resources to make great changes for the future, if only adults would allow them this opportunity. They are, indeed, the ones to get people motivated. I feel that respect is owed to the children, for they can make a differ-

ence, whether that difference is great or small. This story is about such a difference. In "Water Is All Around Us," the character, Madison, begins to understand and believe in the importance of water in our daily lives.

Juli DeLucia, '01

(See Catherine Clay, '01, Juli DeLucia, '01, Katherine Jones, '01, Brianne Rains, '01, Valerie Skaleski, '01, and Sarah Wall, '01.)

Brigitte Dubois, '01

Museum Education in the United States: Providing for a Diverse Public

Faculty Sponsor: Molly Mullin

Major: American Studies
Hometown: Kalamazoo, Mich.

This project seeks to provide an in-depth exploration of educational theory and practice in American museums while providing at the same time a broad overview of the current "state of the field." In particular, I focus on the social role of the museum in contemporary American society—its obligation to both educate and appropriately represent an increasingly diverse public, and the ways that it can participate in our striving for a more just society.

Museums in the United States are as old as this nation, and the development of the institution goes hand-in-hand with the growth of American democracy. From this perspective, we can regard the American museum as an institution that has been, from the beginning, devoted to the education of the common citizen in an informal and voluntary way. The widespread influence of Howard Gardner's theory of Multiple Intelligences reveals the extent to which American public education has embraced experiential and informal learning in recent years. Museums, as institutions of experiential and lifelong learning, have chosen to share the "burden" of public education in creative and significant ways. As institutions that are constantly challenged to meet the needs of a public of diverse ethnicities, ages, and genders, American museums are characterized by constant change and perpetual involvement in the American story of democracy and public education.

Leslie DuBois, '01

A Day at a Time

Faculty Sponsor: Daryl Murphy

Majors: English, History
Hometown: Gaylord, Mich.

A series of personal vignettes traces one family's battle with breast cancer. The voices of four women, from three generations, tell the story of diagnosis, treatment, and both recovery and death. Within the same four-year period, both Charlotte and her daughter Paddy discover they have cancer. Both face hard decisions and deal with their disease in different manners. Cancer does not only change the afflicted, as the voices of Sharon and Leslie relate. Sharon, Paddy's sister, can spend only limited time with her ailing mother and rarely sees her sister; as Charlotte's cancer progresses, Sharon's guilt and regret often manifests itself as fear and discomfort. Leslie, on the other hand, is the youngest, Paddy's elementary-age daughter, who must find ways to deal with the embarrassment and anger that come with illness and death. Paddy must eventually find ways to rationalize that though she survived her mother did not. This family, these four women, speak to the uncertainty of life and the depths of human capability, finding strength in themselves and in each other.

James Eberhardt, '01

Characterization of Glucose Dehydrogenase Immobilized on Acrylic Beads

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: Trenton, Mich.

Carbohydrates can possibly be used as an alternative fuel if a fuel cell can be constructed that uses hydrogen produced by an enzymatic pathway that oxidizes the carbohydrates. Glucose dehydrogenase (GDH) oxidizes glucose to gluconic acid. The reducing equivalents generated are used by hydrogenase to generate molecular hydrogen. In order to construct an enzymatic fuel cell, these enzymes need to be immobilized. Different polyacrylamide materials with azlactone functionality were provided by the 3M Corporation and used in this investigation to immobilize GDH from *Thermos-plasma acidophilum*.

It was found that the properties of the polymer backbone affected the yield of active immobilized enzyme. The best yields of 50+% were achieved when the coupling reaction was carried out in the presence of a competitive binding reagent (BSA) on the 60:10:30 beads (10% vinyl-dimethyl azlactone). The use of different quenching solutions, which change the microenvironment of the immobilized GDH, altered the optimal pH of the immobilized enzyme. However, the immobilized enzyme did lose activity over time. Storage temperature and pH affected the stability, and the majority of activity was lost after 65h in all conditions tested to date. This reduction in activity is most likely due to continued amide bond formation between the azlactone bead and the GDH rather than the GDH being released

from the bead. Currently, efforts to increase the storage stability of the immobilized enzyme are being investigated.

Supported by: FURSCA-Bethune Fellowship
Research performed under the supervision of Jonathan Woodward, Oak Ridge National Laboratory

Lindsay Franson, '01
Paul Garabelli, '02

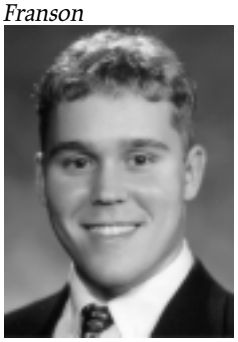
Effect of the Addition of 1-Propanol on the Photocatalytic Decomposition of CCl_4 in Aqueous Solutions of TiO_2

Faculty Sponsor: Lisa Lewis

Lindsay Franson, '01
Major: Chemistry
Hometown: Saginaw, Mich.

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


Franson


Garabelli

The photodecomposition of carbon tetrachloride in aqueous solution by titanium dioxide was studied using gas chromatography-mass spectrometry with headspace equipment. Previous work 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 this experiment, 1-propanol was used as the electron donor at concentrations of 0%, 2.5%. 16.7%, and 33.3%. Our results demonstrate a decreased degradation rate of CCl_4 with increased concentrations of 1-propanol. The 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; chloride ion formation is consistent with CCl_4 degradation.

Supported by: FURSCA

Andrew Frick, '01

Fault-Tolerant Behavior Sets for Nomad200 Robots

Faculty Sponsor: David Reimann

Major: Computer Science
Hometown: Ann Arbor, Mich.

The Nomad200 robot is a research platform created by Nomadic Technologies Inc. The robot is a robust platform for many robotic tasks such as a multi-robot cooperation and single robot research. The behavior sets created in this project are the basis for research in the cooperative robotic task of surveillance. The behaviors in the set are orthogonal in order to allow the robots to perform other self-contained tasks when inhibited from doing certain behaviors. These behaviors must also have the ability to handle real-world conditions and faults. An unreliable behavior is of little use for research outside of a simulator. The behaviors are a movement algorithm, a door-finding algorithm, and an algorithm that detects objects moving through a doorway.

These algorithms have mechanisms that allow the robot to distinguish between an actual doorway or object and a group of false data points. The fault toleration mechanisms are robust and simple, allowing reproduction and use in multiple behaviors in the set. For the movement algorithm, direction vectors and vector algebra are used in a repetitive control loop to make up for inaccuracies in directional movement. For the other behaviors, a queue is used to maintain an average of the previous sensor readings. By adjusting the length of the queue, the robot will become more or less sensitive to faulty sensors. Allowing the robot to deal with faults in the data will lead to a more stable control system that will be added in the future.

Research performed under the supervision of Lynne Parker, Oak Ridge National Laboratory.

Laura Gambone, '01

When to Leave: Factors That Affect Women's Decision-Making in Domestic Violence Situations

Faculty Sponsor: Barbara Keyes

Majors: Psychology, English, Women's Studies Concentration
Hometown: Bloomington, Minn.

Many psychological studies have investigated demographic factors that increase a woman's vulnerability to domestic violence. Though these studies do provide useful information with which we can identify populations most at risk, they often do not explain or investigate women's decision-making in domestic violence situations. It is known that African American women and women of low socioeconomic classes experience more intimate (domestic) violence than other women. It is also known that family and community values and opinions influence the decision-making of individuals. What is not known is the extent to which community-specific values and opinions affect women's decision-making in domestic violence situations.

This study seeks to discover the connection among the opinions of racial/ethnic communities and families, socioeconomic status, and women's decisions to leave or stay in domestic violence situations. The questionnaire used was a hypothetical story detailing a domestic violence situation. On each page, one violent act occurs, and questions are asked to determine whether or not the participant would leave and whether or not she believes her family and commu-

nity would expect her to leave. The same situation continues throughout the questionnaire, and the level and frequency of the violence increases with each subsequent page. Participants' demographic information was also self-reported.

Based on the information that is known about at-risk populations and community/family influences on decision-making, it is hypothesized that women's decisions to leave will correlate positively with perceived community and family expectations, and that these expectations will vary with race/ethnicity and socioeconomic status.

Supported by: FURSCA

Paul Garabelli, '02

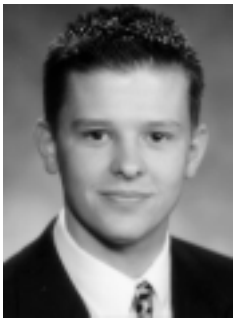
(See Lindsay Franson, '01, and Paul Garabelli, '02.)

James Gignac, '01

Citizen Environmental Activism: Three Case Studies in the Albion, Michigan Area

Faculty Sponsor: Eugene Cline

Major: History
Hometown: Washington, Mich.



To the everyday citizen, environmental problems often seem insurmountably complex. Huge corporations, massive government bureaucracies, and multifarious economic forces contribute to the oftentimes overwhelming nature of environmental issues. In light of these circumstances, what can the common citizen do to protect his or her natural surroundings? What modes of action are available to people concerned about pollution or other environmental problems? What elements contribute to the successes or failures of citizen environmental activism?

In this project, I will pursue these questions by analyzing three case studies of citizen involvement in environmental issues in and around the Albion, Michigan area. The case studies are: (1) the recent controversy over a wastewater disposal project by the Village of Springport, (2) problems associated with a large-scale hog facility in Parma Township, and (3) the environmental activism of residents near Guardian Industries. As opposed to presenting theoretical arguments, these case studies will provide a pragmatic, real-life approach, illustrating how citizen environmental activism works in practice. By relating the history and facts of the case studies, followed by an analysis of successful strategies and a discussion of the impediments faced by the citizens, I will draw insights from each of the examples regarding citizen environmental activism. In this way, future activists confronting environmental problems will be better equipped to pursue concerns and protect their natural environment and community health.

Supported by: Institute for the Study of the Environment

Yvette Girard, '01

The Industrialization of Detroit

Faculty Sponsors: Glenn Perusek, Andrew Grossman

Major: Political Science
Hometown: Lincoln Park, Mich.

This paper explores the industrialization period in Detroit between 1910 and the late 1920s. The main sources of data used were collected from the Walter P. Reuther Library at Wayne State University. Detroit, during the first 30 years of the twentieth century, underwent immense economic and demographic change. This study focuses on one aspect of that change: the social consequences of industrialization as shown in the lives of the automobile workers.

I am interested in the modernization of society during the industrialization process. In exploring the patterns of industrialization, modernization, and the accompanying social order, I have found that many of those individuals responsible for the success of the automobile industry, the laborers, were exactly those persons most likely to fall through the cracks of society. The most poignant example of the negative effects of industrialization on a social level can be found in the Ford Motor Company plants. Henry Ford's automobile industry will serve as the primary case study showing the human expenses of mass production and modernization.

Supported by: FURSCA

Carl Gladstone, '01

Gems and Unicycles

Faculty Sponsor: Lisa Chavez

Major: English
Hometown: Warren, Mich.

Gems and Unicycles is a singer-songwriter endeavor. Each of the original songs contained on the CD will attempt to join both lyric and melodic uniqueness into an exciting audio experience. All recording and artwork will be self-produced. The project will be perfected through an extended process of writing, revision, and live performances. Each song, like "To the House of May" and "Sparrows," contains picture poems that utilize concrete imagery to describe sometimes outlandish situations. *Gems and Unicycles,* as a title, is an attempt to capture the contrast between successful artistic creation and the ultimate futility of such creations.

Supported by: FURSCA

Treasa Gourlay, '01

Relationship between Movement and Student Progress in Elementary School Classrooms

Faculty Sponsor: Thomas Johnson

Major: Physical Education
Hometown: Traverse City, Mich.

Recent brain research has shown that there is a relationship between movement and learning. This research demonstrates that movement stimulates the brain in a fundamental way, which may help a student learn better. By using movement in classroom curriculums, teachers can enhance a student's progress in learning. Dr. Thomas R. Johnson has trained teachers in the Garden City (Mich.) Elementary School in movement techniques. The teachers pre-tested the fundamental physical skills of students to show where the students may be having learning problems. Teachers proceeded to use the movement techniques in the classroom over a two-year period. A post-test was then administered. This study will look at data to see if a behavior change has been made. Utilizing the results from this study will create new opportunities for teachers to help students who are having learning problems.

Heather Heintz, '01

Long-Term Effects of Hospitalization on the Development and Well-Being of Premature Infants

Faculty Sponsor: Eugene Cline

Major: Biology
Hometown: Mentor, Ohio

Hospitalization in the neonatal intensive care unit (NICU) is the option for survival for premature infants because of their dependence on and need for medical intervention. Nonetheless, exposure to conditions in the nursery such as excessive light, excessive noise, excessive handling, improper positioning, and lack of social contact due to prolonged hospitalization may place stress on a developing neonate's systems, with lifelong ramifications for the infant in the form of shortfalls and decreased well-being. Therefore, something must be altered in the NICU setting in order to decrease negative developmental outcomes and to enhance well-being.

A reasonable solution that has emerged is the implementation of an individualized developmental care philosophy that alters environmental conditions in the NICU and changes care protocols to aid in the maximum developmental potential of each infant. A proposed list of recommended alterations was compiled, and an observational analysis of four nurseries in the United Kingdom and four in Michigan was completed. Studies show positive outcomes for infants receiving this type of care, and the analysis suggests that Michigan hospitals more closely paralleled the conditions of an ideal developmentally supportive nursery environment.

Supported by: FURSCA

Michelle Henn, '01

Rice Creek: Nutrient Levels in an Environmentally Degraded Stream

Faculty Sponsor: Timothy Lincoln

Major: Chemistry
Hometown: Westland, Mich.

This study compares the geochemistry of Rice Creek, tributary to the Kalamazoo River, to an adjacent stream, Spring Brook, tributary to the Grand River. Rice Creek has been dredged and straightened; Spring Brook has not. Rice Creek has several potential sources of nitrate and phosphate pollution, including a hog facility, agricultural fields, and municipal lagoon effluent.

The total suspended sediment load in Rice Creek varies with discharge: 5.1 g/l for 8 cfs and 24 g/l for 23 cfs. Nitrate levels and discharge in Rice Creek are positively correlated. Typical low flow (8-10 cfs) nitrate levels of 4-8 ppm contrasted with high flow (50 cfs) levels of 14-18 ppm. This suggests that nitrate reaches the stream through surface runoff or interflow. Spring Brook does not show this relationship, perhaps because nitrate is absorbed by its well-developed wetlands. In Rice Creek, the highest nitrate concentration (32 ppm) was found downstream from the hog facility and several large cropped fields; levels decreased downstream. In Spring Brook, the highest nitrate concentration (14 ppm) was found near the headwaters (also near the hog facility); levels also decreased downstream.

Municipal lagoon effluent discharged into Rice Creek in October and November 2000 had significantly higher phosphate concentrations (3.5-5.5 ppm) than the creek upstream at the time of discharge (0.1-0.5 ppm). At the point of discharge, the creek's levels were elevated to 1-1.5 ppm; levels over 1 ppm persisted for a mile downstream. This is contradictory to the claim posted by the

DNR that the discharge would dilute the pollutants already present in the stream.

Supported by: FURSCA, Institute for the Study of the Environment

Anne Holcomb, '01

Narratives of Chicago and the Shifting Ideology of the American Sublime

Faculty Sponsor: Deborah Kanter

Majors: English, Philosophy
Hometown: Kalamazoo, Mich.

The concept of the sublime in eighteenth-century philosophy was primarily focused on its object, a daunting natural feature that provoked impressions of power or infinitude in the subject. Immanuel Kant reversed the balance of power in the sublime experience in his 1790 *Critique of Aesthetic Judgment,* claiming in his explanation of the dynamic sublime that the true "thrill" of the experience arose in a purely subjective way, and that nature is sublime only in the fact that it causes the subject to feel superiority over nature's power when the subject contemplates his or her own powers of reason.

Kant's theoretical concept can be seen in practice in the culture and history of the United States. The nationalist rhetoric that accompanied technological and industrial development in the late nineteenth and early twentieth centuries echoes the subjective nature of the Kantian sublime. The ideologies that accompanied the construction of the railroads, skyscrapers, and factories eventually alienated Americans from common expressions of the natural sublime. The technological sublime also alienated people on the basis of class, gender, and race.

My research dealt specifically with narratives of Chicago at the turn of the twentieth century. I analyzed the writings of the architect Louis Sullivan, the novelist Upton Sinclair, and the poet Carl Sandburg. I found that all of these men used urban experiences of the natural and technological sublime as a teaching tool for their audiences. These writers also documented the alienating effects that rapid technological development and an unregulated capitalist economy were having on city-dwelling Americans, and they believed that the general public could reunite by taking advantage of the communal and spiritual nature of the sublime experience.

Daniel Holland, '03

A Do-It-Yourself Molecular Beam Spectrometer (Some Assembly Required)

Faculty Sponsor: Craig Bieler

Majors: Chemistry, Physics
Hometown: Canton, Mich.

Our research interests lay primarily in the area of physical chemistry, specifically that of spectroscopy. This is reflected in the current project where a molecular beam spectrometer is designed and constructed. When completed, the device will utilize laser-induced fluorescence on gas phase molecules to aide in identification of the molecules and also in determination of electronic and structural properties.

This type of spectrometer does have a significant difference from most spectrometers—namely the manner in which the gaseous analyte is handled. Instead of examining a static cloud of analyte or even an effusive, rather disordered flow, this spectrometer will rely upon the generation of a molecular beam from the supersonic expansion of a gaseous sample into a vacuum. The molecular beam is a low collision, long mean free path, and literal beam of molecules. The long mean free path is a term describing the much longer distances that particles travel between collisions in the molecular beam, as opposed to regular everyday temperature and pressure conditions outside of the vacuum chamber. The ordered flow, decrease in collision frequency, and narrow velocity distribution of the analyte molecules create an environment that can best be described by saying that the lasers and detectors will be probing an extremely cold sample. The end result is that spectra taken with such an instrument will have much more distinct peaks and be of much greater scientific value. The poster presentation will focus on work completed this past summer, the current status of the project, and some discussion of plans that will direct this project to completion.

Supported by: FURSCA, Student Research Partner Program

Sarah Hudson, '02

Cloning of *xylG*, Encoding an ABC-Type Transporter of Xylose, in *Thermoanaerobacter ethanolicus*

Faculty Sponsor: Luti Erbeznik

Major: Biology
Hometown: Petoskey, Mich.

Thermophilic bacteria are able to bioconvert fibrous organic materials such as cellulose into potential substrates that can be used in fermentation. One of them, *Thermoanaerobacter ethanolicus*, utilizes sugars such as xylose to produce large amounts of ethanol. This production of ethanol is of significant commercial interest because ethanol can be used as an alternative fuel source. Ethanol is a good choice for an energy source because it is cleaner and has a much faster turnover rate than fossil fuels.

T. ethanolicus uses an ABC-type (ATP-binding cassette) transport of xylose, similar to systems found in *Escherichia coli* and other bacteria. *T. ethanolicus* has been shown to have a periplasmic protein, XylF, that binds xylose with high affinity. *T. ethanolicus xylF* gene has been cloned and expressed. Two additional components are

hypothesized to also be present: XylH, a membrane-spanning permease that receives the sugar from XylF and translocates it to the cytoplasm, and XylG, which is an ATPase. The function of XylG is to catalyze ATP hydrolysis thereby providing the energy source for xylose translocation.

To date, computer searches of GenBank and other sequence databases have been conducted yielding XylG homologs from *Haemophilus influenzae* and *E. coli,* as well as closely related sequences of sugar transport proteins from *Bacillus subtilis*, *H. influenzae*, and *E. coli* (for ribose, galactoside, and L-arabinose transporters, respectively). These sequences were aligned using Megalign software, and six consensus regions were employed to design degenerate oligonucleotides, which were computer-tested for possible primer-dimer and hairpin formation. These oligonucleotides are to be used in a polymerase chain reaction (PCR) with *T. ethanolicus* genomic DNA in order to amplify a portion of the hypothetical *xylG.*

Holly Jacobs, '01

Four Years at Albion—Just a Blur: The Imaging behind It

Faculty Sponsor: David Reimann

Majors: Computer Science, Economics and Management
Hometown: Fort Wayne, Ind.

Have you ever wondered why the twenty-dollar bill needed a new look? Visually apparent artifacts are present when the newly designed currency is reproduced because of limitations present in all underlying imaging systems. The accuracy of scanning equipment and various other forms of image-reproducing machines has improved to the point where reproductions are nearly identical to the originals.

When images go through any analog reproduction process, they are degraded. Being able to quantify how accurate an image is or how much degradation has occurred is important to cost effectiveness and to many aspects of society that rely on precise image formations. For example, we are able to use x-ray images effectively because we know how accurate the image is.

The modulation transfer function (MTF) of an image is used to quantify the resolution characteristics of an imaging system and to compare different imaging systems or subcomponents of the same system. Traditional methods for determining the MTF measure it one-dimensionally. Since images are inherently multi-dimensional, this is insufficient in many situations. This work focuses on measuring the two-dimensional MTF using inverse filtering. An image of a circle was simulated, and its two-dimensional MTF was determined. The effects of different parameters on determining the two-dimensional MTF were then evaluated. The results demonstrate the promise of this method as an image quality assessment tool.

Supported by: FURSCA-Hyde Fellowship, Student Research Partner Program

Kelly Janowski, '01

How Conscious Are You? Gender and Media Literacy in College Students

Faculty Sponsor: Lisa Barry

Major: Psychology
Hometown: Northville, Mich.

Extensive research has been done with regard to the media and its effects on women and men, illuminating the differences in the way the media affects both sexes. These studies focus on the outward influences or what thoughts are impacted by exposure to the media. Repeated research has shown that the media does, in some way, shape the thoughts of individuals.

This study, therefore, examines the level of awareness of this influence, using magazines specifically. It was the intent of the experiment to focus on the possible distinctions between individuals who are "media literate" versus those who do not possess any structured media knowledge, or are "media neutral," in regard to personal self-awareness. In conjunction with this, gender is also investigated for its role in determining consciousness of media influence. It is hypothesized that, overall, those participants who are labeled "media literate" as well as those participants who are male will have an increased awareness of the impact the media exerts over their lives, as opposed to those who are "media neutral" or female.

Sheila Johnson, '01

What's a "Normal" Girl? The Effects of Gender and Race on Labeling Adolescent Girls "At Risk"

Faculty Sponsor: Mimi Schippers

Major: Sociology
Hometown: Kalamazoo, Mich.

The intention of this research is to study the differences in the definition of the label "at risk" over racial and gender lines. By studying the differences in the definition of the label of "at risk" over racial and gender lines, I was able to establish a tentative definition for "normal" behavior. Through middle school observations and interviews with faculty from Albion College and the Albion Public Schools, I developed a meaning for what comprises the "normal" girl and how that meaning may change over racial lines. (Normal girl: someone who expresses the correct or expected behavior for adolescent girls.)

Katherine Jones, '01

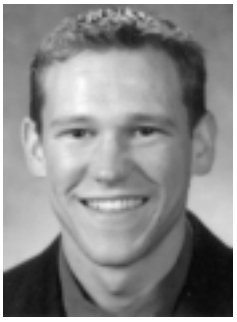
(See Catherine Clay, '01, Juli DeLucia, '01, Katherine Jones, '01, Brianne Rains, '01, Valerie Skaleski, '01, and Sarah Wall, '01.)

Zachary Kleinsasser, '01

Awareness Is Action: Rescuers of Jews during the Holocaust

Faculty Sponsor: Geoffrey Cocks

Major: History
Hometown: Cottage Grove, Minn.



"Righteous Gentiles," as Jerusalem's Yad Vashem Holocaust Memorial Museum calls Holocaust rescuers, performed myriad acts of unabashed self-sacrifice and chilling bravery during the Second World War. Motivations for rescue are equally diverse; hundreds of rescuers rescued for hundreds of reasons. However, following Samuel and Pearl Oliner's *The Altruistic Personality*, many scholars have argued that motivation for rescue is the product of an "altruistic personality" that characterizes these unique and selfless individuals as a group. While recognizing the importance of historical circumstance, psychologists and historians alike have placed more emphasis on an inner core of values than on outside circumstances—degree of German control, geography, a region's history of anti-Semitism, and so forth—that may have encouraged or promoted rescue.

Drawing from my interviews with six Holocaust rescuers, this paper will argue that rescuers did indeed have an inner core of humanitarian values that compelled them to rescue. It will also, however, attempt to articulate what conditions, exactly, caused an "altruistic personality" to emerge. Building on the work of Kohlberg, Piaget, and others, I will apply a cognitive developmentalist orientation to Holocaust rescue and explain how what I call "inclusive awareness "—an early recognition of historical, political, and cultural reality—made these historic altruists aware enough to take action.

Supported by: FURSCA

Lynsey Kluever, '01

Volunteerism in America

Faculty Sponsor: Trisha Franzen

Majors: History, Spanish
Hometown: Orland Park, Ill.

I will examine the history and future of national service in America, focusing on research I gathered from literature, personal interviews, and, most importantly, my internship at the Corporation for National Service in Washington, D.C., the umbrella group for the Americorps, Service Learning, and National Senior Service Corps service programs. I will deal primarily with Americorps, specifically Americorps*VISTA, hailed as the "domestic Peace Corps" and the oldest child in the service family.

Supported by: FURSCA

Lynsey Kluever, '01

The Creation and Sustenance of a College/Middle School Mentoring Program

Faculty Sponsor: Trisha Franzen

Majors: History, Spanish
Hometown: Orland Park, Ill.

I will discuss how I formed the Students Together Raising Integrity, Values, and Excellence (STRIVE) mentoring program three years ago and trace the progress of the organization since its inception. Through STRIVE, Albion College students/staff work with Albion Open School students to enhance their leadership and life skills and bring the communities of the city of Albion and Albion College closer together. Special guest appearances will be included!

Isaac Kremer, '01

Albion, Michigan: Creating an Interactive History

Faculty Sponsor: Wesley Dick

Major: Economics and Management
Hometown: South Lyon, Mich.

For the last two years I have explored ways to use the Internet to present local historical information. Understanding the limitations of narrative history, and the strengths of the Internet, historical material can be presented in a way that shows all of the subtle links between people, buildings, and events, while removing many biases and prejudices narrative history is prone to—all at a price lower than more traditional communications, like books and pamphlets. The two major tasks required to complete this project were reviewing sources of local historical information and learning how to use the Internet to present this information. Finding the information was a cumulative process that took several months. This past summer a FURSCA grant supported this inquiry.

The more difficult part was planning and designing the World Wide Web site. Developing this site led to the realization that, while use of the Internet was once limited to tech-savvy people, today anyone with a good idea can easily use the Internet to present information. The benefits include making people better educated and aware of their community, and engendering a deeper connection and greater "sense of place." Further, when a large amount of historical information is added together, it can be made into regional and national histories, preserving people's lives and historical legacy in an easily accessible way for future generations. Increasingly, it will become the role of educated people in our culture to arrange information in a way that is understandable, and use the Internet to present it. It is my hope that this project will

encourage similar efforts, and locally assist people in better understanding and appreciating Albion.

Isaac Kremer, '01

Albion, Michigan: Development and Challenge

Faculty Sponsor: Wesley Dick

Major: Economics and Management
Hometown: South Lyon, Mich.

Albion is rich with evidence of its distinguished history among America's small towns from its historic downtown to many historic homes, from the campus of Albion College to the campus of Starr Commonwealth, and from the public schools to civic buildings. While many accounts of Albion's history have been written, few have tried to explain the gradual pattern of development that has taken place here. What is lost is something profound. My honors thesis addresses this problem in two ways. The first component is a Web-based interactive history of Albion containing 5,000 digital images and 1,000 individual Web pages. The second component is a written document analyzing historical periods of Albion's development, showing how Albion has become what it is today.

One theme that emerges from my study is the value of understanding the past in directing future development. It also becomes apparent how the fate of a small town like Albion is tied to historical patterns of discrimination and globalization, two problems it cannot control. I propose that, by understanding our own history and what brought us to where we are today, we can find strategies that bring lasting improvement for college and city alike. A copy of my written thesis and interactive history will be placed on CD-ROM and distributed following the presentation. It is my hope that this thesis can be used to direct further research on Albion, and also encourage more vigorous debate on college policy toward the city of Albion.

Supported by: FURSCA

Jennifer Kuebler, '02

(See Mark Ams, '02, and Jennifer Kuebler, '02.)

Elizabeth Kulhawik, '01

Perceptions of Health, Stress, and Social Support

Faculty Sponsor: Jim Haugh

Major: Psychology
Hometown: Grand Rapids, Mich.

This study looks at student evaluations of their own health, stress levels, and perception of social support received from their parents. The results from students were compared to questionnaires received from parents on their perceptions of support provided for their college student. Students were asked to fill out questionnaires regarding their perception of their physical and psychological health and levels of received social support. Parents were mailed questionnaires asking them about what social support behaviors they feel they make available to their college student.

Results will discuss the meaning and utility of the construct of social support and the importance of the perception of receiving social support. It is hypothesized that students who perceive themselves as receiving lots of social support and whose parents' responses match that opinion will self-rate themselves as having better physical and psychological health. Students who perceive themselves as receiving little support and whose parents' responses match that attitude will self-rate themselves as having compromised health and stress levels.

Using the results found in the study, I hope to find more information on how actual social support received and perceived social support affect college students and may influence their well-being and health. Suggestions on future research in this area will also be reviewed.

Supported by: FURSCA

Bryan Kusiak, '01

Testing of Z-Scheme Photosynthesis Using PSI-Deficient Mutants of Green Algae

Faculty Sponsor: Daniel Steffenson

Major: Chemistry
Hometown: Jackson, Mich.

This project was part of a testing process for a potential new type of photosynthesis. Conventional photosynthesis follows the Z-scheme model with both photosystem I (PSI) and photosystem II (PSII) reaction centers. This new type of photosynthesis is thought to be supported by a PSII light reaction alone. This project involved testing the photosynthetic rate of a number of PSI-deficient mutants of *Chlamydomonas*: B4-PsaA delta-2, LMFud26, Duke CC-1047, and the wild type CC125. These strains were also tested on the basis of their PSI content by extraction of their thylakoid membranes. The photosynthetic rate and PSI content were then compared for each mutant type. This project also involved the determination of the chlorophyll antenna sizes of PSI in the mutants by the use of a rapid scanning spectrometer. The results of the PSI content and photosynthetic rate comparison supported the theory of PSII photosynthesis. The results of the antenna size tests can be interpreted as somewhat contradictory to the theory, but more tests need to be done to make a definite conclusion about PSII photosynthesis. It was determined that more adjustments need to be made to the spectrometer in order for more accurate measurements to be obtained.

Research performed under the supervision of James Lee, Oak Ridge National Laboratory.

Jennifer Lau, '01

Esther Inglis and the Creation of Value

Faculty Sponsor: Ian MacInnes

Major: English, Women's Studies Concentration
Hometown: Morton Grove, Ill.

Western thought has historically viewed women as objects, goods to be bartered, acted upon, used, and valued or devalued. There have always been women, however, who have acted against this system by producing objects of their own, working both within and against the traditional systems of value and artistic authorship. My project analyzes the work of one early modern English woman, calligrapher Esther Inglis. By examining attitudes about the value of women's objects and the nature of Inglis's life and works, I demonstrate the limitations she faced as a creator and, more importantly, the ways in which she exercised her available choices to create and enhance the value of her works.

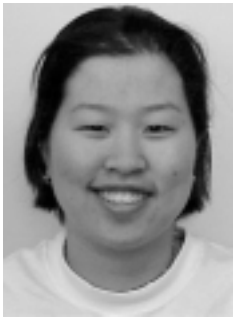
Sarah Leicher, '02

Female Iconography in the Music Industry: From the Women of Woodstock to the Ladies of Lilith Fair

Faculty Sponsor: Trisha Franzen

Major: English
Hometown: Ann Arbor, Mich.

Janis Joplin, Joni Mitchell, Grace Slick, Joan Baez, k.d. lang, the Indigo Girls, Liz Phair, and Sarah McLachlan. What do these women have in common? They have all become a part of the growing presence of women in the music industry. How have the perceptions of women in the music industry changed in the last 50 years? By conducting



interviews and studying the history and dynamics of women's participation in music festivals as both spectators and performers, I will make the answer to this question clear. The purpose of this research is to determine how and if the perceptions of women in the music industry have changed in the time between Woodstock and Lilith Fair.

My Lien, '01

The Salience of Gender and Racial Cues on Children's Choice of Playmates: A Developmental Analysis

Faculty Sponsor: Barbara Keyes

Major: Psychology
Hometown: Grand Rapids, Mich.

Much emphasis is placed on diversity in today's world. To better understand the role that diversity plays in our lives, it is important to examine how and when people learn important attitudes, such as those concerning race. One place to begin is to examine such issues at the very basic level, that is, in the development of racial awareness among young children.

Previous research has demonstrated that the manner and time in which a child learns about his or her own racial identity are important in shaping the future attitudes of that child. The purpose of this study was to determine the level of racial awareness in children and to better understand the cues children use to select their playmates.

One-on-one interviews were conducted with 98 kindergarten, second-, and fourth-grade students of varying racial backgrounds in the Albion Public Schools. Children were asked to choose playmates who differed from them in terms of gender or race. This task was designed to assess which characteristic, gender or race, was most salient in terms of children's choice of a playmate.

It was predicted that older children would have a more sophisticated concept of race across the dimensions of identity, stability, and constancy. Older children were also expected to select playmates of their own race, while younger children were predicted to use gender cues more frequently than racial cues when selecting playmates.

Supported by: FURSCA

Abigail Lindemood, '01

An Analysis of Student and Alumni Giving

Faculty Sponsor: Barbara Keyes

Major: Psychology
Hometown: Kent, Ohio

Surveys were distributed to current students and alumni who graduated from a small, Midwestern, liberal arts institution. The purpose of these surveys was to assess the views of the different cohort groups concerning the importance of maintaining ties to the college and contributing to its financial well-being. Data were gathered from current students as they walked through the college's student center, and surveys were mailed to alumni. Follow-up reminders were sent to non-responders three weeks after the first mailing. Participants were asked to identify factors associated with their decision to give or not to give to their college. One open-ended question about motivations for giving to the college was included at the end of the survey. Differences in attitudes about giving between current students and alumni, between different cohorts of alumni, and between men and women were examined.

Rebecca Linz, '01

Renée Vivien: Une Deuxieme Sapho

Faculty Sponsor: Dianne Guenin-Lelle

Majors: French, English
Hometown: Okemos, Mich.

Renée Vivien (born Pauline Tarn) found relative success as a writer in Paris during the first decade of the twentieth century. Her success is impressive considering that not only was she a woman, but she was an English lesbian feminist writing overtly about her separatist inclinations and her passion for her female lovers. Suffering from depression, alcoholism, and anorexia, Vivien had a melancholy approach to life and was obsessed with death. Yet her works were more often met with praise than with controversy. Inspired by the ancient Greek poet Sappho, her lovers, and Romantic French writers such as Charles Baudelaire and Pierre Loüys, Vivien created volumes of poetry, short stories, plays, and a novel from 1901 to her early death in 1909.

Specifically regarding Vivien's poetic works, critics have often generalized her poetry as being morbid and depressing, but there is a diversity in her works that is much richer than this generalization. Her feminist themes are radical, even for many of today's readers, and her lesbianism comes across as admirably frank. The lesbian world she created in her texts is one of female separatists who reject and despise men, loving only other women. After Vivien's death, she was almost completely forgotten until the 1970s when she was "rediscovered" by certain feminists who recognized her as a pioneer of contemporary feminist-lesbian expression.

Erik Love, '01

The Changing Performance of Masculinity in Contemporary Israel: The Effects of Post-Zionism

Faculty Sponsor: Leonard Berkey

Major: Sociology
Hometown: Southfield, Mich.

From the first half of the twentieth century, Zionism, the social and political movement of European Jews to Palestine or Eretz Israel, espoused the idea of the "New Jew." In the shadow of the Holocaust, Zionists worked to create the "New Jew" as a powerful, community-oriented, "making the desert bloom" man. Throughout most of the state of Israel's 53-year history, this Zionist ideal has shaped Israeli society and, in particular, has dictated the way Israeli men perform their gender.

But now that the state of Israel is well established, and many Israelis feel that the Zionist movement is essentially finished, what changes have there been? It seems that with the rise of post-Zionism, a "newer Jew" masculinity may be rising to challenge the old Zionist masculinity. Given that men dominate Israeli political and social life, this remarkable change could have a definite impact on the future of affairs in Israel, and in the Middle East in general.

What is the "newer Jew" like? I explored this question while in Israel on an off-campus study experience. By collecting ethnographic data and through a survey sent to Israeli university students, I have some intriguing insights into the changing performance of masculinity in Israel.

Supported by: FURSCA

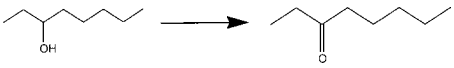
Bryce Marquis, '02

Alumina-Supported Potassium Permanganate Oxidations of 3-Heptanol and 1-Methyl-1-Cyclohexene

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: St. Paul, Minn.

This project reflects an on-going effort to develop a new chemical tool for organic chemists. As part of a continuing study, alumina-supported potassium permanganate (ASPP) was allowed to react with a representative alcohol and alkene under four different sets of reaction conditions. The effects of water content and solvent on product yields were observed in an effort to better understand the properties of this new reagent. 3-Heptanol gave 3-heptanone in 42-99% yield depending on reaction conditions, but 1-methyl-1-cyclohexene gave almost no oxidative cleavage to 6-oxo-heptanoic acid in methylene chloride.



Supported by: FURSCA

Tiffany McCall, '01

Self-Perception of Children in Rural Kenya: A Developmental Analysis

Faculty Sponsor: Barbara Keyes

Majors: Psychology, English
Hometown: Chicago, Ill.

This study, which examines the self-perception of children in rural areas of Kenya, was conducted in the fall of 2000. The variables of age, gender, and school quality were explored to

determine whether or not they affected children's self-perception.

Children who participated in this study were all in Standard 2, which is equivalent to second grade in the United States. They were selected from two village schools that performed differently on standardized tests.

A variety of methods was used to gather data. Participants drew pictures of themselves, their families, as well as what they aspired to be in the future. In addition, each participant answered nine true/false questions from the Tennessee Self-Concept Scale, which focused on the participants' feelings about themselves. Students were asked to use clay to form models.

Differences found in the responses of participants can be explained in terms of age, gender, and school quality. Other studies of the development of self-concept (most of which have been conducted in the United States) will be used in order to explain the current findings.

John Molenda, '01

Hong Kong since 1997: Current Views and Ideas

Faculty Sponsor: Molly Mullin

Major: Anthropology
Hometown: Dimondale, Mich.

In this presentation I will draw on interviews with students, students' families, and social activists. These interviews were completed between January and August of 2000, with the help of FURSCA summer funding.

I will discuss the economic and political changes that Hong Kong has undergone since 1997, when the United Kingdom returned control of Hong Kong to the People's Republic of China. Much of my presentation will draw on interviews regarding Hong Kong people's opinions about democracy, economic well-being, civil liberties, and national identity.

Supported by: FURSCA

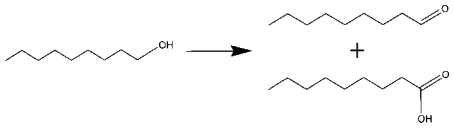
Jason Mussman, '02

Alumina-Supported Potassium Permanganate Oxidations of 1-Octanol and 1-Methyl-1-Cyclohexene

Faculty Sponsor: Clifford Harris

Major: Chemistry
Hometown: Grand Rapids, Mich.

This research is part of an on-going effort to develop a new tool for synthetic organic chemists. As part of a continuing study, alumina-supported potassium permanganate (ASPP) was allowed to react with a representative alcohol and alkene under four different sets of reaction conditions. The effects of water content and solvent on product yields were observed in an effort to better understand the properties of this new reagent. 1-Octanol gave a mixture of 1-octanal and 1-octanoic acid in low yield depending on reaction conditions, and 1-methyl-1-cyclohexene gave 50-64% yield of 6-oxoheptanoic acid in acetone.



Elizabeth Olgren, '01

The Search for the *xylE* Gene in the Genomic DNA of *Thermoanaerobacter ethanolicus*

Faculty Sponsor: Luti Erbeznik

Major: Biology
Hometown: Trenton, Mich.

Thermoanaerobacter ethanolicus is a thermophilic anaerobic bacterium that is able to utilize xylose, a sugar, as food and release ethanol as a by-product. Understanding the mechanism by which *T. ethanolicus* transports xylose across its membrane would be of use in industry, since xylose-containing plant waste could be degraded by *T. ethanolicus*, and ethanol could be mass- produced as an alternative industrial fuel.

In order to construct potent ethanol fermenters, an in-depth study must be performed to find and characterize the genes coding for the transport system of xylose. In other bacteria, *xylE* codes for the low-affinity transport protein of xylose. Specially designed primers were created, using consensus sequences from previously known XylE proteins in other bacteria, in order to use the polymerase chain reaction (PCR) to isolate the fragment of *T. ethanolicus xylE* gene.

Two PCR products of the expected size were obtained, cloned, and sequenced. Computer analysis of the predicted peptide sequences from these two PCR products revealed that neither fragment had homology to *xylE*. Instead, they contained coding information for anaerobic sulfite reductase and an exonuclease, respectively.

An alternative route of cloning the *T. ethanolicus xylE* is Southern analysis of *T. ethanolicus* genomic DNA using the *Escherichia coli xylE* fragment as a probe. The *xylE* fragment has been PCR-amplified, cloned, and sequenced, and Southern analysis is under way.

Supported by: FURSCA

Eric Petroelje, '01

Effectiveness of Physical Education in Elementary Schools

Faculty Sponsor: Thomas Johnson

Major: Physical Education
Hometown: Zeeland, Mich.

In recent years, schools have struggled with the task of knowing how to divide the hours of the day amongst each of the different subjects, particularly in regard to physical

education. This research is important because elementary school principals, administrators, and physical educators ask the question, "Do our children receive enough time in physical education?" on a regular basis.

To answer this question, the study will use the testing results of fifth-grade students at Madison Elementary in Marshall, Mich. Approximately 70 fifth grade students participated in the Presidential Physical Fitness testing that took place in September. These tests included shuttle run, pull-ups, sit-ups, and one-mile run. These same students will be post-tested in the same manner as before to find my results. The physical skills of endurance, strength, speed, and agility will be the focus. This study should help to provide an answer to the educators' questions.

Angela Pierce, '01

Evaluating the Effectiveness of Teenage Pregnancy Prevention Programs

Faculty Sponsor: Trisha Franzen

Major: Political Science, Women's Studies Concentration
Hometown: Holton, Mich.

In 1992, a noticeable decline emerged in teenage pregnancy. Still, over 500,000 teens give birth every year in the United States. The United States currently has the highest teenage childbearing rate in the developed world. The purpose of this project is to prove that teenage pregnancy is a prevalent social issue and evaluate the effectiveness of teenage pregnancy prevention programs in the United States.

The primary research method is to evaluate current models of teenage pregnancy prevention programs by analyzing programs' effectiveness in target areas and the materials covered by each program. I also suggest possible improvements based on other programs. Secondary research is included on the effects of teenage childbearing on society and on other evaluations by organizations.

I have found that the most effective programs contain each of the following: comprehensive sexual education material (covering sexuality, abstinence, responsible choices, and birth control methods); built-in evaluation process; effective outreach to the community; increased awareness and information among teens (specific to the program goals); strong relationship-building between adults and teens; programmatic continuity for a decent amount of time; and measurable short-term and long-term results.

Adolescent childbearing is costly to society. Comprehensive teenage pregnancy prevention programs will allow adolescents to succeed in the marketplace, keep them off welfare, and give them a sense of worth.

Supported by: CIS in Ethnic, Gender, and Global Issues-Adams Fellowship

Nathan Piwowarski, '02

Mr. Polk's War: Executive Power and State Expansion during the Mexican War, 1846-1848

Faculty Sponsor: Andrew Grossman

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

In April of 1846, the United States entered a war that would expand its borders in a manner comparable only to the Louisiana Purchase. Our war with Mexico, and the way President James K. Polk conducted it, is one of the most under-appreciated episodes in American history. President Polk's direction of the war in its smallest minutiae challenges our understanding of antebellum presidents, who we traditionally think of as weak in comparison to Congress. Additionally, the sudden expansion of territory resulting from the Treaty of Guadalupe Hidalgo shaped our nation's future by dramatically expanding our nation's resources—and by bringing sectional conflict over slavery to the fore in national politics.

My research reappraises this critical conflict in order to better understand the nineteenth-century presidency, as well as the capabilities of the antebellum nation-state. My sources have included histories of the Mexican War and internal documents from the Polk administration.

Supported by: FURSCA, CIS in History and Culture, Political Science Department

Kathryn Pritchard, '01

Sedimentology of Glacial Deposits and Landforms near Dowling, Michigan

Faculty Sponsor: Thomas Wilch

Major: Geology
Hometown: Cincinnati, Ohio

Detailed field and sedimentological analyses of surface deposits located on the 13,000-year-old Kalamazoo Moraine near Dowling, Mich. were undertaken to evaluate the distribution of deposit types in the area and their significance in terms of glacial history.

Surprisingly, glacial till comprises less than half the surface area of the moraine study site. The Bedford till forms a thin veneer of muddy-gravelly sediment, rarely more than two meters thick. The deposit is discontinuous and occurs at different locations throughout the area. At five different sites, fifty orientation measurements were taken of the long axes of rock clasts within the till. All five sites showed

similar statistically strong preferred orientations indicating SW-directed ice flow. Locally, at the surface and underlying the Bedford till, glacial river sediments include bedded silts and sands with gravel, and boulder beds finning upward into cross-bedded gravels and sands. The large particle size and the strong preferred orientation of these clasts suggest catastrophic southward meltwater flow events, possibly associated with sub-glacial floods.

Lake deposits are localized in the area and include a delta sequence inter-bedded with fine-grained silt and clay. Extensional faulting in the lower part of the delta deposit indicates release of pressure from the sides of the deposit or loading of sediment on top. Compressional folding and faulting in the upper part of the delta may have resulted from movement of an overlying ice mass.

We hypothesize that formation of the Kalamazoo moraine resulted from two processes: sub-glacial meltwater drainage and flooding accompanied by stagnation of the retreating Saginaw ice lobe.

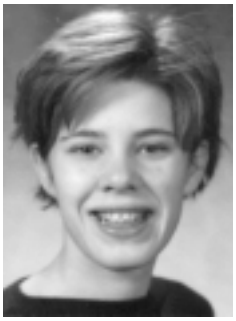
Supported by: FURSCA, Pierce-Cedar Creek Institute

Christine Putnam, '01

The Rise and Fall of the Antebellum Acadian Sugar Culture in Ascension Parish, Louisiana

Faculty Sponsor: Marcy Sacks

Major: History
Hometown: Midland, Mich.



The focus of my research is the rise and fall of the antebellum Acadian sugar culture in southern Louisiana, specifically in the Parish of Ascension. Using material collected in Donaldsonville and Baton Rouge during the summer of 2000, I examined the relationship between the family of Joseph Landry, Jr. and the ill-fated Acadian sugar culture. As successful Acadian sugar planters, Joseph Landry, Jr. and his children amassed considerable fortunes and rose to the highest levels of state and local government. Prior to the Civil War, the Landry family owned a series of successful sugar plantations on the west bank of the Mississippi River. By 1870, however, the combination of war and poor crop yields had destroyed the Acadian sugar trade and the Landry family fortune. The experiences of Joseph Landry, Jr. and his children are representative of the sweeping social changes that accompanied the rise and fall of the antebellum Acadian sugar culture.

Supported by: FURSCA

Brianne Rains, '01

(See Catherine Clay, '01, Juli DeLucia, '01, Katherine Jones, '01, Brianne Rains, '01, Valerie Skaleski, '01, and Sarah Wall, '01.)

Kristi Reithel, '02

Modeling of Charged Particle Trajectories in a 50-Kilovolt Electrostatic Accelerator System Using SIMION

Faculty Sponsor: David Seely

Major: Chemistry
Hometown: Temperance, Mich.

To aid in determining user-definable parameters for the operation of a 50 kV photodetachment apparatus, the SIMION electrostatic ion-optics simulation program was used to calculate trajectories of singly- and doubly-charged ions. SIMION uses relaxation methods to solve Laplace's equation for user-defined three-dimensional geometries. This program was used to model electrostatic fields in a photodetachment apparatus that consists of an ion accelerator and a subsequent analysis chamber. The ion accelerator is comprised of an ion source, Einzel lens, and acceleration column; the analysis chamber contains an electrostatic dodecapole field. Ion formation occurs in the ion source. The Einzel lens serves to define and pre-focus the beam.

The primary acceleration column is used to increase the ion velocity and focus the beam into a charge exchange chamber. Within the charge exchange chamber, the ions pass through an alkali vapor where electron transfer can occur. A multiply charged ion beam with charge states of $-e$, 0, and $+e$ emerges from the chamber. The beam is then directed into the analysis chamber where a dodecapole field separates the beam into its constituent parts. The dodecapole field is created by placing alternating voltages on 12 conducting rods arranged in a circle.

These three-dimensional geometries were entered into SIMION using measurements taken from the actual devices. Within SIMION, virtual ions could be given various masses and kinetic energies along with initial locations. Various voltages were applied to virtual conductors in both the accelerator system and dodecapole to determine where the ion control was optimum.

Supported by: FURSCA-Kresge Fellowship

Erin Risser, '02

The Diet of Bats in the Albion Area Based on the Analysis of Guano

Faculty Sponsor: Douglas White

Majors: Biology, Mathematics
Hometown: Livonia, Mich.

To determine which types of insects bats eat, I collected guano from six sites in and around the city of Albion (four houses, one barn, and one bat house). I attributed the guano to Big Brown Bats, *Eptesicus fuscus*, based on pellet size and location. The bat house was one of four erected at the Whitehouse Nature Center for this project.

For each of 40 pellets from each location, I teased apart surviving fragments

of insect exoskeleton under a compound microscope at 40X magnification. I classified remains to order or to family if larger pieces were available. For each sampling site, I calculated the average percent volume of each taxon.

Contrary to expectation, three sites in Albion were not more similar to each other than they were to three sites in more rural areas. At all sites, Coleopterans (beetles) and Hemipterans (true bugs) were the most common foods. Among sites, however, a trade-off existed between volume of Coleopteran remains and volume of Hemipteran remains. Diptera (flies), Hymenoptera (wasps, bees, and ants), Lepidoptera (moths), and Neuroptera (stone flies) were also represented in small percentages. Each pellet generally contained parts from three or four different Orders. The great diversity of insect remains within pellets, among pellets at a site, and among sites overall suggests that Big Brown Bats feed opportunistically, but only a future examination of prey availability can confirm this conclusion.

Supported by: Institute for the Study of the Environment

Kyle Roslund, '01

Field and GIS Mapping of Glacial Sediments and Landforms near Dowling, Michigan

Faculty Sponsor: Thomas Wilch

Major: Geology
Hometown: Ithaca, Mich.

Field and GIS mapping of sediment-landform assemblages of the Late Wisconsinan (13,000-year-old) Kalamazoo moraine near Dowling, Mich., suggests that southwest-flowing meltwater was a key factor in moraine formation. Mapping of this nature is useful for assessment of land-use practices and interpretation of glacial retreat in Michigan.

Interpretations are based on analysis of sediment in 15 excavations and 83 auger holes in a 370-acre nature preserve, 12 area well logs, and nearby commercial borrow pits. Two- and three-dimensional surface maps created in ArcView GIS enhance visualization of the relationships between sediments and landforms.

The 20 km wide, east-southeast trending hummocky moraine is cut by several southwest trending, 20 m deep, 1 km wide sub-parallel valleys. At present, the valleys contain lakes, streams, peat deposits, and elongate, steep-walled ridges of sand and gravel. The moraine is attributed to the Saginaw ice lobe. The valleys are interpreted as large subglacial meltwater tunnel channels that contain much narrower beaded eskers. Deposit types studied included diamicton (material deposited directly from ice), glaciofluvial sediments (river-like material deposited from glacial meltwater), and glaciolacustrine sediments (annually layered material deposited in glacial lakes).

We hypothesize that the Kalamazoo moraine resulted from two processes: subglacial meltwater drainage and flooding (tunnel channels, boulder gravels, and other deposits overlain by melt-out till) accompanied by stagnation of the retreating Saginaw lobe (melt-out till and upper glaciofluvial deposits).

Supported by: FURSCA, Pierce-Cedar Creek Institute

Nicole Schmeiser, '01

Periphery versus Center: Migration of Industry in Spain and Its Cultural Impact

Faculty Sponsor: Larry Steinhauer

Majors: Economics and Management, Spanish
Hometown: Davison, Mich.

In recent years Spain has undergone an immense amount of integration with the rest of Europe. In 1986 it joined the European Union and subsequently participated in the new free trade zone that was created when all legal barriers to trade were abolished within the Union in 1992. In 1992 two economists, Anthony Venables and Paul Krugman, wrote

an intriguing paper that discussed the possible effects of this integration on Spain's economy. Their theory was based on the concept of an economic center of production and the peripheral economies that surround it and contended that countries on the periphery of Europe such as Spain would initially lose industry as trade barriers were removed but would eventually regain that industry. Furthermore, it suggested that industry within Spain would concentrate in economic centers of production.

In this thesis, I have tried to determine the validity of Krugman and Venables' theory by selecting three industries (textiles, motor vehicles, and other transport vehicles) and analyzing raw data from 1985 to 1997 on the number of firms and employees in each of the regions in Spain to determine whether these three industries are concentrating in certain areas. I have also calculated locational coefficients over time and have compared them to show that industry has indeed been further concentrating in historically industrial centers. In the final section of the thesis, I examine the changing role of women in response to the migration of industry and employment to these industrial centers.

Heather Schmidt, '01

The Effect of Salt-Induced Hypertension on Leptin Transport in Rats

Faculty Sponsor: Susan Klarr

Majors: Biology, Religious Studies
Hometown: Davisburg, Mich.

Connecting the notions of hypertension and obesity, this study examined the link between the "hunger peptide," leptin, and corticotropin releasing hormone

(CRH), a hormone involved in hypertension, stress responses, and possibly feeding behaviors. Little is known about the mechanisms by which leptin and corticotropin regulate parameters such as food intake or blood pressure or how they interact with each other. Specifically, leptin transport in the brain and the effects of CRH treatment and blockade of the CRH receptor 2 (CRHR2) in Sprague-Dawley rats were examined.

Methods: Deoxy-corticosterone acetate salt treated (DOCA-salt) rats, and Sham rats, were each implanted with an osmotic pump, which gradually and consistently released either a CRH analogue (urocortin), a CRHR2 blocker (astressin), or CSF into the brain. The parallels between urocortin presence and leptin transport were examined over a two-week period physiologically (blood pressure and weight change) and behaviorally (food intake and water intake).

Results: Results supported the hypothesis that leptin transport may be connected to a CRHR2-related mechanism requiring the presence of urocortin to maximize operation and, hence, function of leptin.

Significance: Abnormalities in leptin sensitivity have been associated with both hypertension and obesity; these data suggest that a disturbance of leptin transport in the brain may be a mechanism of leptin insensitivity. Since obesity and hypertension are two of the major health problems in the U.S., further elucidation of the relationships among diet, high blood pressure, and the hormone leptin will add important information about these serious disease states.

Supported by: FURSCA

Elise Schultz, '02

The Study and Characterization of Polypyrrole Made by Photochemical Oxidative Polymerization

Faculty Sponsor: Craig Bieler

Major: Chemistry
Hometown: Saginaw, Mich.

The purpose for this study of polypyrrole synthesis is to investigate a new and better way of making this particular conducting polymer. The photochemical oxidative

method was investigated under various reaction conditions in order to maximize product yield, quality, and conductivity. This method used UV light to induce a chemical reaction in a solution of pyrrole and carbon tetrachloride. Following the synthesis of polypyrrole, conductivity studies were performed in an effort to better characterize the product. Optimal conditions for polypyrrole synthesis using the photochemical method are stirring the solution, filtering daily to extract the polymer, using solution concentrations of between 0.1 and 0.5 moles/liter with carbon tetrachloride as the solvent, and rinsing the product to remove impurities. The conductivity of the polypyrrole showed an increase in value with an increase in exposure to a dopant (iodine).

Conducting polymers such as polypyrrole are important for advancement in the technology of semiconductors, electrochromics, rechargeable storage batteries, bio and gas sensors, and biomedical membranes.

Supported by: FURSCA-Kresge Fellowship, Student Research Partner Program

Lisa Schultz, '01

Resolving Organizational Conflict: The Effects of Rational versus Emotional Decision-Making

Faculty Sponsor: Amy Otto

Major: Psychology
Hometown: Sterling Heights, Mich.

Organizational culture has been found to play an important role in the decision-making of individuals involved in workplace conflict (Otto, 1997). The previous research has not yet explored differences between rational and emotional organizational cultures. In the present study, researchers hypothesized that the rational/emotional dimension would play a substantial role in conflict resolution.

The study required that subjects complete one of eight variations of a Web-based workplace simulation (Otto & Barr, 2000) that presented either a rational or emotional organizational culture. As participants proceeded through the simulation, they were introduced to a narrator and taken on a virtual tour of a corporation to establish the cultural artifacts, values, and assumptions intrinsic to the operation of that particular company. They also learned about a past conflict in which either an emotional or rational resolution was attempted. Finally, subjects were introduced to a new conflict and then asked to indicate how they would resolve this new conflict.

The present study may establish that the conflict resolution techniques employed by individuals are dependent on the culture of their workplace. By determining if an organization's culture does play a substantial role in the decision-making process of individuals involved in workplace conflict, then steps can be taken to examine which resolution techniques would be most effective for each organizational culture. The implementation of certain types of conflict resolution techniques could then be tailored to suit each organization's needs, resulting in less expensive, less time-consuming, and hopefully more effective conflict resolution procedures.

Heidi Schurman, '02

A Passion for Fashion

Faculty Sponsor: Trisha Franzen

Major: English, Women's Studies Concentration
Hometown: Highland, Mich.

This presentation will explore and explain many of the recent fashion trends and how they relate to our culture's ideology about women. This will include fashion trends from popular women's magazines such as *In Style* and *Lucky* as well as fashion trends

from various designers. Some of the designers include DKNY, Dolce and Gabbana, bebe, Ralph Lauren, and more.

The presentation will discuss what makes popular fashion trends successful and why some trends are failures. For example, the knee-high boots that are being shown everywhere this winter, will they still be popular next season?

In addition to discussing the popular trends, the presentation will also explore women's reactions to them. How do certain styles affect body image? Can certain clothes positively and negatively affect women's feelings about themselves?

Kathrin Schwesig, '01

A Personal Odyssey: Reflections of a Multicultural Self

Faculty Sponsor: Max Noordhoorn

Major: French
Hometown: Hong Kong

"A Personal Odyssey" is a reflection of my multicultural self and an account of the international encounters I have experienced throughout my life. It is an odyssey that begins with early memories of childhood socialization in Kenya and continues with the experiences of cultural differences, culture shocks, and language barriers in places such as Germany, the U.S., France, and Hong Kong. Furthermore, this thesis examines the significance of being an outsider in a foreign country and the emotions as well as possible frustrations faced by someone who has left his or her comfort zone to live in a new culture. Moreover, this thesis leaves the reader with thoughts on identity, stereotypes, and prejudices, and the notion of "home." It is based on personal testimonies that in combination with literary sources exemplify these issues.

"A Personal Odyssey" is meant to be shared with anyone who will live or has lived abroad, anyone interested in other cultures, and anybody who has ever wondered what it would feel like to be an outsider in a foreign environment. This thesis should serve as a guide, a preparation, or merely a reflection of what one may expect or encounter when living abroad.

Eric Scott, '01

Scottish Cultural Identity in Eighteenth-Century Literature

Faculty Sponsor: Sally Jordan

Major: English
Hometown: Redford, Mich.

My research focused on the ambivalence in Scottish cultural identity in eighteenth-century literature. The Act of Union of 1707, which combined the parliaments of Scotland and England and stole the national identity of Scotland, is one of the catalysts that led to this mixed feeling. Scotland was one of the first colonies England possessed, and England's treatment of the Scots testifies to the inequality of this arrangement. England's attitude toward the Scots is exemplified in the words of Samuel Johnson, the "great man" of the English eighteenth century, as quoted in James Boswell's *London Journal*: "But, Sir, I believe the noblest prospect that a Scotsman ever sees is the road which leads him to England."

My thesis concentrates on James Boswell, Tobias Smollett, James Macpherson, and Robert Burns, significant Scottish writers who revealed feelings of ambivalence toward their native country. I'm interested in why Boswell and Smollett portrayed their Scottishness as something to hold in low regard, but at the same time celebrated it. The other two authors offer paradoxes as well. James Macpherson claimed that he discovered an ancient epic, when in fact he created most of it, and in the process of doing so, he created a national text that allowed the Scots something to rally behind. Perhaps the most adored Scottish poet, Robert Burns, was famed for his poems in the Scots dialect and claimed a humble background, but he could also write in very elevated, educated English when he chose to. This dichotomy is very interesting to me because of paradoxes fashioned under the umbrella of colonialism and national pride.

Supported by: FURSCA

Steven Sexton, '01

How Did T.V. Western Heroes Paladin and Matt Dillon End Up in Vietnam? Mapping Masculine Disorientation in Modern War Literature

Faculty Sponsor: Ian MacInnes

Majors: English, Philosophy
Hometown: Jackson, Mich.

In the Western imagination, masculine identity is inextricably linked to geography. The Western masculine preoccupation with establishing strong ties with the land or a geographical orientation is evinced in several modern Western war novels. The war setting is instrumental because the battlefield has traditionally been the arena where masculine identity is tested and redeveloped. In these novels, geographical disorientation leads to and is representative of masculine identity crises (madness).

This presentation will focus on constructions of masculinity in Tim O'Brien's *Going After Cacciato*. Using this text as a model, and drawing on such films as *The Sands of Iwo Jima*, *Soldier Blue*, and *Southern Comfort*, and old television westerns such as "Gunsmoke," "Have Gun, Will Travel," and "The Rifleman," I will argue that

Vietnam destroys the socially constructed masculine identity of Paul Berlin, the protagonist in *Going After Cacciato*. For Berlin's generation, masculinity is grounded in geography. Consequently, when Berlin arrives in Vietnam he is hoping to find an orientation—both literally and figuratively—that will allow him to discover and test his "manhood." However, he quickly finds that he is unable to orient himself to his new surroundings. He constantly and repeatedly uses the West as his point of reference whereas he needs to locate a point of reference in Vietnam. Furthermore, he must literally find a course in Vietnam that will allow him to test and prove his manhood. As Berlin becomes disoriented, madness ensues, and he escapes into his imagination in hope of discovering an alternate orientation (i.e., Paris).

Supported by: FURSCA

Crystal Shaw, '01

Rice Creek: The Hydrology of an Agricultural Drain in South Central Michigan

Faculty Sponsor: Timothy Lincoln

Major: Geological Sciences
Hometown: Traverse City, Mich.

Rice Creek, tributary to the Kalamazoo River, trends roughly east-west through Calhoun and Jackson Counties. Most of Rice Creek has been dredged to serve as an agricultural drain. Spring Brook, an undredged stream trending north-south through Jackson and Ingham Counties, lies to the east of Rice Creek. This study involved using GIS (Geographic Information Systems) to create a map of the watersheds for each stream, gauging the streams, and creating a groundwater model of a portion of the watershed. These all were important to the generation of a water budget for the area, which aids in a better understanding of the migration of water and its contaminants.

The four-month record of storm surges suggests that Rice Creek has a more flashy response to rainfall than Spring Brook. In Rice Creek, discharge increases more quickly to a higher peak value and decreases more rapidly than Spring Brook. Rice Creek has a concave storm surge pattern, while Spring Brook displays a convex pattern. Using the method of Ousey, a simple spreadsheet model was created to determine the behavior of the groundwater between the north and south branches of Rice Creek, and also east to Spring Brook. The key variables in this model are hydraulic conductivity and recharge rate. Variations in recharge rate were found to have a larger effect on the model. The combination of the results of modeling and mass balance calculations based on stream gauging constrains the overall water budget for the watershed.

Supported by: FURSCA, Institute for the Study of the Environment

Tara Simonds, '01

Rice Creek: Assessment of Habitat Quality Based on the Macroinvertebrate Population

Faculty Sponsor: Timothy Lincoln

Major: Biology
Hometown: Mattawan, Mich.

I sampled at four sites along the south branch of Rice Creek to assess the habitat quality based upon the macroinvertebrate population. Samples were collected up- and downstream from an inactive hog production facility that is suspected of having degraded the water quality of the creek through leaking waste lagoons. Sampling sites were located where the creek crosses Michigan Avenue, two miles upstream from the facility; Callahan Road, at the facility; Gibbs Road, one mile downstream; and 28 Mile Road, five miles downstream. Samples were collected using a D-frame aquatic net. Organisms were separated and identified in the lab.

The data were used to determine diversity index, similarity index, and biotic index values. According to these indices, the 28 Mile Road site was most diverse and also had the best water quality. All of the sites, however, fell into the "very poor quality" category. The 28 Mile Road site was most similar to the Michigan Avenue site, which was expected to have the best quality because it is the only site located upstream from the hog facility. The poor quality of all the sites reflects the negative effects that habitat alteration and animal waste can have on a creek.

Supported by: FURSCA

Lacey Sischo, '01

How Fraternities Shape Gender Relations on the Albion College Campus

Faculty Sponsor: Mimi Schippers

Major: Sociology, Gerald R. Ford Institute for Public Policy and Service Concentration
Hometown: Neillsville, Wisc.

The Greek system in general and fraternities in particular play an integral role in shaping gender relations on the Albion College campus. In order to examine the role fraternities play in perpetuating gender inequality through the objectification of women, I took both a quantitative and qualitative approach.

My quantitative method included a systematic and stratified random sampling of Greek and non-Greek Albion College students that gauged attitudes on gender dominance and rape myth acceptance. The results showed that the survey respondents, both Greek and non-Greek, did not have attitudes that supported gender dominance or rape myth acceptance.

Qualitatively, I employed a participant observation method that compared interaction at open fraternity parties with interaction at other social settings, such as at the bar. It was in these comparisons that I discovered that, within interactions, gender is constantly manipulated, and gender difference is reinforced in a way that perpetuates female objectification and gender inequality.

My findings suggest that, although Albion College students may not possess attitudes that support male dominance, within social interactions gender inequality is reinforced through fraternities, both as an institution and social setting, which initiate and foster such interaction.

Valerie Skaleski, '01

(See Catherine Clay, '01, Juli DeLucia, '01, Katherine Jones, '01, Brianne Rains, '01, Valerie Skaleski, '01, and Sarah Wall, '01.)

Andrea Smith, '01

(See Herman Blacksher, '01, and Andrea Smith, '01.)

Nathaniel Sowa, '03

Sexing Nestling House Wrens: A Protocol for Extracting DNA from Feathers

Faculty Sponsor: E. Dale Kennedy

Major: Biology
Hometown: Marlette, Mich.

House Wrens (*Troglodytes aedon*) are small, brown migratory songbirds that breed throughout much of the Americas, from Canada south to the tip of Argentina. Adult males and females appear very similar physically but can be sexed by behavioral characteristics during the breeding season. Nestling house wrens, however, cannot be sexed either physically or behaviorally.

Determining sex ratios of broods of nestlings is important for several reasons. Female birds in some species may be able to adjust the sex ratio of their clutches based on certain conditions, such as resource availability, time in the breeding season (early vs. late clutches), and status of female (primary vs. secondary female for a male). Ability to obtain nestling sex ratios can be an important tool for conservation of species. For example, if a male-biased sex ratio is found in a species of endangered birds, appropriate steps may then be developed to help conserve the species.

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. I modified existing procedures to develop a relatively easy and inexpensive method to extract DNA from feathers of wrens. This new procedure is less invasive and less time-consuming than other methods.

Supported by: FURSCA

Chandra Thomas, '01

Judging a Book by Its Cover: Exploring How Ethnic Names Influence Employer Perceptions

Faculty Sponsor: Amy Otto

Major: Psychology
Hometown: Pontiac, Mich.

The decision to hire an applicant is generally based on the applicant's educational background, work history, and general skills; however, gender and race are also factors that may determine whether an applicant is hired for a job. Previous research has shown how gender-specific and gender-ambiguous names play a substantial role in hiring decisions. Likewise, several studies have explored the occurrence of racial stereotyping, where those in positions to hire or screen applicants presume the competence and qualifications of the applicant based on his or her race or ethnicity.

Most parents give their children names that have been passed down through generations, or give names that have meaning, symbolic of their religious or cultural upbringing. These names may serve to identify a candidate's race. When parents do this assigning of names as a means of reinforcing heritage or acknowledgment of their ethnic background, these names ultimately may illicit discrimination from potential employers.

In this present study, participants evaluated resumes from applicants with names associated with different ethnic backgrounds: African American, Asian, and Caucasian. It is expected that subjects will make assumptions about the ethnicity of the applicant, which will affect their judgments about the applicant's proficiencies. If this is supported, the present study will provide evidence that even very subtle factors, like the perceived ethnicity of a person's name can result in discrimination in the workplace.

Supported by: FURSCA

Jennifer Tobin, '03

A LabVIEW-Based Data Acquisition System to Study the Motion of Charged Particles in an Electrostatic Dodecapole Field

Faculty Sponsor: David Seely

Majors: Physics, Chemistry
Hometown: Middleville, Mich.

Using a graphical programming language called LabVIEW, several software routines were developed for eventual use in data acquisition and organization for a negative ion accelerator system. The first program was designed to read small values of current detected by a Faraday cup as a function of the voltage applied to the inner shield of the cup. Another program was constructed to control

a monochromator to characterize potential light sources to be used in proposed photodetachment experiments. A third routine was written to control a thermoelectric cooler that was attached to a laser diode housing. The first routine was checked by applying it to a Franck-Hertz experimental apparatus, and the others were employed to study the "mode-hops" of a laser diode system that is a candidate light source for future experiments. Mode-hop behavior was observed, but the data suffered from ambiguities attributed to an inability to precisely control the temperature of the laser diode.

Supported by: FURSCA-Hyde Fellowship, National Science Foundation

Sarah Wall, '01

(See Catherine Clay, '01, Juli DeLucia, '01, Katherine Jones, '01, Brianne Rains, '01, Valerie Skaleski, '01, and Sarah Wall, '01.)

Stacy Warner, '01

The Effects of Media Presentation and Past Experience on Attitudes toward Mental Retardation: A Comparison of Video and Written Works

Faculty Sponsor: Jim Haugh

Majors: Psychology, Music
Hometown: Gladstone, Mich.

Past literature has shown that there exists a generally negative attitude toward individuals with mental retardation. Literature also suggests, however, that attitude change is possible with different techniques. Direct and indirect contact, educational information, and discussion can have profound positive effects on negative attitudes. The media has also been found to play an important role in the influence of attitudes. It is expected that: (1) an informational session about this developmental handicap, specifically through television and written works, will have a positive effect on people's attitudes; (2) information received through video will have a more positive effect on attitudes than information received through a written article; and (3) the attitudes of participants who have had previous experience with mentally retarded individuals will be less likely to change after the informational session. Results of this study could potentially uncover the most effective method of increasing awareness of developmental handicaps and ultimately raise people's attitudes toward individuals with this handicap.

Supported by: FURSCA

Eric Weaver, '01

Ultrastructural Studies of *Lonicera* Species from the Whitehouse Nature Center

Faculty Sponsor: Ruth Schmitter

Major: Biology
Hometown: Honor, Mich.

A study of the *Lonicera* species in the Whitehouse Nature Center was originally undertaken as a pilot study of nectar-secreting tissue. Following observations of the ultrastructural characteristics of plants with conspicuous nectariferous tissue, such as those in the genus *Lonicera*, an attempt would be made to determine if nectaries are present in the Melastomataceae. The small amount of literature about *Lonicera* and the close proximity of populations of *Lonicera* led to the continuation of ultrastructural studies of nectaries in *Lonicera*. This examination of *L. tatarica, L. morrowii*, and *L. x bella* would allow comparisons to be made between the shrub varieties of *Lonicera* and the vine *L. japonica*, studied by Fahn and Rachmilevitz (1970). While the type of plant is different, the flower anatomy is similar. It was hypothesized that, since the flower morphology of *L. tatarica, L. morrowii, L. x bella*, and *L. japonica* is similar, there would be no difference in the ultrastructural characteristics and secretory processes of these plants.

Samples of flowers from six plants were collected. Some were collected for botanical studies, and others were preserved in 3% gluteraldehyde for light and electron microscopy. Sections were stained and observed. Botanical studies provided the basis for identification to species and measuring the sugar concentration of the nectar, which ranged from 14-15%. Electron micrographs were similar to those of Fahn and Rachmilevitz (1970) for *L. japonica*. This suggests that the two studies can serve as representative of genus *Lonicera.*

Supported by: FURSCA-Bethune Fellowship

Jillian Weiss, '01

The Effect of Emotional Script Content on Memory

Faculty Sponsor: Michael Anes

Major: Psychology
Hometown: Niles, Mich.

This study examined the effects of emotional scripts on mood. Subjects received each of three scripts, which included first date, getting ready for school, and driving through a fast food restaurant. The emotional content of scripts consisted of happy, sad, and neutral conditions. Pilot studies found that the scripts successfully induced the respective mood of each script. Participant mood was assessed before and after each script was presented, and subjects subsequently received 16 true or

false questions regarding the script content. It was hypothesized, in accordance with previous research findings, that happy persons would be more likely to rely on general knowledge structures and would thus make more intrusion errors. Sad persons, conversely, would be less likely to rely on general knowledge structures and would thus be more likely to encode and recognize atypical information. Analysis is pending the completion of data collection.

Supported by: FURSCA

Jennifer Wells, '01

100 Years of *Buddenbrooks*

Faculty Sponsor: Ingeborg Baumgartner

Majors: German, History
Hometown: Mentor, Ohio

Thomas Mann's *Buddenbrooks, The Decline of a Family* was published in 1901. In the 100 years since the publication, scholars and critics have analyzed, discussed, and interpreted the novel. Today, it may be of interest to readers how a novel of this stature has fared in the critical world. In this thesis, I analyze some of those aspects of the novel that caught the critics' attention; I examine how they interpreted the action and what they wrote about the structure, organization, and style of Mann's epic work. I do this by selecting one or two critical works for each decade, in order to achieve a chronological overview. This thesis is organized in the following way: first I bring a brief introduction to Thomas Mann's life and work, second a summary of the novel *Buddenbrooks,* and finally a report of the work by selected scholars.

Jennifer Willard, '01

Biocomputing: *in vivo* AND Gate

Faculty Sponsor: Lisa Lewis

Major: Chemistry
Hometown: Riverview, Mich.

Living cells have an amazing capacity for storing information on their genomes. This memory has potential for use in information storage and processing. The construction of *in vivo* logic gates is a step toward information-processing by genetically-engineered whole cells. The AND gate was constructed in *Pseudomonas fluorescens*. In it, luminescence is induced by the presence of both tetracycline and acyl-homoserine lactone. The presence of tetracycline causes the removal of a repressor from the operator (O_{tet}) that controls both the tetracycline resistance gene (*tetR*) and the lux regulatory gene (*luxR*). Acyl-homoserine lactone then binds to the LuxR protein, which in turn binds to the operator (O_{lux}) for the *luxCDABE* genes resulting in their expression and ultimately in the production of light. When an AND gate cell is linked with other *in vivo* logic gate cells, the cells should be able to transmit, receive, and process signals to and from each other.

Research performed under the supervision of Michael Simpson, Oak Ridge National Laboratory.

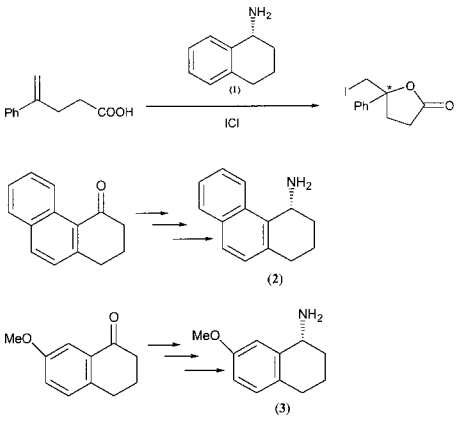
Danielle Willsie, '01

The Synthesis of Chiral Amine Ligands for Use in Halolactonizations

Faculty Sponsor: Andrew French

Major: Chemistry
Hometown: Midland, Mich.

The goal of this project was to produce ligands that would allow better stereoselective control of iodine catalyzed halolactonization reactions. The chiral amine R-1,2,3,4-tetrahydro-1-naphtylamine **(1)** had been shown to catalyze this reaction with 45% enantioselectivity. An attempt was made to synthesize new ligands similar to this with more size on the aromatic ring. From ketones with similar skeletal structures, 2,3-dihydro-4(1H)-phenanthramine **(2)** and 7- methoxy-1,2,3,4-tetrahydronaphthylamine **(3)** were synthesized.



Supported by: FURSCA

Carolyn Winterich, '01

Runway-Based Classical Conditioning

Faculty Sponsor: W. Jeffrey Wilson

Major: Psychology
Hometown: North Ridgeville, Ohio

The purpose of this experiment was to investigate whether classical conditioning could be measured by the voluntary response of running speed down a long straight runway toward a goal. Six female Sprague-Dawley rats were trained in the runway, which was split into five equal segments. At the beginning of Segment 3, an auditory conditioned stimulus (CS) was introduced that signaled either the presence or absence of food at the end of the runway. If the stimulus was a CS+ (indicating the presence of food), the rats' running speed was expected to increase in the final three segments; however, if the stimulus was a CS- (indicating the absence of food), the rats' running speed was expected to decrease. The rats experienced 15 regular classical conditioning sessions and three sessions in which the stimuli were reversed. Although the results suggest that some learning may have occurred, the effect is minimal and in the opposite direction of what was hypothesized.

Supported by: FURSCA-Metalonis Fellowship

Elizabeth Wood, '02

Sheilas in Modern-Day Australia

Faculty Sponsor: Trisha Franzen

Major: English
Hometown: Grand Rapids, Mich.

The Australian woman lives in a society in which much change has been implemented since the country's founding. During the country's early history, its use was strictly for prisoners, women's roles varied, and the ratio between the sexes was very imbalanced. Over time, Australian women's roles changed through the major events of the Second World War and beyond. Here it will be discussed how this came about, as well as the specific historical milestones that have gained women the rights and privileges they now hold. Personal examples will also be illustrated, as I spent five and a half months living in the Australian culture. This study should inform the public about the historical and modern lives of Australian women, and how it all came about.

Tonya Zimmerman, '01

The Effect of Off-Campus Programs on Views of Diversity: A Test of the Contact Hypothesis

Faculty Sponsor: Mimi Schippers

Major: Anthropology and Sociology
Hometown: Millersburg, Ohio

Many people do not consider issues of diversity until they are faced with them. When students go off campus, they are often faced with such issues. Those students who study in the United States may deal directly with diversity because of where they work or live. People who go abroad will deal with diversity because they are in a situation in which their culture is not the norm.

I tested the contact hypothesis by researching whether or not people's opinions about diversity and interracial marriage changed after going off campus. Data were collected through survey and interview methods. The sample consisted of two groups of Albion College seniors. The first consisted of people who have not gone on an off-campus program, and the second group were people who have participated in an off-campus program.

The survey results show some differences in attitude between the two groups, but these results were not statistically significant. The interview data revealed evidence of some change in attitude and what these changes mean for people. The research makes three general contributions. First, this study shows one positive effect of student participation in off-campus programs. Second, it informs debates about the impact of contact on racial attitudes. Finally, the study suggests one way in which people can become more open to diversity.

Kimberly Zuhlke, '01

The Molecular Analysis of DNA Repair in *Drosophila melanogaster*

Faculty Sponsor: Kenneth Saville

Major: Biology
Hometown: Imlay City, Mich.

Transposable elements, pieces of DNA with the ability to jump from chromosome to chromosome, have been found in nearly every organism studied. When these elements jump, they cause DNA damage that must be repaired. If left unrepaired, this DNA damage may lead to the death of the organism or, in

humans, to a greater likelihood of developing cancer.

This research has focused on pinpointing the repair mechanism for double-stranded breaks that occur in the DNA of the fruit fly, *Drosophila melanogaster,* in response to excision of the *hobo* transposable element. Excision of *hobo* results in double-stranded gaps in genomic DNA, and the loss of the complete *hobo* element and a small number of flanking sequences. When this gap is repaired, new nucleotides resembling those of the genomic DNA sequences that originally flanked the *hobo* element are found at the repaired site. While this is a common repair pattern seen in a variety of organisms, in *Drosophila*, this type of repair has only been seen in association with *hobo* excision. To study this type of repair in more detail, I have used the polymerase chain reaction (PCR), DNA cloning, and DNA sequence analysis to identify DNA sequences corresponding to the double-stranded breaks caused by *hobo* excision.

Understanding repair mechanisms for double-stranded breaks in *Drosophila* may lead to a greater understanding of similar breaks in human DNA caused by mutagens such as X-rays and UV rays.

Supported by: FURSCA-Kresge Fellowship

Environmental Geology Class (Fall 2000)

Evaluation of Stream Quality and Conditions of Rice Creek, near Marshall, Michigan

Faculty Sponsor: Thomas Wilch

The environmental quality of a downstream segment of Rice Creek between Albion and Marshall was the subject of three coordinated investigations by 16 students in the fall 2000 Environmental Geology class. Rice Creek is a stream that has been dredged and straightened for use as an agricultural drain. Water pollution is a concern due to the run-off of livestock waste and agricultural chemicals, and periodic dredging. The objective of our study was to assess the relative health of this section of the stream.

The small-group research projects focused on analyses of water chemistry, total suspended sediment, and streambed sedimentology and temperature. Samples and data were collected at four sample points between Michigan Avenue and 22 1/2 Mile Road. The analytical results were compared to stream discharge measurements made at each of the sample locations on four separate dates.

Our conclusions follow. (1) An increase in discharge rates caused a decrease in phosphorus and nitrogen nutrient levels and showed the river's natural ability to attenuate the concentration of nutrients with distance. For example, phosphate levels downstream (0.155 ppm) were half as much as the upstream levels (0.36 ppm). (2) The amount of total suspended solids varied with location and date. There was not a consistent relationship between discharge and turbidity. (3) The temperature of streambed sediment tended to be lower where sediment was more fine-grained, contrary to our hypothesis that discharge of colder ground water to the stream would be higher where sediments were coarser. Groundwater discharge into the stream was found to be approximately 0.6 m^3/s over a two-mile section of the stream.

U.S. Gay and Lesbian History Class

Albion's Gay History

Faculty Sponsor: Trisha Franzen

In 1992 several Albion College students founded Break the Silence. In 1993 the college had its first Coming Out Panel. In 1996 the Albion College Board of Trustees extended the college's non-discrimination statement to cover sexual orientation. Though these landmarks in Albion College's history are clustered in the 1990s, they represent breakthrough moments in a process of change stretching back decades.

As part of the U.S. Lesbian and Gay History course, we are being historians of that process. We are uncovering and collecting the sources needed to reconstruct the experiences of lgbt (lesbian, gay, bisexual, and transgendered) individuals at Albion as well as the events and conditions involved in political and social change. Using oral histories of students, staff, and faculty members, along with examinations of college records as our primary sources, we will reclaim a history that has been invisible.

Members of the U.S. Gay and Lesbian History class: (left to right) Laura Scozzari, Paul Talbot, Tiffany Juliano, Sosi Hagopian, Allen Hearn, My Lien, Katie Pritchard, Shannon Dougherty, Brooke Cummings. Missing: Sarah Leicher.

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.

The Isaac Endowment Committee

Cedric W. Dempsey, '54
Ben E. Hancock, Jr.
T. John Leppi, '59
Thomas G. Schwaderer, '56
Leonard F. "Fritz" Shurmur, '54 (deceased)
John R. Taylor, '55

The 2001 Isaac Student Research Symposium Committee

Craig Bieler (Chemistry)
Sarah Briggs (Communications Office)
Jeffrey Carrier (Academic Affairs Office/Biology)
Jennifer Cook (FURSCA)
Ben Hancock (Institutional Advancement Office)
Lisa Lewis (Chemistry/Honors Institute)
Anne McCauley (Art and Art History)
Mimi Schippers (Anthropology and Sociology)
Larry Steinhauer (Economics and Management/Honors Institute)
Michael VanHouten (Stockwell-Mudd Libraries)