

A L B I O N  C O L L E G E

Elkin R. Isaac

RESEARCH

*S y m p o s i u m*

Honoring  
Outstanding  
Student Research

*1 9 9 8*

Supported by:

Elkin R. Isaac Endowed Lectureship, Honors Program,

Stockwell-Mudd Libraries, and Sigma Xi

## *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  
John R. Taylor, '55

### *The 1998 Isaac Student Research Symposium Committee*

Craig R. Bieler (Chemistry)  
Sarah F. Briggs (Communications Office)  
Lynne Chytilo (Visual Arts)  
D. Scott Dillery (Mathematics)  
Larry Steinhauer (Economics & Management)  
Michael A. VanHouten (Library)

***The Ninth Annual  
Elkin R. Isaac Student Research Symposium***

***Albion College***

***April 13-15, 1998***

***Schedule of Events***

***Monday, April 13, 1997***

- Noon**                    **Dedication of Sculpture, "Faith of Odysseus," by Terrence Karpowicz, '70**  
*Entrance to Albion College A-Field*
- 7:30 p.m.**                **The Elkin R. Isaac Student Research Symposium**  
Opening Remarks: Thomas G. Schwaderer, M.D., '56  
Elkin R. Isaac, '48
- The 1998 Elkin R. Isaac Lecture: Terrence Karpowicz, '70**  
Introduction: Frank J. Machek, Department of Visual Arts  
*Bobbitt Visual Arts Center Auditorium*

***Tuesday, April 14, 1998***

- 3:00-5:10 p.m.**        **Student Research Symposium Platform Presentations**  
Welcome and Introductions: Jeffrey C. Carrier, Vice President for Academic Affairs  
*Olin Hall 112*
- 5:15-5:45 p.m.**        **Poster Sessions**  
*First Floor, Kellogg Center*
- 7:00-9:00 p.m.**        **Student Research Symposium Platform Presentations**  
*Olin Hall 112*

***Wednesday, April 15, 1998***

- 3:00-5:15 p.m.**        **Student Research Symposium Platform Presentations**  
*Olin Hall 112*
- 5:15-5:45 p.m.**        **Poster Sessions**  
*First Floor, Kellogg Center*
- 7:00-9:00 p.m.**        **Student Research Symposium Platform Presentations**  
*Olin Hall 112*



## Schedule of Presentations

All platform presentations are in Olin Hall 112.

### TUESDAY, APRIL 14, 1998

3:00-

**5:10 p.m. Student Research Symposium Platform Presentations**

3:10	<b>Heather Gavord</b>	The Effect of Gender on Perceptions of Candidates in a Resume Evaluation Session
3:25	<b>Katie Drake</b>	The Influence of Managed Care, Specifically HMOs, on the Ability of Physicians to Provide Quality, Preventive Care
3:40	<b>Tameron Govier</b>	Our Justice and Jury System: Factors Affecting the Public's Perception of Fairness
3:55	<b>Daniel Haar</b>	Rorty and Nussbaum: The Idea of the Self
4:10	<b>Molly McCracken</b>	The "Eyes" Have It: Vision in the Novels of Laura Esquivel
4:25	<b>Michael Jones</b>	Taxonomic Placement of <i>Henriettea squamulosa</i> (Melastomataceae: Miconieae) based on ITS Ribosomal DNA Sequences
4:40	<b>Laura Johnson</b>	The Role of Ha-Ras in Mast Cell Granule Morphology and Intracellular Movement
4:55	<b>Emily Marlowe</b>	Children's Facework in Social Predicaments

5:15-

**5:45 p.m. Poster Sessions, First Floor, Kellogg Center**

**Arthur Bragg**

Construction and Characterization of a Molecular Beam Apparatus

**Angela Doty**

The Effects of Psychological Stress on the Immunoglobulin-A Levels in Albion College Students

**Pamela Haywood**

Archaeological Geology of the Duck Lake Site

**Todd Krabach**

Gaussian Quadrature in Two Dimensions

**Mary Lemcke**

GIS Analysis of Vertebrate Diversity with Respect to Climate

**Ryan McKeachie**

A New Photochemical Method for the Production of Polypyrrole

**Kelly Probert**

Physical Education Leads to Life Patterns of Physical Activity

**Wendy Van Scyoc**

Ortholithiation of Pivanilide and Subsequent Alkylation with Carbonyl Compounds: A Preliminary Investigation

7:00 -

**9:00 p.m. Student Research Symposium Platform Presentations**

7:00	<b>Michael Callahan</b>	The Influence of Expectancy, Recency, and Frequency on the Major/Minor Distinction
7:15	<b>Joseph Ales</b>	The Use of the <i>hobo</i> Transposable Element to Study DNA Repair in the Fruit Fly <i>Drosophila melanogaster</i>

7:30	<b>Loretta Rozdoske</b>	People's Perceptions of the Battered Woman and Her Batterer
7:45	<b>Thomas O'Brien</b>	"Progress is Albion's Future": A History of the West Central Urban Renewal Project
8:00	<b>Scott Johnson</b>	Strength and Conditioning Program for Swimmers
8:15	<b>Jaime Petrus</b>	Investigation of the Photoreduction of Carbon Tetrachloride by Titanium Dioxide Using GC/MS with Headspace Sampler
8:30	<b>Jennifer Haiduc</b>	The Effects of Exposure to Made-for-TV Films on Perceptions of Victims of Violence
8:45	<b>Jennifer Jacobs</b>	Microbial Removal of Chloroorganics from Dilute Gaseous Waste Streams

### WEDNESDAY, APRIL 15, 1998

3:00-5:15 p.m. <b>Student Research Symposium Platform Presentations</b>		
3:00	<b>Stephen Lathom</b>	Reconceptualizing the Ghetto
3:15	<b>Shawn LaCasse</b>	Acquisition of MS/MS Reference Data of Industrial Chemicals by Ion Trap Mass Spectrometry
3:30	<b>Audrey Adams</b>	¿Quien es Eva Peron? Who is Eva Peron?
3:45	<b>Jennifer Hanket</b>	Patient Characteristics and Patient Satisfaction: A Two-Part Study
4:00	<b>Kathryn Cavanaugh</b>	The Women of Dean Hall
4:15	<b>Heather Bullen</b>	Do Aromatic Methoxy Groups Lead to Cross-Linking in the Thermolysis of Low-Rank Coal?
4:30	<b>Amanda Gilman</b>	Properties of a Thermophilic Cellulase from <i>Thermotoga maritima</i>
4:45	<b>Timothy Minniear</b>	The Effects of Larval <i>Xenopus laevis</i> Xenografts on Spinal Cord Crush Injuries in <i>Ambystoma maculatum</i>
5:00	<b>Anne Bruce</b>	The Persistence of the False Memory Effect
5:15 - 5:45 p.m. <b>Poster Sessions, First Floor, Kellogg Center</b> See Tuesday schedule.		
7:00-9:00 p.m. <b>Student Research Symposium Platform Presentations</b>		
7:00	<b>Robert Jageman</b>	Dretske and the Challenge of Misrepresentation
7:15	<b>Melora Haas</b>	A Comparison of the Retention of Year-Old Fruit in Two Species of Sumac, <i>Rhus typhina</i> and <i>Rhus glabra</i>
7:30	<b>Jennifer Ralston</b>	The Catholic Church and the Third Reich During the Pre-War Years, 1925-1939
7:45	<b>Phillip Shaltis</b>	Design, Construction and Programming of an Autonomous Mobile Robot
8:00	<b>Cara Sedlak</b>	Economic Considerations Bar Equal Access to the Civil Justice System
8:15	<b>Elise Georgi</b>	An Analysis of Thomas Mann's Novella, <i>Mario and the Magician</i>
8:30	<b>Amanda Carriere</b>	Nazi Persecution of the Roma People: "Our ashes were mingled in the oven."
8:45	<b>Elizabeth Kudirka</b>	The Word as Power in the Works of Isabel Allende



***The 1998 Elkin R. Isaac Lecture  
Monday, April 13, 1998  
Bobbitt Visual Arts Center Auditorium***

**“Millwright’s Apprentice”**

**Terrence Karpowicz, '70**

Terrence Karpowicz is a professional sculptor who lives and works in Chicago, Ill. He has received two National Endowment for the Arts fellowships and five grants from the Illinois Arts Council in support of his work. He also received a Fulbright Hayes Grant to the United Kingdom. Karpowicz’s work is now held in collections in the Tblisi Museum in the Republic of Georgia, the Steensland Museum of Art and Tweed Museum, both in Minnesota, and the Rockford Art Museum in Illinois, as well as at the University of Oklahoma at Norman, Governor’s State Park, Park Forest, Ill., and Tiffany’s & Co. His works have been commissioned by Northeastern University in Chicago, Crain’s *Chicago Business*, the University of Illinois Medical Center in Chicago, the City of Chicago’s Thurgood Marshall Memorial Library and the Illinois State University Life Science Building in Normal, Ill. For the past three years, he has been executive director of the 3D Chicago/Pier Walk Exhibition at Navy Pier and has also participated as an exhibitor.

His solo exhibitions have been displayed at the Franz Bader Gallery in Washington, D.C., the Zolla/Lieberman Gallery in Chicago and at other locations in the Midwest, and he has been a featured artist in group exhibitions at McCormick Gallery, DePaul University, the Ukrainian Art Museum, and the Evanston Art Center, all in the Greater Chicago area, as well as at University of Notre Dame, Carnegie Mellon University and Albion College.

A 1970 graduate of Albion College, Karpowicz also participated in the New York Arts Program while at Albion. The recipient of an M.F.A. degree from the University of Illinois at Champaign-Urbana, he has served as a visiting artist at nine colleges and universities. Recently he has been commissioned to create two sculptures for Albion College, and the first, now installed near the entrance to the Dow Recreation and Wellness Center, was dedicated today (April 13, 1998).



*Terry Karpowicz with his work, "Faith of Odysseus," at Albion College.*

## Abstracts of Student Research

---

Adams, Audrey, '98

### ¿Quien es Eva Peron? Who is Eva Peron?

Majors: Spanish and Political Science  
Faculty Sponsor: Pamela McNab

---

Eva Maria Duarte de Peron was the second wife of former Argentine President Juan Domingo Peron and is often referred to as the most powerful woman in the history of Argentina. Born into poverty, Eva aspired to be an actress and so moved to Buenos Aires at the age of fifteen to fulfill her dream. There, she met Colonel Juan Peron whom she soon married. When Colonel Peron was elected president in 1945, Eva immediately became a very prominent first lady. Her participation in the government helped to maintain Peron's popularity throughout his two terms in office, even after her death.

My project attempts to re-evaluate the many roles Eva assumed: first lady, a champion of the working class, a leader of the women's movement. Even after her death she was considered larger than life. Eva Peron invokes strong feelings of both love and hatred among both her supporters and opposition. However, it can be argued that she has had a lasting effect on Argentina, as well as the world, as both her personality in addition to her actions are studied yet today. Over forty years after her death scholars are still left posing the question, Who is Eva Peron? By analyzing her own writings as well as other biographical and critical materials, I am attempting to clarify the answer to this question.

---

Ales, Joseph, '98

### The Use of the *hobo* Transposable Element to Study DNA Repair in the Fruit Fly *Drosophila melanogaster*

Major: Biology  
Faculty Sponsor: Ken Saville

---

The *hobo* element is a transposable element found in the fruit fly *Drosophila melanogaster*. Transposable elements are pieces of DNA that can "jump" from one chromosomal location to another. When transposable elements jump out of a chromosome, that chromosome is temporarily broken into two pieces. The genes needed to repair this and other types of chromosome damage are called DNA repair genes. Cells with defective DNA repair genes accumulate mutations, which can lead to drastic consequences for the cell, including cell death, or the development into a cancer cell.

Because DNA repair genes are very similar in diverse organisms from bacteria to humans, information about DNA repair genes in experimental organisms may eventually lead to a better understanding of DNA repair in human cells. The goal of this research is to develop a genetic system with which to identify and characterize DNA repair genes involved in the repair of DNA damage caused by the *hobo* element in the fruit fly. Results of initial experiments characterizing the necessary components of the genetic system will be reported.

---

Bragg, Arthur, '99

### Construction and Characterization of a Molecular Beam Apparatus

Majors: Chemistry and Physics  
Faculty Sponsor: Craig Bieler

---

In order to simplify molecular electronic emission spectra, we have undertaken the task of designing and constructing a molecular beam/laser-induced fluorescence spectrometer. The design consists of a home-made pulsed nozzle placed inside a high vacuum chamber. The molecular beam is produced by the supersonic jet expansion of a gas sample into the vacuum chamber through a 500-micron pinhole. The pulsed nozzle, constructed from the element of a piezo-driven audio speaker, is driven by a 200 V, 30 ms square wave at 10 Hz. The characteristics of the molecular beam produced by this method, such as pulse width and degree of cooling, can be probed with laser-induced fluorescence spectroscopy.

---

Bruce, Anne, '98

## The Persistence of the False Memory Effect

Major: Psychology  
Faculty Sponsor: David Hogberg

---

Three groups of participants were involved in an experiment to test the hypothesis that people will remember words related to words that they heard even though the words they remember were never actually presented and that they will remember fewer words after a delay between hearing the words and a recognition test.

In the present experiment, people heard 12 words related to the word "sleep," but never the word sleep. They were then given a printed 30-word list containing the 12 sleep-related words, the word "sleep" itself and 17 words not related to the concept sleep. They rated each of the words on a -5 to +5 scale, with -5 indicating no, the word definitely did not appear on the first list, through a zero-point of uncertainty to +5, the word definitely appeared on the list the first time. After delays of 1 hour, 6 hours, or 24 hours, people again did the recognition test using the same judgments about the words on the printed list.

An analysis of variance indicated that people differentially recognized sleep- vs. non-sleep-related words as well as the word "sleep,"  $F(2,72)=598.97$ ,  $p < .0001$ . There was, however, no significant difference among word recognition over the three delay conditions,  $F(2,72)=2.35$ ,  $p=.130$ . A possible reason for the finding of no delay effect is that the task was perhaps so simple as to allow a ceiling effect to occur. The false memory for the word "sleep" was robust, however, and lasted over the delay periods with a reported confidence rating greater than that seen for any of the other words, again, even though it was never presented.

---

Bullen, Heather, '98

## Do Aromatic Methoxy Groups Lead to Cross-Linking in the Thermolysis of Low-Rank Coal?

Major: Chemistry  
Faculty Sponsor: Lisa Lewis

---

A model system that simulated the type of restricted mass transport found in coal was synthesized by surface immobilization of 1,3-diphenylpropane (DPP), a free radical initiator, and 3,4-dimethoxyphenol (3,4-DMOP) onto a high purity fumed silica surface. Surface immobilization was prepared by the condensation of 4-(3-phenylpropyl)phenol (HODPP) and 3,4-DMOP with surface hydroxyl groups on the silica surface ( $\sim 3,4\text{-DMOP}/\sim\text{DPP}$ ,  $.324/.101$  mmol/g, and  $.335/.115$  mmol/g, where  $\sim$  indicated a Si-O-C aryl surface attachment). This system was then pyrolyzed at  $375^\circ\text{C}$  up to 64% conversions to investigate whether aromatic methoxy substituents contribute to the formation of cross-linkages during thermolysis under free radical conditions.

Based on low 3,4-DMOP conversions (2.0-6.8%/h) and product analysis by GC/MS which identified no cross-linked products, aromatic methoxy substituents do not significantly contribute to the formation of cross-linkages. Conversion rates of  $\sim\text{DPP}$  were higher than expected at 31%/h for  $\sim 3,4\text{-DMOP}/\sim\text{DPP}$  ( $.324/.101$  mmol/g) and 36%/h for  $\sim 3,4\text{-DMOP}/\sim\text{DPP}$  ( $.355/.115$  mmol/g). It is proposed that the high rate of conversion of  $\sim\text{DPP}$  with  $\sim 3,4\text{-DMOP}$  is due to 3,4-DMOP cleaving from the surface and shuttling hydrogens.



---

Callahan, Michael, '98

## The Influence of Expectancy, Recency, and Frequency on the Major/Minor Distinction

Majors: Cognitive Science and Psychology  
Faculty Sponsor: William Hayes

---

The present study was a modification of a study by Epstein and Rock (1960) that attempted to show that expectancy can be explained in terms of recency and frequency. They carried out four experiments to tease out the differences in visual experience due to expectancy, recency, and frequency. This study utilized major and minor triads, and chords that were ambiguously major and minor, so that the same questions could be asked for audition. It was found that the quality of the expected chord, major or minor, had a significant effect on the response. Expectations had a significant effect on perceptions. In addition, musical experts tended to be more consistent in their responses.

---

Carriere, Amanda, '98

## Nazi Persecution of the Roma People: "Our ashes were mingled in the oven."

Major: International Studies  
Faculty Sponsor: Geoff Cocks

---

The Roma, also known as the Gypsies, have endured a long history of persecution and discrimination in Europe. Like the Jews, the Roma have been used as a handy scapegoat in times of economic or political strife. During the Third Reich, the Nazis categorized the Roma as an asocial and criminal race that they had to destroy in order to preserve German culture and society.

Many scholars and historians believe that the annihilation of the Roma by the Nazis was not a case of genocide, but rather was a travesty of justice against a group of people that the Nazis felt were socially dangerous, due to deviant behavior. Historians estimate that over one million Romanies died during the Nazi regime, yet in many books and articles on the Holocaust they are a mere footnote.

Until recently, very few scholars researched or wrote about the *Porrajmos*, which is the Romani word for the Holocaust of the Gypsies. I looked at a number of sources, both written about the Roma, as well as more comprehensive Holocaust books. I concluded that the Roma were the only other ethnic group, besides the Jews, slated for extermination for racial reasons by the Nazis. Unlike the Jews, however, most Romanies did not receive compensation, nor are they given much recognition at Holocaust memorials.

Today the Roma still do not enjoy full equality with other minorities in Europe, especially in the former Communist bloc countries, such as Romania and the Czech Republic. I believe that only by educating people about the history and true nature of the Roma will people learn to accept Romanies as an important and necessary ethnicity in Europe and North America.

---

Cavanaugh, Kathryn, '98

## The Women of Dean Hall

Majors: Anthropology/Sociology and English  
Faculty Sponsor: Molly Mullin

---

My project, "The Women of Dean Hall," is an ethnographic study of the women who have lived at Dean Hall from its founding in 1928 to the present. My purpose was to explore the relationships between the women, the trends that have existed in the house, how Dean Hall reflected the happenings of the greater society, and what it was and is about Dean Hall and its women that created the family-like community that exists there. I was also very interested in the feminist aspect of the recent Dean Hall and whether or not feminism has always been a part of Dean.

---

**Doty, Angela, '99**

### **The Effects of Psychological Stress on the Immunoglobulin-A Levels in Albion College Students**

Major: Biology  
Faculty Sponsor: J.P. Hostetler

---

This study was done to examine the relationship between increasing psychological stress and salivary Immunoglobulin A (IgA) concentrations in Albion College students. Saliva samples were collected from, and stress questionnaires were completed by, subjects during both a stressful period (e.g., final exams) and a relatively non-stressful period. Nephelometric analysis was used to assay IgA levels. A significant inverse relationship was found between the participants' reported stress levels and their corresponding IgA levels. Previous studies have shown that the decreased IgA levels often found in people experiencing stress can lead to more frequent and severe illnesses.

---

**Drake, Katie, '98**

### **The Influence of Managed Care, Specifically HMOs, on the Ability of Physicians to Provide Quality, Preventive Care**

Major: Biology  
Faculty Sponsor: Richard Mortensen

---

This research focuses on the effects that managed care, specifically through HMOs, has had on the ability of physicians to provide effective, preventive care. I began my study by reviewing the historical changes that have occurred in the United States' health care system in the last forty years. The introduction provides preliminary research and background on the current U.S. health care crisis, and includes a brief description of the economic, social, and governmental issues surrounding the system.

From this historical information, a questionnaire was constructed, and a randomized survey from a compiled list of 300 Albion College alumni was performed. The questionnaires were mailed in January of 1998 to 150 Michigan physicians. By March 6, 1998 there were 64 responses to this survey (a 43 % response rate), and of the respondents: 21 were primary care physicians (PCPs), 34 were non-primary care physicians or specialists, 5 were retired PCPs, and 4 were retired specialists.

The data suggest that Michigan physicians participating in HMOs have not been prepared for the expectations of managed care, are limited by cost-containment measures in the types of treatment they can provide, and believe the current system of managed health care needs to be greatly improved. These physicians also believe that through managed care, patients are not being seen by the most capable and appropriate physicians for quality care. The results demonstrate that managed care has drastically influenced physicians' abilities to provide quality, preventive care.

---

**Gavord, Heather, '98**

### **The Effect of Gender on Perceptions of Candidates in a Resume Evaluation Session**

Major: Psychology  
Faculty Sponsor: William Hayes

---

This study examined the effect a candidate's gender has on his or her likelihood of being selected for an available employment position. There were three conditions in which participants examined a resume and supporting material from a male, female, or a candidate whose gender was unknown. They then rated the candidate on several characteristics related to their ability and chances of being hired. Specifically, the data yielded significant results on the measures of likelihood of being hired, competence, appropriateness of previous employment background, potential for leadership, and the likelihood of being a parent, in that the male candidate received significantly higher ratings than those of the female candidate, while the candidate for whom gender was unknown generally fell between the two. Significant results were also obtained on the measure of free time. The female candidate was rated as likely to engage in typical female activities, the male typical male activities, and the gender-unknown candidate engaged in a mixture of the two.



---

Georgi, Elise, '98

## An Analysis of Thomas Mann's Novella, *Mario and the Magician*

Majors: Chemistry and German  
Faculty Sponsor: Ingeborg Baumgartner

---

Known worldwide, Thomas Mann is considered one of the most inspiring German authors of the twentieth century. His works, characterized by intricate and often complicated insight into the world, society and the relationships between people, include *Buddenbrooks*, *Death in Venice*, *The Magic Mountain*, *Joseph and his Brothers*, *Mario and the Magician* and *Doctor Faustus*, among others.

*Mario und der Zauberer*, like most of his works, has been interpreted over the years from many different angles, and many critics have seen a wide range of messages and symbolism in the novella. In this research project, I have attempted to explore and analyze some of these interpretations as well as state my own.

In *Mario und der Zauberer* the story is of a German family that travels to Italy on vacation and describes their unusual encounter with a magician, Cipolla, who visits the town one summer night. Within the happenings and symbolism can be found interpretations of the homoerotic nature of men, political allegory for the workings of a Fascist society and how Fascism might come to be, and also a representation of the power exchange between two men, or one man and a society. It is these major aspects of the novella that will be explored in this project.

---

Gilman, Amanda, '98

## Properties of a Thermophilic Cellulase from *Thermotoga maritima*

Major: Chemistry  
Faculty Sponsor: Robert Armstrong

---

Cellulose is a polymer of glucose molecules that makes up the majority of biomass, as well as the majority of waste created by human activity. It can be degraded into individual glucose molecules by an enzyme, cellulase. Glucose, in turn, can be fermented into fuels and chemicals currently obtained from fossil fuel sources. The enzymatic degradation of cellulose, therefore, could help reduce the amount of space needed for waste disposal and the reliance on nonrenewable resources. Most cellulases have very low activity on crystalline, insoluble cellulose, the type of cellulose found in biomass. A major goal of this study is to find a cellulase with higher activity on insoluble cellulose.

One area that is being researched for more active cellulases is extremozymes, enzymes that come from organisms that thrive outside the range of conditions (pH, temperature, pressure) in which most living things exist. This paper describes the characteristics of a thermophilic ("heat-loving") cellulase from the thermophilic bacteria, *Thermotoga maritima*. This cellulase is unique with only 38.7% homology to known cellulases. The optimal pH for its activity on barley beta-glucan, carboxymethyl cellulose, p-nitrophenylcellobioside and Avicel, a microcrystalline cellulose, is pH 5.0, although the pH at which it is most stable after being heated for one hour at 80 degrees Celsius prior to reaction with substrate is 6.0. The optimal temperatures for hydrolysis of these substrates range between 70 and 85 degrees Celsius, far outside the range in which most living things can survive. When native cellulase is heated in solution with nanopure water, it has high thermal stability at 80 degrees Celsius. One of the cellulase's unique features is its high activity on barley beta-glucan, at least twice as much activity as the most active mesophilic glucanase. There may be combinations of other enzymes and the *T. maritima* cellulase, either in synergistic reaction mixtures or coupled through chemical reactions, that would increase the activity level on crystalline cellulose.

As of yet the exact mechanism of action of the *Thermotoga maritima* cellulase is unknown. However, analysis of the products of hydrolysis of insoluble cellulose and various sugars with high performance liquid chromatography shows that the major product is cellobiose which indicates an exoglucanase mode of action.



---

Govier, Tameron, '98

## Our Justice and Jury System: Factors Affecting the Public's Perception of Fairness

Major: Psychology  
Faculty Sponsor: Amy Otto

---

Researchers have neglected to examine what affects public perception of justice. This 2 (Verdict) X 2 (Evidence) X 2 (Time) study investigates the effects specific procedures have on public perception of fairness. The participants read a newspaper article describing a murder trial. In the articles, the jury either acquitted or convicted, reviewed or did not review evidence, and deliberated three hours or three days. The participants rated the fairness of the justice system, media, jury verdicts and deliberations, and the defendant's character. The results are consistent with research indicating procedures are more important in determining fairness than verdict or defendant characteristics. The results support the hypothesis suggesting deliberation and review of evidence are two jury procedures affecting public perception of the fairness of trials and jury verdicts. This research indicates the actions of the justice system throughout the trial rather than the verdict or the media affect public perception of justice.

---

Haar, Daniel, '98

## Rorty and Nussbaum: The Idea of the Self

Major: Philosophy  
Faculty Sponsor: Gene Cline

---

Philosophers today are, for the most part, in a general agreement that the traditional metaphysical idea of the self as a spiritual soul trapped in a physical body is a bankrupt notion. Yet besides this consensus, there is still wide variation among different kinds of philosophers. For instance, postmodernists believe that, with the end of metaphysics, the ideas of "truth" and "knowing the world" are now useless, whence they claim that there is no such thing as a self. Other philosophers, who still believe in the usefulness of science, look to empirical studies which point to the commonalities between humans all over the world to shed some light onto what is the human self.

Richard Rorty is an example of a postmodernist philosopher. In his book *Contingency, Irony, and Solidarity* he makes the claim that there is no inherent human nature, or "core self" because "socialization goes all the way down." Yet later on, he states that it is important for political discourse to "notice our similarities" with other humans. Yet if Rorty claims that the world cannot be known, and that all human nature is contingent upon history, then how can we find our similarities with others?

Martha Nussbaum, in her article "Human Capabilities, Female Human Beings," makes a list of what she believes to be the necessary and sufficient conditions to be human. A philosopher like Rorty would attack Nussbaum for being universalistic. Yet is not Nussbaum simply following Rorty's advice of "noticing our similarities"?

Rorty discounts metaphysical truths but also does not allow for the practical uses of the scientific method. For accounting for disease, developing technology, and predicting natural phenomena, physical and natural science "work" the best. Yet Rorty is only willing to call science another form of literature, just like poetry and fiction.

I would argue that Rorty is mistaken to take such a naïve stance on the importance of science. While any "truth" we "discover" is necessarily imperfect due to the imperfections in language and human shortsightedness, it does not mean we should dispense with these ideas altogether. I would also argue that Nussbaum does a good job completing Rorty's task of "noticing our similarities." While this list of the components of "human nature" is by no means perfect or complete, it cuts across many cultural boundaries.

---

Haas, Melora, '98

## A Comparison of the Retention of Year-Old Fruit in Two Species of Sumac, *Rhus typhina* and *Rhus glabra*.

Major: Biology  
Faculty Sponsor: Dale Kennedy

---

Staghorn sumac (*Rhus typhina*) and smooth sumac (*Rhus glabra*) are closely-related plant species that both produce bird-dispersed, low-quality fall fruits. These species compensate for having low-quality fruit by having high rates of fruit retention; thus their fruits are available for birds during winter and spring when other food sources are scarce. Sumac may retain their fruit clusters for many years. Casual observations indicated that smooth sumac appeared to retain a greater number of fruit clusters than did staghorn sumac.

During the winter of 1997-1998, I did a quantitative survey of fruit retention in 10 clones of each species in south-central Michigan. In each clone, I scored fruit clusters from the previous year to determine the percentage of fruits remaining after the 1996-1997 winter usage period. Smooth sumac had a significantly higher mean retention of fruits than did staghorn sumac (32% vs. 10%, respectively;  $P < 0.005$ ). These results indicate that staghorn sumac may be a preferred food source for birds. This preference could indicate birds are selecting for greater nutrition, for different types of fruit presentation, or away from non-nutritional chemicals in the fruit pulp. Alternatively, these data may suggest a greater droppage rate in staghorn sumac.

---

Haiduc, Jennifer, '98

## The Effects of Exposure to Made-for-TV Films on Perceptions of Victims of Violence

Major: Psychology  
Faculty Sponsor: Amy Otto

---

**Purpose:** This study was designed to examine the effects of what two different types of victim scenarios, women as a perpetrator (WP) and women as a victim (WV), have on mock jurors' reactions to a rape trial.

**Procedure:** Thirty-one undergraduate students from Northeast Missouri State University and 111 undergraduate students from Albion College were randomly assigned to one of five conditions. Group 1 viewed a WV film, WP film, then a mock rape trial.

Group 2 viewed the WP film, then the trial. Group 3 viewed a WP film, WV film, and then a mock rape trial. Group 4 viewed a WV film followed by the trial, while Group 5 only viewed the mock rape trial. Before and after each film, subjects completed a Mood Affective Adjective Check List (MAACL), and after viewing the rape trial, completed a questionnaire measuring attributions of victim blaming, liking for the victim, and their verdicts.

**Results:** The movies viewed affected people's perceptions of the victim in trial situations. Specifically, subjects' level of anxiety, depression, and hostility were at an increased level when entering the trial phase of the study, in contrast to their emotional state at the beginning of the study. The movies viewed also affected people's perception of the victim in trial situations. When WP was viewed last, subjects' were more apt to believe that the victim could have avoided the situation and that the victim did deserve the abuse. Furthermore, subjects exposed to both films were more likely to find the defendant guilty than those exposed to only one film.

**Conclusions:** While a great deal of attention has been focused on the media's influence on potential jurors due to pretrial publicity, researchers have not focused much attention on the general effect the media may have on potential jurors by means of everyday programming. Potential jurors' beliefs about victims of crime are not only being influenced by case-specific media coverage, which a judge might handle by using a change of venue, or issuing a gag order, but possibly more important, their beliefs are being influenced by the kinds of media that they are most frequently exposed to every day through TV programming. Obviously more attention needs to be given to this kind of media influence, so that its effects can be considered in court proceedings.

---

**Hanket, Jennifer, '98**

## **Patient Characteristics and Patient Satisfaction: A Two-Part Study**

Major: Psychology  
Faculty Sponsor: Barbara Keyes

---

Few studies concentrate on the characteristics of the adult clinical population, and those that do have conflicting results concerning the strength of the correlation between patient satisfaction and symptom improvement. Eighty-one clients at a small, Mid-western, private outpatient facility participated in this two-part study. In the first portion of the study, clients were administered a standard intake form and the Brief Symptom Inventory (BSI; Derogatis and Spencer 1982). Several correlations were tested, including sex, age, referral source of the clients, and to whom the clients are referred, be it a psychologist or psychiatrist. Using stepwise regression, this study found significant correlations between patient diagnoses and the BSI subscale scores. In the second part of this study, a proposal for an outcome study, a portion of clients from the same population in this outpatient facility will be readministered the BSI after eight sessions, along with a patient satisfaction questionnaire. It is hoped that the results will demonstrate a strong correlation between patient satisfaction and symptom improvement. The researchers also hope to find variables that significantly improve patient satisfaction, and therefore decrease the current rate of drop-outs and early termination

---

**Haywood, Pamela, '98**

## **Archaeological Geology of the Duck Lake Site**

Major: Archaeological Geology/Geological Sciences  
Faculty Sponsor: William Bartels

---

The Duck Lake archaeological site (ca. 1700 B.C.) has yielded projectile points, copper tools, unworked copper pieces, animal bones, and hearth features. The materials used in the making of these tools range from exotic chert to local quartzite and copper. The site itself is believed to be a transition between the Middle Archaic Period and the Late Archaic Period as they relate to the Upper Peninsula of Michigan.

The purpose of this study is to determine the climatic and geographic setting of this site by analyzing paleontological and geological data gathered at and near the site.

The site consists of three different localities: A, B, and C. Localities A and C are only known from surface collections made by the Forest Service. Locality B has been excavated by Forest Service archaeologists. Faunal remains from locality B have been compared to modern faunas in the Western Upper Peninsula in order to determine possible climatic changes. The majority of these remains came from level 6 or below in the archaeological excavation units. The remains are extremely fragmentary and poorly preserved, and there is a lack of the typical fish bones and mammal teeth that are normally associated with the food gathering practices of this era. The scarcity of vertebrate remains may be due to bone degradation in the sandy soil or the fact that the occupants may not have been processing their food at the site. The soil is largely aerobic and would allow for rapid decay of the organic materials by insects and bacteria. The presence of decayed organic matter in the stratigraphic samples also supports the degradation hypothesis.

Stratigraphic sequences for the area were reconstructed from 11 core samples taken from the three localities. These sequences were then analyzed to determine the environment present at the time of occupation. Each column represents 120 cm of sediment and was collected in thirty centimeter intervals. The stratigraphic sequences are comprised of fine to medium grained sand with a sub-rounded to rounded grain shape. The sequence may represent a regressing lake in the vicinity of the sites, possibly indicating occupation well away from the ancient shoreline. These sediments are overprinted by centuries of erosion and soil formation.

---

**Jacobs, Jennifer, '98**

## **Microbial Removal of Chloroorganics from Dilute Gaseous Waste Streams**

Major: Chemistry  
Faculty Sponsor: Jack Crump

---

Many industries produce volatile organic compounds (VOCs) in dilute gaseous waste streams that must be removed before being released into the environment. A viable alternative to incineration, adsorption, or stripping is bioremediation, by which an aerobic microbial consortium enriched from methanotrophs use gaseous VOCs as their sole carbon source and degrade them to carbon dioxide. Previous research at Oak Ridge National Laboratory has shown that this type of approach is effective for treating a wide variety of alkanes including the use of a trickle-bed bioreactor.



The investigations of this project have been devoted to biodegradation of chloroorganics; specifically, chloropentane and chlorobutane. The goal of this project was to model previous research of bioremediation of alkanes and apply it to the bioremediation of chloroorganics via the trickle-bed bioreactor. In trickle-bed bioreactors, chloroorganics are passed over a biofilm-coated packing in which the chloroorganics are degraded. The scope of this work was to study the degradation of chloroorganics in small batch microcosms, to determine the feasibility, and to study the removal of chloroorganics in trickle-bed reactors.

Experiments have enabled us to examine and balance the chloropentane-oxygen reaction to determine the effects of different chloroorganic concentrations on the microbial consortium. From the results, it is concluded that for every mole of chloropentane the reaction requires 4.5 mole of oxygen and produces 82.7 g of biomass.

---

**Jageman, Robert, '98**

## **Dretske and the Challenge of Misrepresentation**

Majors: Philosophy and Cognitive Sciences  
Faculty Sponsors: Ned Garvin and Gene Cline

---

In a series of major books and articles, Fred Dretske has advanced a representational theory of mind (RTM)—a theory that postulates an equivalence (“plus or minus a bit”) between mental phenomena and *natural systems of representation* (Conscious, 1). For Dretske, a natural system of representation is a physical system that has an intrinsic function of indicating some condition in the world. Dretske's RTM is thus an attempt to naturalize the mind—to demonstrate an equivalence between mental properties and physical properties. To support his theory, Dretske has been concerned with demonstrating that the properties and characteristics commonly attributed to beliefs can also be attributed to natural systems of representation.

One property of belief that Dretske has been particularly concerned with is their apparent capacity to *misrepresent*—to be false. His goal has been to show that natural systems of representation, as he defines them, also have the capacity to misrepresent. In doing so, Dretske identifies the capacity to misrepresent with the capacity to fail in the performance of an indicator function. Whether or not natural systems of representation have this capacity thus depends on what types of indicator functions they have. Dretske argues that a natural systems of

representation capable of *associative learning* have fixed, fallible indicator functions. Thus, all natural systems of representation capable of associative learning have the capacity to misrepresent. This is an important conclusion for Dretske, because it buttresses his case for an equivalence between natural systems of representation and one type of mental phenomenon (belief).

In this thesis, I explicate and clarify Dretske's account of misrepresentation. I then argue that it leads to counter-intuitive ascriptions of representational content. On Dretske's account, natural systems of representation capable of associative learning turn out to represent their own reactions to the external world. Although this allows for the possibility of misrepresentation (such systems can be wrong about how they will react to the world), the overall picture of natural representation Dretske paints is not one that resembles our everyday conception of belief. Given that Dretske's primary goal is to demonstrate an equivalence between belief and natural representation, this does not seem like an acceptable result. I suggest that the problem lies not with Dretske's account of misrepresentation but with his implicit assumption that a naturalized account of mind will reveal that mental states have determinate content.

---

**Johnson, Laura, '98**

## **The Role of Ha-Ras in Mast Cell Granule Morphology and Intracellular Movement**

Major: Biology  
Faculty Sponsor: Patricia Visser

---

The purpose of this research is to determine whether Ha-Ras is involved in the intracellular movement of granules during the process of degranulation and to investigate the role of this protein in mast cell granule morphology. Mast cell granules were analyzed for the presence of Ha-Ras in the membranes and for the content of the granules to analyze their morphology. The results will be discussed during the presentation.

---

Johnson, T. Scott, '98

## Strength and Conditioning Program for Swimmers

Major: Physical Education  
Faculty Sponsor: Keith Havens

---

In recent history, Albion College swimming has not had strength and conditioning as a component of the conventional training regimen. With swimming becoming a sport where outcomes are determined by a hundredth of a second, it is now necessary to go beyond just traditional methods of training. Complex training adds a new component to traditional weight and strength training by adding plyometrics to the conditioning of the athlete. This new component adds the explosive and powerful aspect to many sports, specifically swimming, that gives an edge to competitors.

---

Jones, Michael, '98

## Taxonomic Placement of *Henriettea squamulosa* (Melastomataceae: Miconieae) based on ITS Ribosomal DNA Sequences

Major: Biology  
Faculty Sponsor: J. Dan Skean, Jr.

---

*Henriettea squamulosa* (Cogn.) Judd is a small tree endemic to moist montane forests of Puerto Rico. It was first described by Alfred Cogniaux as *Calycogonium squamulosum* Cogn. in 1886. A century later Walter S. Judd transferred the species to the genus *Henriettea* DC., primarily based on common growth pattern and architecture, and the presence of megastylid crystals in the leaves, the latter characteristic of *Henriettea* species and absent in other species of *Calycogonium* DC. To test the hypothesis that this placement would be supported by comparisons of DNA sequences of internal transcribed spacer (ITS) regions from *H. squamulosa* and species of *Calycogonium* and *Henriettea*, total genomic DNA was isolated, and ITS regions of 18S-26S nuclear ribosomal DNA were amplified and sequenced from field-frozen leaves of *H. squamulosa*, *H. fascicularis* (Sw.) Gomez-Maza, and *H. macfadyenii* (Triana) Alain from Puerto Rico, and leaves of greenhouse-grown specimens of *Calycogonium hispidulum* Cogn. and *Sagraea fuertesii*, both collected on Hispaniola. An unidentified species of *Miconia* Ruiz & Pav. from Mexico

was used as the outgroup. Cladistic analysis of the six aligned sequences (660 bases) yielded 105 possible trees. A branch-and-bound search yielded one most parsimonious tree which was 250 steps long (Consistency index = 0.912; Consistency index removing uninformative characters = 0.758; Retention index = 0.703). Based on this study, Judd's placement of *C. squamulosum* in the genus *Henriettea* is supported.

---

Krabach, Todd, '99

## Gaussian Quadrature in Two Dimensions

Major: Mathematics  
Faculty Sponsor: Scott Dillery

---

Gaussian quadrature is a well understood technique for numerical integration in one dimension. By selecting special Gauss points, we can approximate a definite integral with a summation using

$$\int_W f(x) dx \approx \sum_{i=1}^n A_i f(q_i)$$

where  $A_i$  are weights associated with the Gauss points  $q_i$ . The weights and points depend upon the value of  $n$ . It can be shown that this approximation is exact for polynomials of degree less than or equal to  $2n-1$ , and the rate of convergence for arbitrary smooth functions is  $h^{r+1}$ .

This process is easily extended to rectangles for the two-dimensional case. Combinations of the original Gauss points and weights are used to get the following approximation

$$\int_R f(x,y) dy dx \approx \sum_{i=1}^n \sum_{j=1}^n A_i A_j f(q_i, p_j)$$

This approximation is once again exact for polynomials of degree less than or equal to  $2n-1$ , and the rate of convergence is  $h^{r+1}$ .

We extended this notion of Gaussian quadrature to triangles. The question was what should we pick for points and weights. We explored scaling the points and weights used for a rectangle first in the  $x$  direction and next in the  $y$  direction. To try to get a better approximation, the average of the two methods was used. In all three cases we found that our method was exact for all polynomials of degree less than or equal to  $2n-2$  but was not exact for some polynomials of degree equal to  $2n-1$ . However, it was the case that the rate of convergence was found to be the optimal  $h^{r+1}$ .



---

**Kudirka, Elizabeth, '98**

## **The Word as Power in the Works of Isabel Allende**

Major: Spanish  
Faculty Sponsor: Pamela McNab

---

My project is an analysis of four novels and one collection of short stories by the Chilean author, Isabel Allende. I have analyzed these novels to find the significance that communication plays in the lives of the characters, especially the female characters. Communication acts as a means of obtaining power in two senses. It enables characters to take power in interpersonal and intrapersonal relationships, and it also allows them to achieve political power despite oppressive governmental regimes.

The final section of my thesis deals exclusively with the book *Paula*, which Allende wrote originally as a letter to her daughter Paula, who was in a coma. After Paula's death, Allende eventually published the letter, which is very autobiographical and tells much about her writing career and the purpose behind her writing. I was inspired to do this project two years ago while studying one of Allende's short stories. The story deals exclusively with a woman who uses her knowledge of words to gain both political power and personal power over a man.

I have discovered in the course of the project that Allende has based much of her writing on her life. She has personally used her writing to deal with her experiences and to spread her views around the world, thus gaining indirect political power. There is only a small amount of criticism written on Allende's writing, since her first novel was published less than twenty years ago. This project approaches her work from an angle that not many have explored and will add to the growing body of work on her writing.

---

**LaCasse, Shawn, '98**

## **Acquisition of MS/MS Reference Data of Industrial Chemicals by Ion Trap Mass Spectrometry**

Major: Chemistry  
Faculty Sponsor: Lisa Lewis

---

The U.S. Army and other agencies of the Department of Defense have a continuing interest in the development of MS/MS instrumentation and software as part of their field detection of chemical and biological agents and treaty verification missions. Experiences during the Gulf War have suggested a need to characterize possible exposure to hazardous industrial chemicals as well. MS/MS instruments have the ability to selectively detect compounds in the parts

per billion (ppb) and the parts per trillion (ppt) range. Because of this great selectivity and sensitivity, these instruments are excellent tools for the detection of industrial chemicals, environmental contaminants and chemical agents.

To help aid in the development of field identification methods, the need for a reference MS/MS database has arisen. The assembly of this database is being sponsored by Oak Ridge National Laboratory (ORNL) and the Defense Special Weapons Agency (DSWA). The database is comprised of three major programs: Microsoft Access, Isis/Base, and Isis/Draw.

Through the use of an ion trap gas chromatograph-mass spectrometer (GC/MS), reference spectra from various lists of industrial chemicals were recorded. These spectra include MS and MS/MS spectra of the major ions formed by electron ionization (EI) of compounds including phosphonates, substituted benzenes, halogenated alkanes and alkenes and phthalate esters. Pertinent information about the chemicals such as molecular weight, experimental conditions, and name synonyms are also included in the ORNL/DSWA database.

---

**Lathom, Stephen, '98**

## **Reconceptualizing the Ghetto**

Major: American Social Policy  
Faculty Sponsor: Len Berkey

---

The amalgam of problems associated with ghetto neighborhoods—welfare dependancy, teen pregnancy, single parenthood, education underachievement, gang violence, and the like—are subjects of intense debate among social analysts. The dominant academic analyses of the ghetto are examined, and ultimately rejected, on the basis of their grounding in classical sociological theory. Instead, a Weberian-inspired analysis, one that recognizes multiple spheres of power in the social order, proves more useful in our attempts to understand and approach the ghetto.



---

Lemcke, Mary, '98

## GIS Analysis of Vertebrate Diversity with Respect to Climate

Major: Geological Sciences  
Faculty Sponsor: William Barteis

---

The geologic record clearly shows that the earth's climate regularly shifts between warm and cold periods. Our current climate has changed rapidly over an alarmingly short period of time with record high temperatures occurring across the globe. To better understand this present warm trend we can study past climates using paleontological data, comparing fossil vertebrate distributions to the distributions of living vertebrates.

The purpose of this study is to develop vertebrate diversity criteria for paleoclimatic analysis for tropical and subtropical regions.

Vertebrate diversity, vegetation, and climate data were gathered for Australia, South America, and the Yucatan Peninsula for comparison of climate sensitive vertebrate distributions with respect to the climate parameters of precipitation and temperature. The vertebrates chosen for this study are crocodylians, lizards, and turtles for Australia and the Yucatan Peninsula and only crocodylians for South America. The vertebrate, vegetation, and climate data for each area were spatially and statistically analyzed using Geographic Information System (GIS) software. The geographic and plot analyses for each area were compared to fossil data for the final climate analysis.

Distribution maps were made for each vertebrate guild showing the number of species within that group that can be found at any particular point within the area of study. These maps are then compared to (regressed against) climatic maps in order to analyze the relationship between vertebrate diversity and climate. The X-Y plots of vertebrate diversity versus climate (and vegetation) can then be used to make predictions about ancient climates as reflected in the diversity of the fossil faunas.

---

Marlowe, Emily, '98

## Children's Facework in Social Predicaments

Major: Psychology  
Faculty Sponsor: Barbara Keyes

---

Fifth-grade and sixth-grade participants were asked to read four scenarios, each depicting a social predicament in which the participant was the offender and a same-sex classmate was the victim. The scenarios varied by blameworthiness (high and low) and closeness of relationship between offender and victim (friend and acquaintance). Participants were then asked to write an account of what they would say to the victim for each scenario. Other factors that were expected to affect the results include the sex, self-regulatory style, and sociometric status of the participant. Account elements were coded into four main categories of concessions, excuses, justifications, and refusals. Analysis was then performed to determine if the above factors affected various aspects of the account including length of account, type of account elements used, complexity of account, and number of lies. Participants' situational self-esteem and their expectations about the future outcome of the situation were also measured.

---

McCracken, Molly, '98

## The "Eyes" Have It: Vision in the Novels of Laura Esquivel

Majors: Economics/Management and Spanish  
Faculty Sponsor: Pamela McNab

---

In my research on the novels *Como agua para chocolate* (*Like Water for Chocolate*) and *La ley del amor* (*The Law of Love*), both written by Laura Esquivel, I explore the use of vision in depth, principally as a means of transmitting emotion. This project suggested itself due to the highly visual quality of the two novels. Much of the novels' progress depends on types of non-verbal means of communication. There are four visual concepts which function as a means of emotional expression: the gaze from one person to another, a mutually exchanged gaze, blindness (both literal and figurative), and crying. This study is significant because it helps to explain how Esquivel's background as an author of movie scripts influences her fiction.

---

McKeachie, J. Ryan, '98

### **A New Photochemical Method for the Production of Polypyrrole**

Major: Chemistry  
Faculty Sponsor: Craig Bieler

Polypyrrole is a conductive polymer that is generally synthesized by electrochemical or chemical oxidation of the polymer monomer. Unfortunately these synthetic methods do not provide satisfactory means for coating surfaces of any type due to the insoluble and infusible nature of the polymer. Recently we have seen that photolytic synthesis is a promising surface-coating method for polypyrrole. Polymeric material coats the interior of a quartz sample cuvette filled with a solution of pyrrole in  $\text{CCl}_4$  where intense 300 nm light from a xenon arc lamp strikes the cell. New solution absorbances develop at 340 and 460 nm, accompanied with a noticeable solution color change from colorless to bright yellow. Infra-red and UV-Visible spectra, conductivity, and solubility of the photolytic product have been compared to those of polypyrrole synthesized in the lab by oxidation using a variety of oxidizing agents.

---

Minnear, Timothy, '98

### **The Effects of Larval *Xenopus laevis* Xenografts on Spinal Cord Crush Injuries in *Ambystoma maculatum***

Major: Biology  
Faculty Sponsor: Richard Mortensen

To find the effects of fetal neural tissue transplants on the recovery of function after the spinal cord has received a crushing injury, spotted salamanders (*Ambystoma maculatum*) received grafts from South African clawed toad larvae (*Xenopus laevis*). The salamanders were injured by vertebral dislocation of the tenth and eleventh thoracic vertebrae. Incisions were made, exposing the spinal cord. Neural tissue from the tadpoles was removed and injected into the injured tissue in the experimental salamanders. The hind leg function of the subjects was measured before surgery and at two-day intervals beginning the day of the surgery. The control salamanders regained complete function after nine days and survived for more than two weeks. The experimental salamanders never regained function, and all had died after six days.

These results show that fetal interspecies grafts inhibit the natural recovery process in *Ambystoma maculatum*. It also suggests that cellular grafts may be detrimental to the recovery of function after the spinal cord has received a crush-type injury.

---

O'Brien, Thomas, '98

### **"Progress is Albion's Future": A History of the West Central Urban Renewal Project**

Major: History  
Faculty Sponsors: Wesley Dick and Larry Steinhauer

In 1965 the Albion City Council voted, in the face of substantial community opposition, to enter into a contract with the federal government to carry out an urban renewal project on the city's primarily black west side. The West Central project, as it came to be called, was to displace approximately 150 families and thirty individuals in an attempt to eliminate 'slum' conditions and prepare the west side land for redevelopment. From the outset the project ran into several obstacles—poor communication between the various local and federal agencies; lack of standard, low-income housing in which to relocate the displaced residents; failure to attract private contractors and developers; and lack of cooperation from neighborhood residents were just a few of the various obstacles faced by the city's urban renewal department. Many of these problems were similar to those faced by urban renewal projects across the nation, while others were particular to small cities such as Albion. As an example of both community opposition and federal encroachment on local power, the West Central project was one of the most controversial events in the history of Albion, and the impact of the project on the city's west side is highly visible even today.

---

Petrus, Jaime, '98

### **Investigation of the Photoreduction of Carbon Tetrachloride by Titanium Dioxide Using GC/MS with Headspace Sampler**

Major: Chemistry  
Faculty Sponsor: Lisa Lewis

Titanium dioxide ( $\text{TiO}_2$ ) will photodegrade volatile organic compounds in water and holds promise as a technique for remediation. The photoreduction of carbon tetrachloride ( $\text{CCl}_4$ ) by  $\text{TiO}_2$  (340 nm) was analyzed using gas chromatograph-mass spectrometry (GC/MS). Previous study of the kinetics of  $\text{CCl}_4$  photodegradation used alternate methods of analysis, such as single ion electrode monitoring of chlorine evolution. This investigation explored the use of GC/MS with headspace sampler as a more complete method of analysis, allowing for identification and quantification of both products and reactants.



---

**Probert, Kelly, '98**

## **Physical Education Leads to Life Patterns of Physical Activity**

Major: Physical Education  
Faculty Sponsor: Darrell Sedersten

---

**Purpose:** To discover whether what is taught in physical education is being utilized throughout life. To find out what activities people are doing once they are no longer in a physical education class. **Method:** Survey of staff and faculty members. The next step was to compile and compare results.

**Significance and Results:** Physical education is important but some of the major activities people are participating in are not taught in physical education until college if at all.

---

**Ralston, Jennifer, '98**

## **The Catholic Church and the Third Reich During the Pre-War Years, 1925-1939**

Majors: History and Religious Studies  
Faculty Sponsor: Frank Frick

---

The Catholic Church has been placed at two polar ends of the spectrum of fault in relation to the Holocaust and the Nazi regime in Germany. Some scholars claim the Vatican had prior knowledge of Hitler's plan of genocide against anyone of non-Aryan descent. Others claim that the Catholic Church was duped by the Nazi leader, and it was merely an innocent victim in his onslaught against the world. This thesis will try to balance both arguments and show how the fault of the Catholic Church during World War II is neither complete nor nonexistent.

The Catholic Church could have made a stronger stand against the treatment of the Jews, Roma, and political prisoners in Germany, yet the Pope and the Vatican were placed in a terrible situation. Either the Catholic Church would disengage completely from the political sphere of influence in Germany, or it would risk losing the freedom of the Church, its parishioners, and the Catholic organizations in Germany. Neither of these options was the first choice of the Catholic Church, yet the church was forced into choosing a disagreeable option.

This thesis will show how the history of anti-Judaic sentiment, the political arm of the Catholic Church in Germany (Catholic Center Party), the 1933 Concordat between the Holy See and the Reich

Government, and the violations of this Concordat shaped the circumstances under which the decisions of the Catholic Church were made. This thesis' goal is not to answer the question of the degree of guilt of the Catholic Church on these issues, but to present a balanced argument so the reader can make an informed decision.

---

**Rozdoske, Loretta, '98**

## **People's Perceptions of the Battered Woman and Her Batterer**

Major: Psychology  
Faculty Sponsor: Ivelisse Martinez

---

This study examined the general population's perceptions of the battered woman and her batterer. Two hundred forty undergraduates were given a scenario, along with a questionnaire, to determine whether their perceptions of the battered woman and her batterer were either negative or positive. The scenario developed for this study included three factors which were believed to have an effect on the participants' perceptions. This study used a between-subjects, 2 (scenario ending) X 2 (woman's reaction to prior abuse) X 3 (familiarity) factorial design. Analyses included factor analysis, reliability analysis, and several analyses of variance (ANOVAs). Implication of such research is discussed.

---

**Sedlak, Cara, '98**

## **Economic Considerations Bar Equal Access to the Civil Justice System**

Major: Political Science  
Faculty Sponsor: Allen Horstman

---

Americans have come to rely on the legal system to work through almost every type of dispute imaginable. Consumers sue to receive compensation for damages caused by faulty products. Neighbors sue neighbors regarding overhanging tree limbs. Employees sue employers because of sexual harassment. Stockholders file class action suits against corporation management. Neighborhood associations appeal zoning decisions. Use of the legal system has become an integral part of American culture.

This reliance on the legal system has contributed to an increase in the different abilities of the rich and the poor to obtain relief. The legal system, in theory, is an excellent venue for fair dispute resolution.



However, the system cannot live up to this potential unless all persons are equal under the law. Unfortunately, litigation is very costly; the poor cannot afford to utilize the legal system in the manner which Americans of higher economic status have become accustomed.

To help combat this inequality, attempts have been made throughout history to provide organized legal assistance to the poor. Beginning with private charities and eventually leading to government funding, legal aid has been around since the late 1800s. Originally, aid was seen as a privilege and covered only certain "worthy" procedures for those deemed "deserving." Federal government involvement, which began in the 1960s, changed the outlook to use of the legal system to attack the underlying causes of poverty. As years passed and the idealism of the 1960s faded, government-funded legal assistance shifted to pursue the expansion of individual access to justice.

The result has been a decreasing viability for community impact litigation, particularly for poorer communities. Without access to government dollars, poorer communities cannot afford to bring forth litigation which might potentially benefit a large number of residents. Because the Legal Services Corporation can no longer finance class action lawsuits, these communities have been forced to make use of alternative funding options.

Methods of funding include finding a lawyer willing to take the case pro bono or under a contingency fee arrangement, seeking reimbursement for attorneys' fees under statutes including such provisions, attempting private funding, making use of cost minimization strategies, and applying for assistance from public interest groups. Each of these solutions has obstacles which make financing community impact litigation very difficult. The obstacles are heightened for poorer communities. Coupled with the American reliance on the legal system, these obstacles stand in the way of justice through equality under the law.

---

Shaltis, Phillip, '98

## Design, Construction and Programming of an Autonomous Mobile Robot

Major: Pre-Engineering/Physics  
Faculty Sponsor: David Kammer

An autonomous mobile robot was designed and constructed that is able to navigate in the presence of previously unknown obstacles. The robot is based on the Motorola 68HC11 micro controller integrated circuit and has five sensors: an infrared proximity sensor, a scanning ultrasonic range finder, a floor reflectance sensor, and shaft encoders for dead reckoning. Programs were written in the "C" language using basic techniques of artificial intelligence that obtain information from these sensors and produce commands for the driving motors in order to navigate in unknown environments. Live demonstrations will be given.

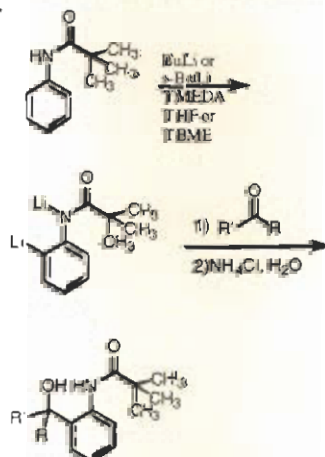
---

Van Scyoc, Wendy, '98

## Ortholithiation of Pivanilide and Subsequent Alkylation with Carbonyl Compounds: A Preliminary Investigation

Major: Chemistry  
Faculty Sponsor: Andrew French

In an effort to access chiral biaryl methyl alcohols, we investigated the ortholithiation/alkylation of pivanilide. The dianion, **2**, was generated with *s*-BuLi in TMEDA/THF at low temperature. Reaction of this dianion with carbonyl compounds (benzaldehyde, acetophenone, etc) gave, in some instances, the desired amide alcohol in low to moderate yield. A discussion of previous work in this area, and our attempts to expand the scope of this reaction will be presented.



**Albion College**  
**Albion, Michigan 49224**