

The Sixth Annual

Undergraduate
Research

&

Creative
Achievement
Day

2002

UMBC
AN HONORS
UNIVERSITY
IN MARYLAND

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SCHEDULE OF EVENTS

- 9:00 a.m. – 1:00 p.m. Concurrent Sessions**
Oral Presentations, Room 767, Albin O. Kuhn Library & Gallery
Poster Sessions, 7th Floor, Albin O. Kuhn Library & Gallery
Musical Performances, Room 767, Albin O. Kuhn Library & Gallery
Visual Arts Exhibits, 7th Floor, Albin O. Kuhn Library & Gallery
- 1:00 p.m. – 2:00 p.m. Formal Program, Room 767**
Remarks by:
President Freeman A. Hrabowski, III
Provost Arthur T. Johnson
- Faculty Speakers
Topic: The Importance of Undergraduate Research and Creative Achievement
- Dr. Phyllis R. Robinson
Associate Professor, Biological Sciences
 - Dr. James C. McKusick
Associate Professor and Chair, English
- Introduction of the 2002-2003 Undergraduate Research Award Recipients
- Diane M. Lee
Vice Provost for Student Academic Affairs
- 2:00 p.m. Reception**
7th Floor, Albin O. Kuhn Library & Gallery

Poster and artistic exhibits will remain available for viewing until 4 p.m.

April 17, 2002

Dear Participants and Visitors:

I am pleased to welcome you to UMBC's sixth annual Undergraduate Research and Creative Achievement Day. This celebration of our students' scholarly and artistic accomplishments is especially meaningful as we conclude an academic year during which we have considered our successes and our challenges in engaging our students in meaningful academic experiences. Among the measures of educational effectiveness that we have examined is the "Institutional Engagement Index" from the 2000 National Survey of Student Engagement. Virtually all factors characterizing student engagement in this study are complemented by UMBC's undergraduate research initiatives:

- Academic challenge
- Active and collaborative learning
- Student interactions with faculty members
- Enriching educational experiences
- Supportive campus environment

Join us in saluting the students whose presentations and exhibits you will see today. We are proud of what they have achieved. Their faculty mentors have encouraged these students to wonder, to imagine, to investigate, to create, to persevere, to compete, and to excel - the essence of dedicated teachers engaging young scholars.

In addition to today's event, our Research Week is marked by the dissemination of the third edition of our undergraduate research journal, *UMBCReview*. Please visit the journal's exhibit table to receive a copy and to learn details of the next publishing cycle. On Friday, our Graduate Research Day, co-hosted with the University of Maryland, Baltimore, will take place in The Commons. We hope that you will support our graduate students' exhibition as well, recognizing the significant inspiration and instruction they contribute to our undergraduate scholars and to the university community as a whole.

Thank you for being here today. Please discuss with our undergraduates their projects and broader research goals. We take great pride in their accomplishments and their aspirations.

Sincerely,
Arthur T. Johnson
Provost

PRESENTERS

Presenters are listed in alphabetical order by type of presentation. Some students are involved in joint projects, as described in the abstract section. The number refers to the page on which the abstract is found. An asterisk notes that the student is a 2001-2002 Undergraduate Research Award Scholar.

Oral Presentations

| | |
|---------------------------|---------------------------------|
| Anchor, Kristen | Visual Arts/Rim |
| Baker, Jason | Philosophy /Biological Sciences |
| Dailey, Stuart | Music |
| Foster, Steve | Mathematics |
| Freedlander, Jonathan | Psychology |
| Herling, Jenafer | Dance |
| McElroy, Oleta Dianne | Sociology |
| McKerrow, Katherine | English |
| Monti, Jana | Interdisciplinary Studies |
| Morse, Charlie | History |
| Pilecki, Faith | Modern Languages & Linguistics |
| Rhodes, Heather Couvillon | Chemical Engineering |
| Rund, Michael | American Studies |

Poster Presentations

| | |
|---------------------|-----------------------------------|
| Acevedo, Claudia | Anthropology |
| Adkins, Charles | Interdisciplinary Studies |
| Aynalem, Henok | Chemistry |
| Bailey, James | History |
| Baird, Jana | Psychology |
| Balighian, Eric | Chemistry |
| Beck, Kevin | Biological Sciences |
| Brenick, Alaina | Psychology |
| Casiano, Karol | Health Administration & Policy |
| Desai, Anura | Sociology |
| Dummett, Alex | Chemical Engineering |
| Goodlin, Vanessa | Biochemistry |
| Hudson, Jonathan | Computer Engineering |
| Israel, Lisa | Psychology |
| Jose, Gilbert | Interdisciplinary Studies |
| Karimullah, Azfar | Information Systems |
| Mitchell, Jessica | Geography & Environmental Systems |
| Morin, Nick | Biochemistry |
| Mullan, Melissa | Chemistry |
| Ocheni, Henrietta | Biological Sciences |
| Ramakrishnan, Ramya | Computer Sciences |

Poster Presentations (Cont.)

| | |
|-----------------------|---------------------------|
| Robucci, Ryan | Computer Engineering |
| Rowhanirad, Amir | Computer Engineering |
| Semiatin, Joshua | Psychology |
| Staroswiecki, Ernesto | Computer Engineering |
| Sun, Yu-Feng | Chemistry |
| Zahn, Jason | Interdisciplinary Studies |

Musical Performances

| | |
|--------------------------|--------------------------------|
| Belt, Kriste | Music |
| Derrick, Deirdre Justine | Music |
| Kloezli, Liesel | Music |
| Rose, Leigh Ann | Music/Imaging and Digital Arts |

Artistic Exhibits

| | |
|---------------|--------------------------------|
| Duvall, Najah | Art History |
| Fall, Steve | Imaging and Digital Arts/Music |
| Lawhon, Bette | Imaging and Digital Arts/Music |

2002 PROVOST'S UNDERGRADUATE RESEARCH AND CREATIVE ACHIEVEMENT DAY COMMITTEE

Diane M. Lee, Chair
Vice Provost for Student Academic Affairs
Associate Professor, Education

Joseph C. Morin
Assistant Professor
Music

Guenet Abraham
Visiting Assistant Professor
Visual Arts

Beth Pennington
Assistant to the Provost
Academic Affairs

Nessly C. Craig
Associate Professor
Biological Sciences

Kathy Sutphin
Coordinator of Special Projects
Biological Sciences

Stephen M. Miller
Assistant Professor
Biological Sciences

Victor Wexler
Associate Dean of Arts and Sciences
Associate Professor, History

On leave for 200:1-2002, though ever supportive:

Steve Bradley
Associate Professor
Visual Arts

Zoe Warwick
Associate Professor
Psychology

Tim Topoleski
Professor
Mechanical Engineering

ACKNOWLEDGEMENTS

The organizing committee would like to express its gratitude to the many people who helped make this day possible. First and foremost, we thank the student participants and faculty advisors whose talent and dedication inspire the entire event. Provost Art Johnson, whose support continues to make this event and other initiatives an annual testimony to UMBC's commitment to undergraduate research, deserves special appreciation. We are grateful for the continuous support of Marilyn Demorest, Vice President for Faculty Affairs, and Antonio Moreira, Vice Provost for Academic Affairs. Provost's Office staff members Linda Hatmaker, Sue McMillian, Susan Mocko and Beth Wells have provided essential administrative support to this event, as have student assistants Katya Trubitsyna, Kendra Mitchell, and Thomas Briggs.

Each year we are indebted to the faculty advisors, whose support of the participating students is essential and yet often unsung. The tremendous effort made by members of the Undergraduate Research Awards Committee to screen applications and identify many of the talented students featured in each year's event should be acknowledged. We thank the members of last year's URA committee, whose reviews have contributed to selecting today's participants: Robert Deluty, Thomas Field, Vin Grabill, Doug Hamby, Ramachandra Hosmane, Brad Humphreys, Preminda Jacob, Marjoleine Kars, Lisa Kelly, Claudia LawrenceWebb, Mary Stuart, Tim Topoleski, Gavin Watson, Lynn Watson and Victor Wexler.

We are honored that Professor Phyllis Robinson, Biological Sciences, and Professor James McKusick, English, have graciously agreed to serve as this year's faculty speakers. We also thank Professors Stephen Braude (Philosophy), Marilyn Goldberg (Ancient Studies), Julie Fette (Modern Languages & Linguistics) and Preminda Jacob (Visual Arts) for their moderation of the oral presentations.

Our gratitude is always owed to Larry Wilt, Linda Durkos, Tom Beck, Cynthia Wayne, and Sylvia Wright for their annual efforts to facilitate our use of the Albin O. Kuhn Library & Gallery. Among the many individuals who have assisted in the publicity and planning for this event are Lisa Akchin, Jack Suess, John Fritz, Eleanor Lewis, Sandra Dzija, Michelle Healy, Sara Sommerville, Charlie Melichar, Sandy Campbell, Tom Taylor, Yvette Mozie-Ross, Dale Bittinger, Jose Barata, Kim Leisey and Jennifer Dress. Special appreciation goes to Karen Baxter, Vanessa Rivera and Kristin Brings for the design and production of this program, invitations, and various displays. The Retriever staff members have also been supportive of our publicity efforts, and we appreciate the announcements of WMBC Radio Station.

A special thanks is extended to Tim Sparklin and Susan Sonnenschein for their assistance in seeing that all projects have followed guidelines of the Institutional Review Board (IRB).

We are pleased to collaborate with the Graduate Student Association in promoting events of this Research Week and thank Rami Bardenstein and Matthew Avila for the dedication, hard work, and support they have extended to promote the event of their undergraduate colleagues.

Oscar Berninger and the staff of Wood Food Service have worked to provide an enjoyable reception, and Brian Shipley and the Student Workforce staff provide unseen but invaluable support to this event. The help of Audio-Visual Services will be especially evident this year, and we thank Steve Anderson and his staff for their assistance.

Members of the President's staff Doug Pear, Karen Wensch, Kathy Raab, Sue Bosley, Andrea Desantis, and Susan McGuire "sooner or later" always provide assistance for this event and have facilitated the participation of President Freeman Hrabowski, whose spirited leadership continually inspires this annual celebration of student achievement.

A heartfelt word of appreciation goes to the family and friends who, with loyal pride and ceaseless support, come to hear their special presenters each and every year. Their encouragement is often unacknowledged and deserves special recognition.

Lengthy though our list, we can never include the entire cast of individuals who help with this event. To all who have assisted in any way (even as the day progresses), we are most grateful.

ORAL PRESENTATIONS

Visual Arts/film

Appropriate(d) History: Making up lies to reveal the truth about Truth

Kristen Anchor

Advisor: Professor Hollie Lavenstein

"Tonight, it is with a heavy heart that I address this truly great nation built on the principles of individual freedom with the common good, because, I, your trusted leader have misled you. In such a great democracy integrity and honesty are the paramount qualities required of your elected officials, this includes myself. I have lied, and for this I am deeply sorrowful, for I may have shaken the strength and faith of such a great and powerful nation, just as we needed this strength. Turmoil within should not be allowed to weaken our outward strength as the world leader. This is why I ask for your forgiveness, you, as individuals make up this great nation, and it is of each of you I ask to dig deep in your heart for understanding. I did not deceive you for my own good, but for the good of the nation, for I knew then, and know now, that I am the strongest, the best leader I can be, especially now that the truth has been exposed. I did not conceal my past in order to mislead our nation down the wrong path, but rather to overcome my beginnings and to lead us down the righteous path of glory. I ask you, great nation, are not men and women equal? In a nation built on the very principle of human dignity in the personal pursuit of life, liberty, and the pursuit of happiness for each and every man and woman, should it matter how we begin life? Shouldn't it matter not which obstacles we must overcome, but how we overcome our obstacles with dignity, strength, and integrity? Is that not the basis of our great democracy? Should not every man have the right to control his own destiny?" With these words, main character, President Donald Deagan, opens this quick satirical film that takes on history, politics, and the definition of the individual as we know it.

What can a make-believe story of an unbelievable presidential scandal, constructed of images that don't even belong to the filmmaker, tell us about the nature of contemporary political reality? How does the media inform our identities? How is democracy influenced by the production of images, both of self and of politicians? What is the role of power in image making? How do the allure of the narrative, and therefore the tropes of storytelling, manifest themselves in what we know and how we know our politicians, and our very history? Is history just heroic storytelling? Are democratic elections really just a contest between stories? How many layers or readings can one image have? Do images help or hurt our own process of self-definition and self-determination? Is self-determination the ultimate freedom?

Biological Sciences and Philosophy

What Is a Species? Insights from New World Orioles (Icterus)

Jason M. Baker

Advisor: Dr. Kevin Omland, Biological Sciences

Biologists and philosophers have long debated the definition of species (reviewed in Hull 1988). The biological species concept (Mayr 1963), which is the most commonly held, defines a species as a group of populations that exchange genes with each other but not with other populations. Despite its widespread acceptance, this concept fails to account for the frequency of fertile hybrids between

species, lack of gene flow among some populations within a species, and existence of asexual species (Templeton 1989). It also fails to adequately address theoretical challenges (Cracraft 1989). As a result, several other concepts were created to cope with these difficulties. Among these, phylogenetic species concepts in their various forms (Cracraft 1983, Donoghue 1985, Mishler and Brandon 1987) have achieved perhaps the most success in ornithology. According to these accounts, a species is a group of individuals related to each other genetically. The monophyly, or shared ancestry, of these individuals is often used to define a species (e.g., McKittrick and Zink 1988). Yet theoretical models of speciation (Avice 1994) predict patterns of non-monophyly at early stages of speciation. Recently-diverged species will not demonstrate reciprocal monophyly for some time after they have stopped exchanging genes (Hudson 1990). Moreover, the evolution of reciprocal monophyly does not appear to mark the boundary of any evolutionarily significant event. Rather, it is a pattern caused by stochastic processes, which may or may not be correlated with evolutionary changes in behavioral, ecological, or morphological characters. Thus, we have reason to question both the utility and theoretical robustness of phylogenetic species concepts based on monophyly.

In the present study, we examined two closely-related species and subspecies pairs in the New World orioles (*Icterus*): Baltimore (*I. ga/bula*) and Black-backed Orioles (*I. abeillei*), and Orchard (*I. spurius spurius*) and Fuertes' Orioles (*I. s. fuertest*). In each pair, we found clear differences in plumage, breeding range, and migratory habits, which suggests that the two forms in each pair are separate species. However, reciprocal monophyly has not yet evolved in either pair we studied. Our findings confirm doubts about the adequacy of reciprocal monophyly to appropriately demarcate species limits, particularly in closely-related species.

Music

Voice of the R & B Saxophone

Stuart Dailey

Advisor: Dr. Joseph C. Morin

The saxophone is fundamental to many twentieth-century musical genres. During the early years of Rhythm and Blues, 1940's through the 1950's, the saxophone emerged as the primary solo instrument. Despite the important role of R&B saxophone, the history and development of this unique style of musical expression has been largely ignored in academic scholarship. Many studies which discuss the genre of Rhythm and Blues, such as Arnold Shaw's *Honkers and Shouters* (1978), attribute the origin of R&B sax to a variety of individuals and have little to say about the improvisational style and techniques of playing R & B sax solos. At the heart of the issue is the relationship between jazz and R&B and the saxophone styles that are characteristic of both. This would seem especially important given that many sax performers became fluent in both styles of expression. This paper presents research that explores this relationship and begins to bring the early history of R & B sax into sharper relief. My research involves comparing and contrasting musical elements (such as meter, syncopation, note selection, range, inflection, ornamentation, and other musical characteristics) that are fundamental to R&B sax style, and attempts to sort out its emergence during a time when the free interplay of pop, jazz and R&B was extensive.

Mathematics

Comparative Performance Studies of the Discontinuous Galerkin Method for the Scalar Transport Equation

Steven C. Foster

Advisor: Dr. Matthias K. Gobbert Low pressure gaseous mixtures are used in several production processes in semiconductor manufacturing including atomic layer deposition and low pressure chemical vapor deposition. These processes are designed to deposit a solid onto the surface of a silicon wafer inside a reaction chamber.

A model for the transport and reaction in these processes based on the Boltzmann equation has been introduced recently. The Boltzmann equation is a non-linear integro-partial differential equation. It models both the transport and collisions of gases at low pressure

The Boltzmann equation is converted to a system of linear hyperbolic partial differential equations through an expansion in velocity space. The basis functions in this expansion are chosen specifically to produce diagonal system matrices in the system of hyperbolic equations. This system is solved with the discontinuous Galerkin finite element method.

Taking the system matrix to be a one-by-one matrix produces the scalar transport equation, the prototype problem for this system. This presentation focuses on performance studies of the discontinuous Galerkin method for solving the prototype problem.

The method is tested on several parallel computing environments. Though the systems are all clusters of workstations, the network connections, and hence communication performances, differ vastly. The method performs with near-optimal speedup on all systems considered. These results justify the use of the discontinuous Galerkin method for the more complex original problem.

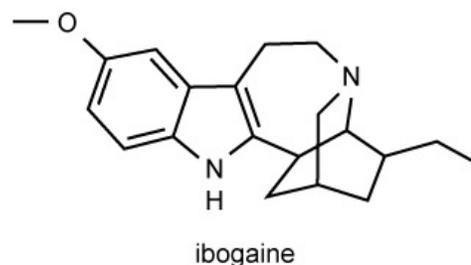
Psychology

Ibogaine: A Novel Anti-Addictive Compound

Jonathan Freedlander

Advisor: Dr. Carlo C. DiClemente

The purpose of this study is to provide a comprehensive background for further investigation into the use of ibogaine and related compounds as psychopharmacological treatment for the pathologies of addiction. Specifically, ibogaine has been indicated in animal and pre-clinical human studies to have properties that interrupt addictions to opiates, cocaine, nicotine, and alcohol (Glick, Rossman, and Steindorf, 1991, Lotsof, Della Sera, and Kaplan, 1995, ibogaine Mash et al, 2000). This study endeavours to establish a collection of diverse aspects of information regarding ibogaine, including its historical uses, pharmacology, and potential applications.



Ibogaine is a naturally occurring indole alkaloid, found in a variety of tropical African shrubs, most notably the Tabernathe iboga (Shulgin and Shulgin, 1977). Preparations of these shrubs have been used for centuries in traditional African medicine and religious rituals, and were first introduced to the Western world by French and Belgian explorers in the late 19th century (Popik and Skolnick, 1999). The iboga root contains twelve known alkaloids, of which ibogaine is the most psychologically active (Popik and Glick, 1996). At lower doses, ibogaine acts primarily as a stimulant, and gained some popularity in Europe in the early to middle 20th century, sold under many trade names in varying concentrations (Goutarel, Gollnhofer, and Sillans, 1993).

At higher doses, ibogaine elicits its full effect; a quasi-hallucinatory state which facilitates long-term memory retrieval (Naranjo, 1974) and eliminates symptoms of opiate withdrawal (Glick, Rossman, and Steindorf, 1991). It is thought that this state enables the brain changes necessary to interrupt addictive behavior, though the specific nature of this phenomenon is not yet well understood. Ibogaine's anti-addictive properties were first documented in a series of focus groups led by recovering heroin addict Howard S. Lotsof in the 1960's. However, clinical investigations of ibogaine's anti-addictive properties did not effectively begin until the late 1980's.

The pharmacodynamics of ibogaine are quite complex and involve multiple sites of action. Of particular interest is the fact that among the neural systems most affected by ibogaine are those systems implicated in the neuropathology of addiction; specifically the dopaminergic, glutamatergic (NOMA), and opioid pathways (Alper et al, 1999). Ibogaine also acts on the serotonergic, sigma, and nicotinic pathways, sometimes in seemingly paradoxical ways (Popick and Glick, 1996). Additionally, when ibogaine is ingested some of the compound is metabolized by the liver into noribogaine. This metabolite is also psychopharmacologically active, with a similar, but not identical, pharmacological profile to ibogaine, and a longer half-life (Mash et al, 2000).

Presently, human toxicology studies on ibogaine as prescribed by FDA protocol are underway at the University of Miami, led by neurologist Deborah Mash. Should it prove to be adequately non-toxic, ibogaine therapy would represent a truly novel pharmacological approach to treating addictions. Current drugs such as antabuse and naltrexone work by interfering with the effects of the drug of abuse, causing the addict unwanted effects (such as vomiting), which are hoped to deter use. Other pharmacological treatments for addiction, such as methadone, merely replace the drug of abuse with another, medically sanctioned drug. In either case, long-term treatment is required, often resulting in patient non-compliance (Judd, 1994). Contra wise, preliminary reports indicate that one treatment of ibogaine may interrupt addiction for six months or longer (Sheppard, 1994). It is suspected that this is due to an acute reorganization of neural activity, resulting in enduring behavioral change, though it is clear that much further study is needed.

Dance

Making Meaning Move

Jenafer Herling

Advisor: Professor Doug Hamby

The intent of my undergraduate research presentation is to first project "Picking Up the Pieces", a dance that I created after participating in the Bates Dance Festival, and second, to reveal the method by which

the dance took shape. While at Bates this past July, I was fortunate to take part in a creative process workshop led by Liz Lerman, and numerous contact improvisation classes taught by Nancy Stark Smith. Contact Improvisation is a dance technique that involves a physical exchange between at least two people. It is a form of partnering that ranges from light touches to large lifts.

My research objectives were accomplished through the intensive study of both contact improvisation technique, and a full investigation into the different ways to generate movement for a dance. Often times the first step of choreographing a dance is to gather movement ideas, this is called movement generation. To make "Picking Up the Pieces," I used tools taught by Liz Lerman to generate movement. For example, she taught an exercise where one person interviews another, and takes note of the gestures used by the interviewee. Naturally the interview is about the subject matter that the dance is exploring. This allows the choreographer to reveal meaning about a particular issue without being overly literal or theatrical. Exercises like this allow one to use dance to speak about concepts and social issues. My extensive studies of partnering at the Bates Dance Festival, as well as my previous training, gave me the skills to safely use risky partnering in "Picking Up The Pieces". Two primary emotions involved in partnering are trust and fear. In order to partner successfully a dancer must completely trust her partner. Whether the choreography involves diving into someone's arms, or jumping onto someone's shoulders, any amount of fear or trepidation will hinder the movement. I believe that when partnering is done well it is an effective way to communicate with the audience. Respected dance professionals at The American College Dance Festival recently adjudicated "Picking Up the Pieces". This was a great opportunity for me to disseminate my research findings to a large audience, as well as to gain insight into the success of my research. "Picking Up the Pieces" was said to be "intriguing, effective, and enigmatic".

Sociology

Disaster Prevention and Preparedness: An International Comparative Study

Oleta Dianne McElroy

Advisor: Dr. Mary Stuart

This is an exploratory, comparative study of disaster prevention and preparedness in the United States and Switzerland. In this study, I compare the frequency and types of disasters in the U.S. and Switzerland as well as policies, procedures and attitudes regarding disaster prevention and preparedness.

The Swiss have a good international reputation regarding disaster prevention and preparedness, particularly in the area of environmental concern. Because my own interests include, but extend beyond, the environment and because this study is preliminary in nature, I chose to maintain a broader focus.

The strength of this study is that by using a variety of field research methods, including analysis of administrative statistics, content analysis of direct observation, interviews with public officials and an opinion survey of citizens, I have obtained a broad overview of policies, procedures and attitudes regarding disaster prevention and preparedness in Switzerland as compared to the U.S.

I found that the organizational structures of disaster management in Switzerland and the U.S. are

similar, although the Swiss indicate a preference for handling disaster management at the local level. U.S. local officials are more inclined to seek help from a higher level of government. Mitigation, or action taken to reduce susceptibility to hazard, forms an important aspect of disaster prevention for both countries. Experts in both countries consider public disaster education to be important. Despite these apparent similarities, Swiss citizens express more confidence in their government's disaster prevention and preparedness policies. They also express less anxiety regarding community and personal preparedness regarding future disasters than their U.S. counterparts. Lower Swiss anxiety about disasters is consistent with a lower probability that Swiss citizens will experience a disaster, compared to U.S. citizens. Using World Health Organization data, I found that Switzerland has significantly fewer disasters, relative to their population, than does the U.S. However, it is unclear whether the strikingly lower rates of disasters in Switzerland compared to the U.S. result from more effective prevention and preparedness strategies or whether there is another explanation.

This preliminary, exploratory, comparative study has provided a broad overview of the topic of disaster preparedness and prevention. It has also identified a number of issues for future research. These are important and timely issues. The events of September 11, 2001, and the subsequent concerns regarding public safety, highlight how vital it is for a nation to have effective and efficient disaster prevention and preparedness policies that maintain public confidence and reduce disaster incidents.

English

Decayed Castles, Deerstalker Caps: Linking Gothic Horror and the Modern Mystery Tale

Katherine McKerrow

Advisor: Dr. Kenneth H. Baldwin

During the latter half of the eighteenth century, the genre of the Gothic romance was born and reached outstanding heights of popularity. From this time through the first quarter of the nineteenth century, hundreds of Gothic works were published and consumed by the hungry masses. The Gothic structure, on the whole, is rather formulaic. Writers seem to have primarily plugged different names into a pre-conceived equation.

In the typical Gothic tale, a young virginal girl (preferably orphaned) finds herself in the clutches of her evil guardian. The guardian whisks her away from her pastoral, idyllic home and forces her to live in some sort of crumbling edifice - a castle, a monastery, a convent, etc. The guardian also has some evil designs upon the maiden, wishing to rape her and/or rob her of her inheritance. Thus, the breathless girl must run through a labyrinth of locked chambers, haunted crypts, and strange black curtains. The castle is generally inhabited by a good assortment of wailing ghosts, evil abbots, undead knights, and wronged nuns. Just when it appears that the heroine is doomed forever, lo and behold, her long-lost sweetheart emerges and rescues her from peril. What is more, the secret of his ancestry reveals him to be of princely birth and the rightful heir of fabulous estates. Thus, he is worthy of her hand in marriage.

This often hackneyed genre, nevertheless, did produce a few literary gems - the works of Ann Radcliffe, for example. But for the most part, the tradition consists of maudlin pot-boilers. The tradition found much criticism (Jane Austen's *Northanger Abbey* being the most popular example). Today, the genre continues to be criticized and ignored by many serious literary scholars.

But new light being shed on this bizarre tradition shows that the Gothic romance had much more of an impact on popular culture and the English language than previously thought. In fact, the tradition is directly responsible for today's most beloved and read literary genre, the mystery/detective story. "Decayed Castles, Deerstalker Caps" delves into this genre to reveal the line of descent from the Gothic to the mystery. Along the way, a few "missing links" appear. Interestingly enough, these "links" prove to be works considered among the greatest of Victorian literary classics. Thus, this project attempts to solve a great mystery of literature and finds the fascinating and somewhat surprising connection between the Gothic and the gumshoe.

Interdisciplinary Studies:

Art History/ Ancient Studies

Venus: A New Perspective on a Classical Figure

Jana Monti

Advisors: Dr. Preminda Jacob, Art History

Dr. Marilyn Goldberg, Ancient Studies

Ms. Andrea Shaffer, Interdisciplinary Studies

I will be presenting an oral synopsis of the findings of my research paper for Interdisciplinary Studies, supplemented by a PowerPoint presentation. As my final project, the research paper serves to synthesize my combined major of Art History and Ancient Studies. The paper is an exploration of the symbolism and iconography of the classical Venus/Aphrodite image in antiquity and the recurrence of such imagery in the visual art of the twentieth century. Besides conducting thorough library research on this subject, I also plan to make good use of the extensive resources on this topic available in art museums. I will initiate my research by using both of these resources (libraries and museums) to compile a database of representations of the Venus/Aphrodite images as they appear in ancient art and twentieth century art. These references will provide a foundation upon which to build my argument, which will be comprised of three parts. I will first analyze the iconography of such female imagery in their specific historical contexts, citing such images as the Venus de Melo and the Aphrodite of Knidos. In the second section of the paper, I will examine the symbolic role of Venus/Aphrodite images in artwork by modern, primarily male, European and American artists during the first half of the twentieth century, discussing such works as Salvador Dali's Hallucinogenic Toreador. In the third and final section of the paper, I will analyze the political and artistic reasons for the appropriation of Venus/Aphrodite images by Feminist movements of the 1970's.

History

The Wright Brothers and the Founding of American Military Aviation

Charlie Morse, Jr.

Advisor: Dr. Joseph N. Tatarewicz

Why do we have to study history? Students ask this question of teachers in a variety of ways many times a day in our schools. Many students believe that studying history is inconsequential. The goal of the project is to provide significance and meaning to the study of history. We designed the project to give the student access to the same sources in much the same manner as a historian would have access to

them. Obtaining the same sources that a historian would use and making them accessible on a CD achieves this goal. We scanned and converted original documents and photographs to Adobe PDF format so that they would maintain their appearance. Other documents, whose scanning was problematic because of archive limitations, were copied on the same machines that researchers would use, then converted to Adobe PDF format. Thus, all of the documents are in a form that historians would use. We have labeled and organized the documents just as they were in their home archives. Only the smell, dust, and hundreds of feet of unrelated documents are missing.

The events at Fort Myer, VA and College Park, MD, from 1908 through 1913, that made up military aviation's infancy, are the project's primary investigative focus. The events are rich with famous historical characters, easily identifiable firsts, and many primary and secondary resources. The documents from the National Archives and Records Administration and Library of Congress are presented raw and uninterpreted. The historiography surrounding the events at Fort Myer and College Park is presented in the bibliography (future versions may possibly include copyrighted material.)

Modern Languages & Linguistics

The Impact of language Policy on Non Governmental Organizations

Faith Maya Pilecki

Advisor: Dr. Stanley McCray

Non-governmental organizations (NGOs) are formed by agreements among private national organizations. Non-governmental organizations have developed due to need for independent aid with issues such as education, health, sustainable development, sanitation and medicine. Non-governmental organizations are able to transcend national boundaries to implement programs that affect millions of people.

There is debate as to whether NGOs actually are independent or if they spread the policies of their home countries. This research project postulates that language policies affect the ability of NGOs to communicate with the community. Non-governmental organizations are generally based in industrialized countries, whose official languages are English, French and Spanish. Though NGOs have programs in formerly colonized countries where the official languages may be colonial languages, the everyday language used by the community may be different. The goal of this research project is to determine the effects of a language policy on the accomplishments of a non-governmental organization.

Both primary and secondary sources will allow me to investigate the effects of language policies on NGOs. This project will first include background information and definitions. I will use reports prepared by NGOs to determine their actions within a language policy and contact a variety of non-governmental organizations regarding their programs, recruitment and communication policies in order to support my thesis.

Chemical Engineering

Development of an Imaging System for Pressure Sensitive Paints (PSPs)

Heather Couvillon Rhodes, Megan Brelsford

Advisor: Dr. Lisa A. Kelly, Chemistry and Biochemistry

A multi-component instrument has been designed and assembled to test Pressure Sensitive Paints (PSPs). The instrument was designed to test and demonstrate PSPs while varying pressure, flow conditions and excitation and emission wavelength. PSPs can be used to map 2-dimensional pressures across surface. Potential uses include automotive, naval and aerospace engineering. The focus of this presentation is the development and construction of the instrument as well as preliminary demonstration.

The instrument incorporates the following system components: a flow chamber, monochromators, spectrometer and a computer interface. The flow chamber allows various pressures and flow rates of water and air to be applied. An illumination system was assembled to monochromate excitation and emission light. A LabView graphical user interface has been developed to control the hardware components.

American Studies

Influence, Reflection and Consumerism: How Advertising in Men's Magazines Affects Contemporary Masculinity

Michael Rund

Advisor: Dr. Jason Loviglio

The purpose of this research is to look at how the advertising in popular men's magazines shapes and reflects the ideas of men, women, and life in terms of modern masculinity. It is important for people to understand how advertisers work, and how they are shaping concepts of masculinity in contemporary America. These magazines make strong messages about how readers should behave and these messages are supported or, in some cases, shaped, by the advertising that subsidizes it.

In my study I am asking several questions including: How do these ads shape and reflect men's views towards women, themselves, alcohol and consumer culture? Who are these ads targeting and why? How do the ads affect the content of the magazine? How do the ads affect the readership of the magazine? And, how do these ads shape and reflect the culture of American manhood? For my research I am concentrating on Playboy and Maxim. I chose these two magazines because they are the most popular in their respective categories of nude and semi-nude-meaning that they both have a running theme of scantily clad women; however, in Playboy the clothing is often limited to jewelry (I would like to note that there will be no pornographic material in my presentation, my research will concentrate strictly on the advertising content of the magazines). To supplement my research I have read several texts that have helped me better understand the state of masculinity in America including, but not limited to: Michael Kimmel's *Manhood in America: A Cultural History*, and Susan Faludi's *Stiffed: The Betrayal of the American Man*. I am also reading several texts on advertising and ad culture, to help me better interpret the work within these magazines. Finally, I am making use of the demographic

information provided by the magazines themselves to back up my assumptions of who these ads are trying to target and why.

So far I have accomplished much of my background research on ad culture and masculinity in America and am preparing to begin engaging the magazines themselves. The research also includes a close - but brief - look at the state of the advertising industry both from the academic perspective, and the industry perspective so as to remain as unbiased as possible. I continue to review the scholarly literature on the state of masculinity in America, and that phase of my research is nearly completed.

This research should enlighten one as to how ads contribute not only to the culture of manhood, but to all of our lives in America. This is an oft neglected area of study due to frequent dismissal of popular culture in academia, but with readerships in the millions the content of these magazines needs to be assessed, especially the ad content, which is far more enigmatic than the editorial content. Barbra Ehrenreich briefly covered the subject of how men's magazines contribute to consumer culture in her book *The Hearts of Men*, but her coverage was short and general, whereas mine will be longer and more in-depth.

POSTER PRESENTATIONS

Anthropology

Migration and Life Change: Latin American Women in the Baltimore-Washington Metropolitan Area

Claudia Acevedo

Advisor: Dr. Sara Poggio

The main purpose of this anthropological study is the analysis of the changes that occur in the lives of Latin American women who migrate to the U.S. and reside in the Baltimore-Washington Metropolitan area. The objective of the investigation is to learn about specific aspects of their personal and family life. Issues of interest also include working status in their country of origin as well as in their migratory destination. The study analyzes the pre and post migratory experiences in order to find any life changes, and the causes and factors that determine them.

This exploratory investigation was conducted on a purposive and nonprobability sample gathered by the snowball method. The selection criteria were based on: sex, socioeconomic, working, and marital status, number of children, level of education, proficiency in the English language, and years of residence in the U.S. The data collection was gathered through semi-structured, open-ended, face-to-face interviews conducted with 12 Latin American immigrant women on general topics related to personal, working, and family life issues. For analysis purposes the interviews were tape-recorded without the identification of the interviewees and conducted in a neutral location in order to protect the identity of the respondents.

The initial findings from the data show that the patterns of change in the lives of the Latin American immigrant women are not uniform. Some revealed drastic changes in every aspect of their lives while others had only a slight modification in their ways of living. Women with similar patterns of life in their country of origin did not necessarily display the same pattern of life change after their process of migration. Post migratory experiences seem to be as influential in the onset of a life change as migration

was itself a means of change. Additionally, the data also show that the migratory process by itself is not a guarantee of change in the life of the Latin American immigrant woman. It was as common to find independent and autonomous women who migrated seeking a new life, a different job, or better life opportunities, as it was to find women with a submissive attitude following their husbands or partners. In the cases where a change in the life patterns were found, the data suggest that the leading factors to direct and define the change were: marital status, conjugal relationship, motherhood, purpose and reasons for migrating, family ties in the country of origin, personal goals, level of education, English proficiency, working status, network of relatives and friends in the place of settlement, number of children, and age.

In relation to the change itself, it appears to be that there is a common change in the life of the women who migrated with a partner or even who established a partner relationship once being settled in the U.S. This main change is the gradual modification of gender roles not in terms of domestic chores but especially in the aspects of decision-making, economic contribution, and autonomy of action. These initial findings support the works of Hondagneu-Sotelo (1992) Baca Zinn (1995) and Poggio and Woo (2000) in the concept of the transformation of gender roles not due to a process of acculturation but due to the conditions of life and individual circumstances that lead couples to create new gender-role patterns in order to survive and adapt in the new environment.

Interdisciplinary Studies:

Sociology

Sexual Rights: Validation of an Instrument and Views of University Students

Charles W. Adkins

Advisor: Dr. Ilsa Lottes, Sociology and Anthropology

Originating primarily from the views of scholars and health professionals outside the U.S., the concept of sexual rights has gained a wide international audience since the 1994 International Conference on Population and Development and the 1995 4th World Conference on Women. In attempts to implement the programs of action supported by representatives of the vast majority of countries of the world at the two aforementioned conferences, international organizations such as the World Health Organization, the International Women's Health Coalition, the International Planned Parenthood Federation, and the World Association of Sexology have adopted a discourse on sexual rights. The assumption is that a rights framework can serve as an effective advocacy technique to motivate politicians and policy makers to provide better sexual health services to their citizens.

Despite the importance of the establishment and realization of sexual rights to an increasing number of educators, scholars, human rights advocates, feminists, and health professionals, we know of no research that has examined the attitudes of various population groups toward sexual rights. To begin to correct this research gap, we constructed and validated the Sexual Rights Survey. We used a list of 11 sexual rights formulated and adopted at the 1997 and 1999 meetings of the World Association of Sexology to guide our choice of items for the survey. The final survey included multiple questions to assess views about each of the 11 rights as well as several items for validation purposes and reliability checks. The Sexual Rights Survey contains 120 Likert type items and several background questions, some of which were also used for validation. A subset of nearly 150 respondents of the total 563 who

completed the questionnaire answered open-ended questions about sexual rights. These questions served to aid our understanding of respondents' views on sexual rights and the basis for their views.

The validation revealed that most of the 11 measures of sexual rights had acceptable psychometric properties. Nevertheless, three of the measures of the rights need revision for future work. In addition, the sample of mostly university students generally reported strong support for sexual rights. Rights that were most problematic were those involving adolescents' rights to privacy and non-heterosexuals' rights to equal benefits with heterosexuals. Nevertheless, the results support the view that the vast majority of students support a sexual policy that is different from the one advocated by our present political leaders in Washington, D.C. and yet consistent with the recommendations of the Former Surgeon General in his Call to Action to Promote Sexual Health and Responsible Sexual Behavior (2001).

Chemistry

Substitution of Nitrogen Atoms on Naphthalene and Azulene and Calculation of the Total Energy for Detennination of the Effect of Nitrogen on the Two Isomeric Systems

Henok Aynalem, Yu-Feng Sun and Joel F. Liebman

Advisor: Dr. Joel F. Liebman

As found in the literature, extensive research has been done on replacing carbon atoms by different types of atoms in aromatic compounds. One of the common interests is to determine the stability of the aromatic compounds. The ultimate goal of our theoretical research is to analyze "fat nucleotides" that are designed to serve as substitutes for natural nucleotides, and to determine how stable they are after modification. However, before looking into the complicated molecules such as the fat nucleotides, we are investigating simpler derivatives of the two isomers, naphthalene and azulene, wherein we are substituting different numbers of nitrogen atoms in different positions in the two isomers. We recognize some of these species as the basic ring systems found in such fat nucleotides. Based on our new quantum chemical calculations of the total energy with thermal corrections and zero point energies, we studied the effect of nitrogens on the stability of these species. The results showed distinctive patterns of the molecular energies. We find both the position and number of nitrogen atoms are critical factors that affect the stability of the species, e.g. adjacent nitrogens are destabilizing and addition of more nitrogen atoms produces similar amount of energy changes per nitrogen. Our analysis of isodesmic reactions of these species confirms these findings.

History

"I Wish The Yankees Were In Hell:" The 1862 Romney Campaign

James Bailey

Advisor: Dr. Anne Sarah Rubin

*"I Wish The Yankees Were In Hell"*¹- rectifies the lack of significant scholarship on the 1862 Romney Campaign of the American Civil War by addressing its social, political, and military impact on what is now the eastern panhandle of West Virginia. This region was strategically important to both the Union and the Confederacy for the transportation network of railroads, waterways, and roads, which wound over and around its rough mountain ranges. Equally important to the opposing governments was the

ability to influence and coerce the regions politically divided citizens. The political loyalty of these citizens was necessary to both armies since they could either support or obstruct efforts to control the region's future government. The 1862 Romney Campaign was an attempt by the Confederacy to regain control over these resources. Previous scholarship has dealt with the campaign only superficially. Over the last one hundred and twenty years, research has focused almost exclusively on Confederate generals such as "Stonewall" Jackson at the expense of the common soldier and civilian.

"I Wish The Yankees Were In Hell" employs a broad approach and examines the campaign in its totality. The National Archives, Museum of the Confederacy, and Virginia Historical Society, in addition to several regional libraries, have been used to compile a wealth of archival sources. The diaries Poster and correspondence of both soldiers and civilians illuminate the social, military, and political aspects of the campaign. In addition, multiple field investigations have yielded a significant understanding of the campaign, uncovering a battle site that had remained lost for one hundred and forty years. An examination of archival and field resources shows that the 1862 Romney Campaign was much more complex than previous scholars have allowed. The campaign re-directed the long-term strategy of the Union in western Virginia and ended serious Confederate attempts to seize the region. It also deeply affected men in the armies who were not used to warfare in severe weather, and the large scale burning of private residences terrified civilians who had not previously considered themselves combatants. *"I Wish The Yankees Were In Hell"* contributes to Civil War historiography through an in-depth examination of a campaign that impacted the war in many ways and yet has received little scholarly attention.

1 The title makes reference to an eyewitness account in Henry Kyd Douglas, *I Rode With Stonewall* (Chapel Hill: University of North Carolina Press, 1968), 19-34.

Psychology

Relationship Conflict Behaviors: Motivations and Consequences

Jana Baird

Advisor: Dr. Christopher Murphy

The purpose of this study is to examine the motivations or reasons why subjects may have engaged in twenty-eight examples of relationship conflict behaviors and the consequences these behaviors elicit. Prior research has subcategorized the relationship conflict behaviors used in this investigation into four different types of "emotional abuse" that are hypothesized to be distinct from one another (Murphy, Hoover & Taft, 1999).

This past research has led to the development of a psychological assessment tool called the "Multidimensional Measure of Emotional Abuse" (MMEA), a twenty-eight item questionnaire that includes seven examples of relationship conflict behaviors from each of the four subtypes of emotional abuse. If the 4-factor model used by the MMEA is an accurate representation of emotional abuse, then the motivations for engaging in the behaviors asked about in this study should vary depending on the factor, and the outcomes of the behaviors should vary with the factor, as well.

One hundred and eleven undergraduate students at UMBC volunteered for the study and received extra credit valid for psychology classes. Each participant took a modified version of the MMEA that included a list of possible motivations and a list of possible consequences following each set of relationship conflict

behaviors (after every seven questions). Directions for the questionnaire asked the participant to think of an incident in which the described conflict behaviors really took place during their present or past relationship and report on what actually happened.

Data are currently being analyzed and prepared for the presentation date. The data available should reveal some of the common problems that students have in their dating relationships, regardless of whether significant results are found with respect to the hypothesized motivations and consequences tested in this study. Those results may lend assistance to those employed with the task of counseling students with their personal lives and contribute to the development of programs that may help prevent conflict behaviors within their relationships in the future. Either way, the MMEA remains a promising assessment tool, leading us to an understanding of why individuals continue to act in hostile or demeaning ways toward relationship partners even though they later feel bad or regret things they have said or done.

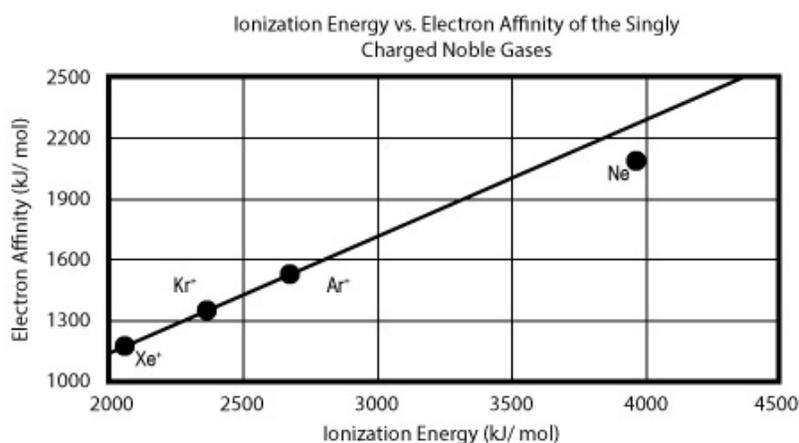
Chemistry

How Anomalous are the Anomalous Properties of Fluorine?

Eric Balighian

Advisor: Dr. Joel F. Liebman

The properties and trends for the element, fluorine, and related species were analyzed. Fluorine has been known to exhibit anomalous behavior. The behavior studied was fluorine's ionization energy, its inherent "want" of electrons. It has been shown¹ that fluorine's ionization energy and electron affinity is not what the pattern of the periodic table suggests. This observation has been made for oxygen and nitrogen, as well². We have extended this observation to elements that are similar to fluorine, namely cationic species that contain the same number of electrons as fluorine, nitrogen, and oxygen. The electron affinities were plotted against ionization potential in order to see the trends among elements belonging to the same group. We discovered the cationic species that are isoelectronic to fluorine, oxygen, and nitrogen exhibit the same anomaly of "wanting" electrons less than anticipated.



[1] P. Politzer, *Journal of American Chemistry Society*. 91 (1969), 6235.

[2] P. Politzer and J.W. Timberlake, *Journal of Organic Chemistry*. 37 (1972), 3557.

Biological Sciences

The Role of Water-Desiccation Stress in Mediating Feeding Decisions of the Tobacco Hornworm

Kevin Beck, Marc Rowley and Frank Hanson

Advisor: Dr. Frank Hanson

Feeding decisions of the tobacco hornworm, *Manduca sexta*, are governed by a myriad of factors including phytochemical content, protein/carbohydrate composition, and hydration of the food. We hypothesize that the animal's physiological state, particularly its water levels, are involved as well. This is based on the fact that the caterpillars acquire all their water through the food they consume and not through drinking. Thus, in times of water stress, they may be more willing to consume food they would normally avoid in order to reap the benefits of its water content. After a 10 percent water-mass loss due to desiccation, caterpillars were placed in feeding arenas with filter paper discs saturated with either caffeine, a feeding deterrent, or water arranged in an ABABAB manner. These stressed animals fed on caffeine in considerably higher quantities than control animals. Under the same stress levels, another cohort of animals was given the opportunity to eat water-saturated discs for two hours before being placed in the feeding arena. These caterpillars were deterred from consuming the caffeine in the same manner as control animals, showing behavioral recovery after hydration. The next step in our work was to establish exactly how much stress was required for this change. To do this, we determined survivorship under different environmental levels of relative humidity (RH), leading to differential desiccation levels of the animals. There was little variation in the survivorship across treatments indicating our stress treatment was not lethal. However, it was clear that animals in drier conditions were more dehydrated than the others. In response to this observation, we will be testing the effects of RH controlled desiccation on mass loss in order to obtain data that is more quantitative. The findings of these experiments will be used as a foundation for feeding experiments with a focus on leaf disks cut from plants. Ultimately, we believe these studies will confirm our hypothesis that the tobacco hornworm's feeding decisions are partly regulated by the animal's level of hydration.

Psychology

Communication Variance between Art Therapy and Traditional Group Therapy among Patients with Schizophrenia

Alaina Brenick, Mary Collins

Advisor: Dr. Anne E. Brodsky

This study involved the examination of the variance of quantity and quality of communication between two types of therapy. A mixed modality treatment program has been initiated by myself and Mary Collins, a social worker at the Maryland Psychiatric Research Center, involving the alternation of weekly therapy sessions between traditional group therapy and art group therapy. This new treatment program has been in effect for one year now with two different groups of patients participating. As the third group chosen to participate in this program began, I researched the communication variance between the two sessions. Communications were tallied and categorized into questions, comments and responses as well as distinguished whether the communication was prompted by the therapist or not, on or off topic, and if the communication was a compliment, an interruption or thought disordered in some way. The third cohort consisted of eight patients who were asked to participate in this study and membership in this group was the only inclusion criteria for participation (this encompasses the

Maryland Psychiatric Research Center's criteria for receiving treatment at their facility). They all were receiving treatment at the Maryland Psychiatric Research Center and were thus diagnosed as having schizophrenia or schizoaffective disorder. The study lasted for fourteen weeks, six weeks of traditional therapy sessions and six weeks of the art therapy sessions and two weeks of baseline data collection during only traditional group sessions (one week prior and one week after the implementation of the new program).

Health Administration & Policy

An Exploratory Study of Knowledge and Attitudes about Managed Care as a Cost-Containment Measure in Switzerland

Karol Casiano

Advisor: Professor Joyce L. Riley

Objectives

In 1995, Switzerland reconfigured its health care system, requiring all citizens to obtain compulsory health insurance. ¹ Switzerland, like the United States, is concerned about the rising costs of health care. One cost-containment effort, being used by both countries, is to shift the population to managed health care. ² This exploratory study attempts to examine three areas:

1. What are public health officials doing to educate the Swiss on the benefits of switching to managed care?
2. What are the consumers' experiences and knowledge of managed care?
3. What are the health care providers' experiences and attitudes toward managed care?

Methods

A two-week visit to Switzerland in August 2001 permitted informal surveys of Swiss citizens to be conducted concerning consumer knowledge and attitudes about managed care. Interviews with public health officials were arranged. One was conducted on site in Switzerland and a second was conducted by email following the August trip. While in Switzerland, informal discussions also were undertaken with several health care providers to ascertain the reaction to managed care by the physician.

Results

Of the consumers interviewed, although concerned about the rising costs of health insurance, the majority concluded that a switch to managed care would reduce overall satisfaction because of the loss of the freedom to choose their own doctors. The public health officials viewed that a switch to managed care would be an effective way to contain health care costs, but that the Swiss consumers' values of the freedom to choose their own doctors would be obstacles in converting the population to managed care. Of the physicians interviewed there was no consensus on whether managed care would be a successful way to cut expenditures. Further study on a more representative sample is needed to confirm and investigate more extensively the findings of this exploratory study.

¹ Dorozynski, A. (1995) Swiss opt for compulsory health insurance. *The British Medical Journal*. 310:11 (7 January).

² Health Care Systems in Transition. European Observatory on Health Care Systems. 19 Feb 2001. [online] http://www.observatory.dk/frame_index_main.htm.

Sociology

Tuberculosis Among the Foreign-Born Populations in the United States and Switzerland

Anura Desai

Advisor: Dr. William G. Rothstein

As tuberculosis is the one of the oldest infectious diseases in the world, its resurgence is a matter of serious concern. In the early 1800's, the world was faced with the epidemic of TB that infected and killed millions globally. It was finally in the 20th century that there was notable relief from the disease. However, new cases in the early 1990's began appearing throughout North America and Western Europe. These new cases were largely resistant to drug therapy. With intensified research and newly formed drug combinations, the prevalence of tuberculosis in the overall populations has declined somewhat. Despite the major success in the overall population, rates among the foreign born population in these countries continue to rise.

In comparing the immigration and health policies of the United States and Switzerland, it was my intention to come to an understanding of what procedures and practices concerning medical screening most benefit the fight against TB. My methods of research included conducting exploratory research on TB in the United States, and qualitative field research on TB in Switzerland. This specifically entailed reviewing existing literature concerning immigration policy, current statistics, and TB prevention and response in the United States. In Switzerland, informal and formal interviews as well as non-participant observation were conducted in the areas of health and immigration policy and medical practices dealing with tuberculosis. Existing literature was also obtained at the World Health Organization (WHO) in Geneva and the Swiss Federal Office of Public Health (SFOPH) in Bern.

As a result, differences in the approach to medical screenings for the foreign-born populations were found between the two countries. Despite these differences, rates among immigrants, refugees, and asylum-seekers were found to have increased or are higher than the overall population. Several sociological factors can be possibly attributed to the high rates, including poverty, alcoholism, drug abuse and unemployment.

Recommendations include increasing the training among medical personnel within the United States and Switzerland, as well as, establishing programs that have an adequate number of trained nurses to visit and monitor the newly arrived foreign-born persons with tuberculosis.

Chemical Engineering

Boronic Acid-based Fluorescent Glucose Sensors: Immobilization in Amphiphilic Polymers

Brian Alexander Dummett

Advisors: Dr. Govind Rao and Dr. Haley R. Kermis

Eye, nerve, kidney, and skin damage are just some of the health risks faced by diabetics who fail to manage their blood glucose levels (BG) [1]. Those who regularly manage their BG suffer less. The traditional method of blood glucose analysis involves a painful finger stick to extract a drop of blood. The blood is then tested using glucose oxidase coupled with an electrochemical detector. Doctors

recommend that patients test their BG each morning and evening, as well as before and after each meal. The pain and inconvenience discourages many from properly monitoring their BG, and also introduces a risk of infection. A less invasive test would be a welcome solution to this ongoing problem.

The ultimate goal of the sensor being developed in Dr. Rao's lab is a glucose sensitive fluorescent implant that can be detected transdermally. The small implant would potentially last for months, greatly reducing the amount of daily pain that diabetics currently experience. Another and more immediate use of the glucose sensor is to monitor nutrient levels in a bioreactor. A small fluorescent patch can be positioned on the side or bottom of a bioreactor and monitored externally. The glucose sensitive dye that is currently being used is a boronic acid (BA) derivative based on anthracene and amino phenyl boronic acid [2]. The fluorescence emission intensity of the probe increases with increased concentration of sugar. BA is sensitive to cis diols as well as pH. The probe works in solution but in order for it to be a viable sensor it needs to be immobilized into a glucose permeable membrane that can be attached to the inside of a bioreactor or possibly implanted. BA is hydrophobic and precipitates out of aqueous solutions. This physical property allows for it to be physically entrapped into a polymer containing hydrophobic regions. The dye preferentially stays in the polymer when in an aqueous environment. The sugar has to be able to access the BA so the polymer must also have a network of hydrophilic regions. Amphiphilic polymers have hydrophobic and hydrophilic characteristics.

The BA was physically entrapped in several amphiphilic polymers including: polyurethane and PEG-dimethacrylate. The change in fluorescence intensity was monitored as the concentration of sugar in the external solution varied. BA entrapped in polyurethane showed no change and also demonstrated an unexpected peak. It is possible that interaction between the polymer and the BA prevented it from being responsive to sugar. However, the BA in PEG-dimethacrylate demonstrated up to a 50% increase in intensity at 37mM glucose and this change was reversible.

Biochemistry

Synthesis of a Purine Analog of the Bis(benzoxazole) Natural Product UK-1

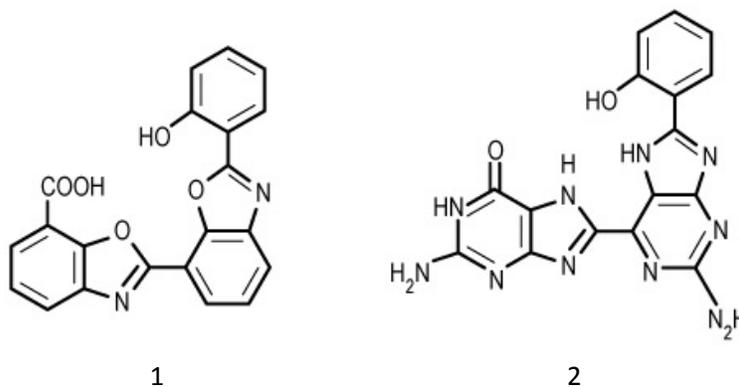
Vanessa Goodlin

Advisor: Dr. Paul Smith

Topoisomerases are enzymes that modify and regulate the topological state of DNA, and are responsible for catalyzing the relaxation processes necessary for DNA transcription and replication.¹ Topoisomerase I (Topo I) acts by introducing a nick in one strand of DNA, forming a covalent DNA-enzyme intermediate. The DNA then relaxes and is released by the enzyme.² Topoisomerase poisons are compounds that trap the covalent DNA-enzyme intermediate. This leads to an accumulation of DNA strand breaks and ultimately results in cell death.³ This has caused topoisomerase poisons to become of significant interest as potential antitumor agents.

The natural product UK-1 (**1**) is a bis(benzoxazole) metabolite of *Streptomyces*. UK-1 has been known to have cytotoxic effects on a variety of cancer cell lines.⁴ The structure of **1** contains 5, 6-fused ring systems which resemble the structures of the purine bases found in DNA. Since DNA is the target of Topo I, purine analogs of **1** may demonstrate more potent antitumor activity. For this reason, the synthesis of a purine analog of UK-1 (**2**) is being pursued, using a series of palladium or nickel catalyzed coupling reactions as key steps. While several methods have been found to be unsuccessful, other

coupling methods continue to be explored. Compound 1 is also being synthesized so that the inhibitory effects of 2 on Topo I can be compared to the natural product. Efforts towards the syntheses of both 1 and 2 will be presented.



Computer Engineering Home Appliance Automation

Jonathan Hudson, Ryan Robucci, Amir Rowhanirad, Ernesto Staroswiecki
Faculty Advisor: Dr. James Plusquellic

The purpose of this research is to develop a new standard hardware model for upgrading, customizing, and developing a wide range of devices based on a reconfigurable wireless module. The growing popularity of wireless technology within the past two decades is largely due to the mobility that it offers. However, few have built a programmable wireless device, which offers both mobility as well as reconfigurability. The purpose of this research is to develop a method for using bare minimum hardware components to create very diverse applications by exploiting the possibilities of wireless and reconfigurable technologies. The primary intended market is home appliances, which require less processing power and low wireless bandwidth. The standard model used for the device should allow standard products to be optionally upgraded. The upgrade will allow functionality to be added to the device with minimal preparation on the side of the manufacturer and little added cost to the initial product. The functionality will be provided by the module that can be purchased and inserted by the home user. Two or more home appliances that have this module installed can create a wireless network, through which they can communicate with each other. The main concern of the project, however, is the reconfigurability. Reconfiguration is essential in the development of such a portable module that can be used in many devices. Instead of having several different specialized hardware devices for different applications, one reconfigurable device can be programmed to serve any application needed. Thus, the same standard module can be used in many devices. The desired standard method includes a Microcontroller, a Field Programmable Gate Array (FPGA), memory (SRAM), and a wireless module. The wireless connection for the current device is a simple RF transceiver, but the architecture of the module should be such that new wireless technologies such as Bluetooth and its features can be used in the future. Initially, the FPGA is programmed via the wireless link from a PC. The PC sends the data to the Microcontroller, which copies all the data to the SRAM. Later, the Microcontroller reads the data from the SRAM and configures the FPGA. Once the FPGA is configured, it can function independently of the PC. The appliance can communicate directly through the module with other appliances that have their

own module installed. The modules can send and receive instructions to and from other modules, which will be executed on the FPGA and cause the appliance to perform a certain task.

Psychology

"The Scoop Inside the Loop:

Psychological Sense of Community Among Residential Students at UMBC"

Lisa Israel

Advisor: Dr. Anne E. Brodsky

Previous research has examined the positive relationship between on-campus living and psychological sense of community (PSC). The present research explores whether there are differences in the reported PSC between students living in residence halls, on-campus apartments, or non-traditional halls made up of suite or co-op type living arrangements at University of Maryland, Baltimore County (UMBC). Because previous research has shown that different variables such as gender, class standing, and age can affect one's reported PSC, the present study addresses those variables as well. A random sample of 184 full-time undergraduate resident students at UMBC completed five measures: the Collegiate Psychological Sense of Community Scale, the Residence Hall Climate Inventory, two versions of the Sense of Community Index, one revised to measure PSC towards the university and the other to measure the PSC towards the individual living community, and a demographics questionnaire. Data are currently being analyzed and it is expected that those living in the traditional residence halls will report a higher PSC towards their individual living community as well as towards the university as a whole, and those living in on-campus apartments will report a higher PSC towards their individual living community but a lower PSC than all the other types of living facilities' in regards to the university. This suggests the need for further exploration of PSC among university resident students, particularly regarding type of residence.

Interdisciplinary Studies:

Biological Sciences

Interspecies Exchange of the P3 Hairpin of the RNase MRP RNA Subunit of *Saccharomyces cerevisiae* with Several Yeast Species

Gilbert G. Jose

Advisor: Dr. Lasse Lindahl

The purpose of this study is to contribute to the understanding of RNA-protein particles with nuclease enzymatic activity. RNase MRP is a small ribonucleoprotein particle (snoRNP) complex that consists of an RNA subunit surrounded by nine proteins. RNase MRP cleaves precursor-rRNA molecules at the A3 site in the Internal Transcribed Spacer 1 (ITS1) separating the 18S from the 5.8S and the 25S sections. These sections form the functional subunits of the ribosome. Structurally, RNase MRP is closely related to the RNase P enzyme, which cleaves the 5' end of a precursor-tRNA molecule to form a mature tRNA molecule [1]. Previous research identified analogous P3 hairpins within the RNase MRP and RNase P RNA subunits that had similar structures. These hairpins were successfully switched between RNase MRP and RNase P within *Saccharomyces cerevisiae* without a loss of function. However, P3 hairpin exchange between humans, *Schizosaccharomyces pombe* and *S. cerevisiae* were unsuccessful [2]. We therefore decided to test the hypothesis that P3 in RNase MRP and P is species specific. To test this, we

constructed a mutant of *Saccharomyces cerevisiae* that had an RNase MRP P3 hairpin from another related yeast species, *Torulaspora delbrueckii*. The construction involved Polymerase Chain Reaction and other molecular biology techniques. Successful transformations and sequencing showed that the RNase MRP P3 exchange is not species specific; however, questions arose as to the extent to which the exchange was possible. Therefore, we modified the hypotheses to say that substitution of the P3 hairpin is possible only between close evolutionary species that share genus and/or family. Current research is focused on the hairpin switch of P3 hairpins from four different yeast species, *Klyveromyces lactis*, *Saccharomyces servazii*, *Zygosaccharomyces rouxii*, and *Saccharomyces dairensis*. Each yeast species has a MRP P3 hairpin of differing loop size, hairpin length and base-pair combination that make them genetically different from *S. cerevisiae* MRP. In addition, each species is on a different taxonomic level than *S. cerevisiae*, some species being of the same genus and others of a different genus but within the same or different family. Results from this experiment will test the hypothesis and give a picture as to the conserved nature of the RNase MRP P3 hairpin in the yeast, *S. cerevisiae*.

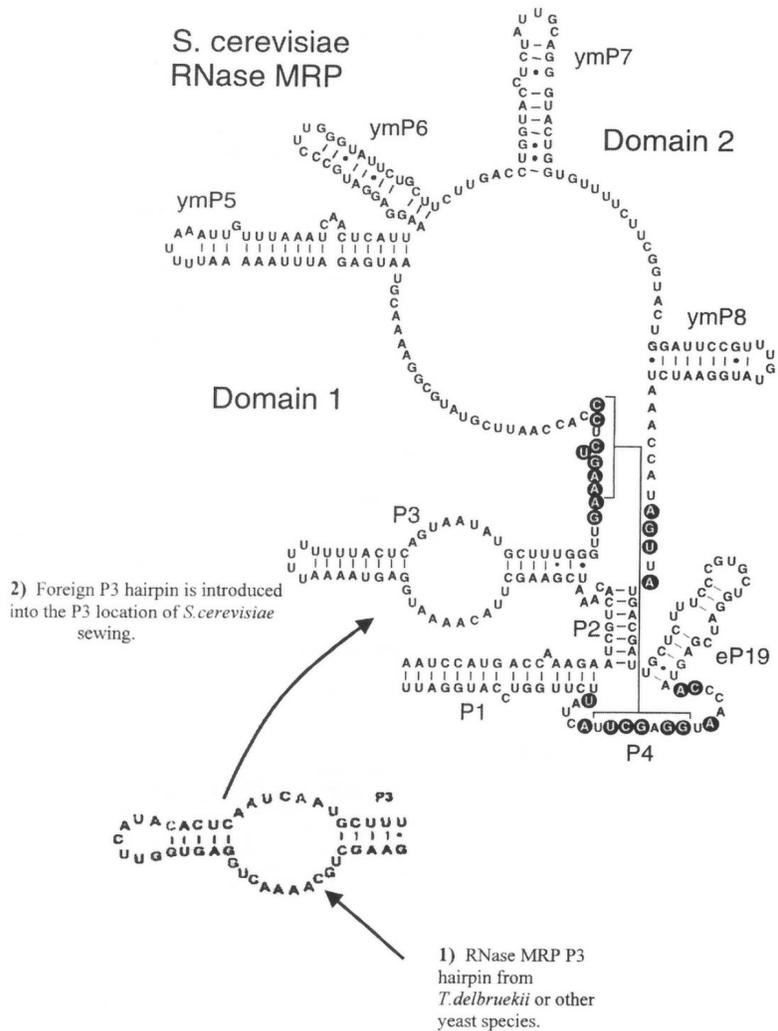


Fig. 1 - Schematic Overview of the exchange of the RNase MRP P3 hairpin of *Torulaspora delbrueckii* into the P3 location of the RNase MRP molecule of *S. cerevisiae*.

Information Systems

Speech-Based Cursor Control

Azfar S. Karimullah

Advisor: Dr. Andrew Sears

Speech recognition has improved dramatically in recent years and can be a powerful tool when used effectively. In particular, speech recognition can be useful when performing eyes-busy or hands-busy tasks as well as for individuals with physical disabilities that hinder their use of traditional input devices. While many researchers are investigating the issues involved when using speech recognition for dictation-oriented applications, the focus of this study is speech-based cursor control.

Numerous researchers are investigating techniques to improve the underlying technologies that make speech recognition possible while others focus on the application of this technology to dictation-oriented tasks. While various solutions have been implemented, few studies have focused specifically on speech-based cursor control as an alternative to traditional pointing devices. In this study we investigated the two speech-based cursor control mechanisms:

1. A standard approach where spoken commands start and stop cursor movements.
2. A variation on this standard approach that employs a predictive cursor designed to assist users as they compensate for the delays often associated with speech recognition.

We conducted a controlled experiment designed to provide insights into the experience of individuals using these two types of speech-based cursor control mechanisms. This experiment allowed us to assess:

1. Positioning accuracy.
2. The selection time.
3. User confidence while positioning the cursor.
4. User satisfaction with the interaction technique they used.

Twenty-eight individuals were recruited to participate in this study. Interestingly the predictive cursor did not provide the expected benefits. We believe this may be due to the relatively short and consistent delay that allows users in the standard cursor condition to predict where the cursor would stop at any given time. The difficulty users experienced in selecting targets appears to be a result of the speed at which the cursor was moving, the size of the target, and the delay itself. Directions for future research have been identified that may allow users of speech-based cursor control mechanisms to (1) select smaller targets more reliably and (2) select all targets more quickly. Additional experiments are underway to investigate these ideas.

Geography & Environmental Systems

Urban Development and Landscapes: Soil Composition near Roads in Baltimore City

Jessica Mitchell

Advisors: Dr. Andrew Miller, Dr. Jonathan Russell-Anelli

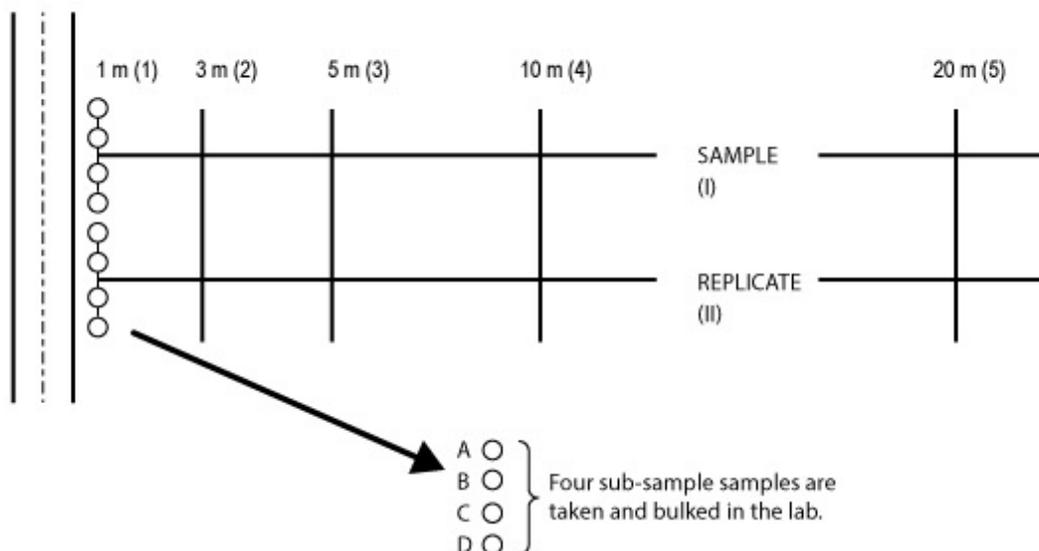
Heavy metal content, pH, organic matter content, and bulk density were determined at five distances from five different locations near roads with varying traffic flow (Table 1). At each site the soil samples were obtained along two transects that extended from the road into a forest patch (Figure 1). A representative sample was obtained for each distance by taking four sub-samples and bulking the soil cores in the laboratory. Preliminary analysis of pH indicates a general trend of decreasing pH with distance. Bulk density and organic matter content do not show a general trend with distance, but these two soil characteristics do share an expected inverse relationship with each other. The organic matter and bulk density trends for the Purnell site (lowest measured traffic density) are distinct when compared to the other road sites. The Purnell site has the lowest bulk density at a distance of one meter from the road and the highest bulk density at distances three and five meters from the road. The reverse is true for organic matter. This may be related to road design since all of the other road sites have curbs and Purnell does not.

Samples were prepared at UMBC and sent to Cornell Nutrient Laboratories for ICP elemental analysis of a suite of 19 heavy metals. A preliminary analysis of lead, chromium, and zinc indicates that heavy metal contents tend to decrease within twenty meters of the road, which is supported by previous findings (Harrison and Johnston 1985). The relationship between traffic density and heavy metal content has not yet been evaluated statistically. However a preliminary review suggests a positive correlation between lead and traffic density, which has also been documented by Rodruiguez and Rodruiguez (1982). Statistical analysis of trends relating physical and chemical parameters to traffic density and distance from the road will include use oft-tests, ANOVA, and linear regression.

Table 1

| SITE | TRAFFIC INTERSECTION | TRAFFIC | DESCRIPTION |
|--|---|-----------------------------------|--|
| Leakin Park | | No Road | Near nature center |
| Perring Pkwy | NB & SB on Perring Pkwy at Belvedere & Echodale | 17690 vehicles/ 24hr (08/ 08/ 01) | Near county line, between Herring Run and road |
| Northern Pkwy near Greenspring Ave | NB & SB on Northern Pkwy at Liberty Heights | 16883 vehicles/ 24hr (3/ 21/ 95) | A lot of ivy and leaf coverage |
| Greenspring Ave. near Northern Pkwy | NB & SB on Greenspring Ave. at Rogers Ave. | 7929 vehicles/ 24hr (12/ 21/ 00) | A lot of ivy and leaf coverage |
| Purnell Drive near Forest Park Ave (Hillside Park) | NB & SB on Hillsdale Rd. at Forest Park Ave. | 1953 vehicles/ 24hr (6/ 29/ 89) | Between Gwynn's Falls and road |

Figure 1



Biochemistry

Determination of Gene 32 Protein Cleavage Products

Nick Morin

Advisor: Dr. Richard L. Karpel

My project has been part of the research being conducted in Dr. Richard Karpel's laboratory into the properties of phage T4 gene 32 protein, which is a model for single-strand specific nucleic acid-binding proteins. The goal of this ongoing research is to identify the regions of gene 32 protein that are protected from chemical cleavage upon binding single-stranded DNA. My specific objective has been to identify the unexpected cleavage sites observed when gene 32 protein is digested with the chemical reagent BNPS-skatole and to gain some insight into the underlying chemistry of BNPS-skatole cleavage. The reason for determining the regions of protection of gene 32 protein is that it will allow for the identification of the parts of the protein involved in protein/DNA interactions. In order to do this, precise molecular markers must be generated so that when protection from cleavage occurs, the exact location of protection is known. This is done using cleavage reagents that have a known specificity for particular amino acids. For example, if a reagent is known to cleave at a certain location on the protein but cleavage does not occur when the protein is bound to DNA then that location is protected and is therefore a site of protein/DNA interaction. One common cleavage reagent is BNPS-skatole, which has a supposed specificity for cleavage at the amino acid tryptophan. However, upon digestion of gene 32 protein with BNPS-skatole more products are observed than would be expected, given the known number of tryptophan residues in gene 32 protein. It is necessary to determine exactly where these unexpected cleavage sites are so that the regions of protection can be accurately identified. The results of this research are not just relevant to the study of gene 32 protein but are important for the scientific community, which regularly utilizes the chemical reagents for numerous applications. For my research I

have used matrix-assisted laser desorption-ionization (MALDI) mass spectrometry, which can determine molecular weights of proteins with an accuracy of up to 0.01%. First, undigested gene 32 protein was used to optimize the MALDI procedure. The proper standards, solvent, and matrices were determined that gave the most accurate MALDI results for gene 32 protein. Next, I determined the molecular weights of gene 32 protein fragments from BNPS-skatole cleavage. These molecular weights along with the known amino acid sequence can be used to assign the cleavage sites. I have verified several of these cleavage sites and have experiments in progress to ascertain the remaining sites.

Chemistry

The Enthalpies of Formation of Some Dihydrodibenzocycloostenones

Melissa A. Mullan, St. Perisnau, Julia Contineau, M.D. Banciu, Joel F. Liebman, Behzad S. Farivar, James S. Chickos and Dorothea M. Hillesheim
Advisor: Dr. Joel F. Liebman

The standard enthalpies of formation of 11,12-dihydro-6H-dibenzo[a, e]cycloocten-10-one (1) and 11,12-dihydro-10H-dibenzo[a, d]cycloocten-5-one (2) were derived from heats of combustion and measured in a bomb calorimeter. Dihydrodibenzocyclooctenone isomers 11,12-dihydro-5H-dibenzo[a, d]cycloocten-10-one (3) and 11,12-dihydro-5H-dibenzo[a, d]cycloocten-11-one (4), as well as isomers 1 and 2, were studied by *ab initio* quantum chemical calculations (see Figure 1, below). These computations were performed to test experimentally obtained enthalpies of formation and to understand the relative stability associated with each isomer. *Ab initio* calculations were carried out using the SPARTAN quantum chemical calculation program at the HF/3-21G(d)//HF/3-21G(d) level. Vibrational frequencies and zero-point energies were computed at the same calculational level to obtain thermally corrected total energies. The theoretical expectations, calculational results and experimental data are all in agreement.

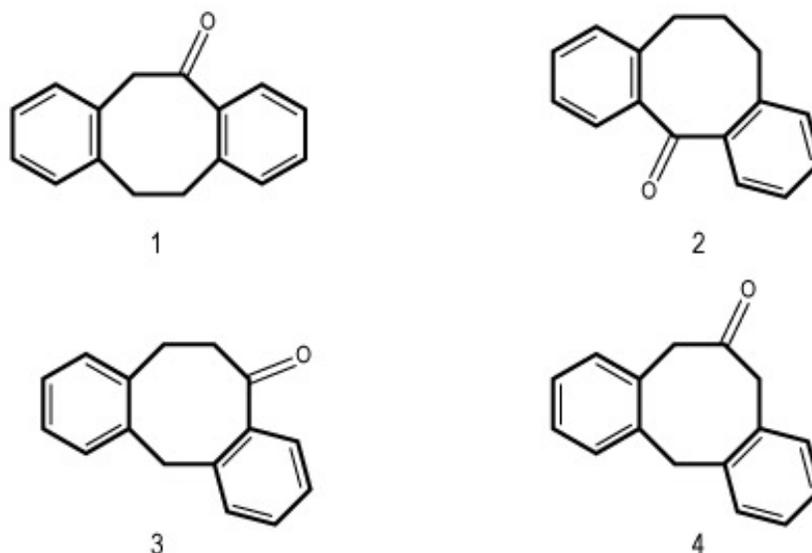


Figure 1: Dihydrodibenzocyclooctenone isomers.

Biological Sciences

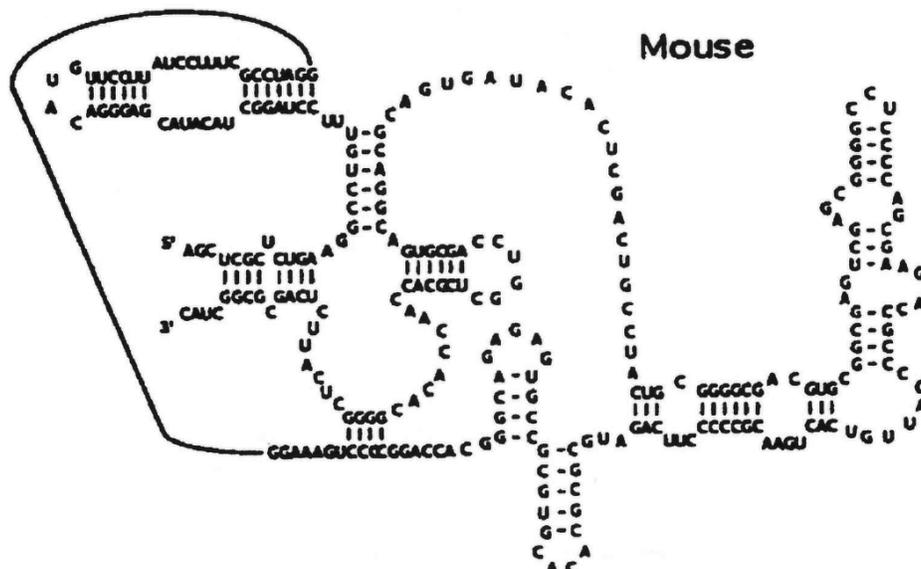
Effect of RNase MRP Genetic Alterations on *Mus musculus* Phenotype

Henrietta Ocheni

Advisor: Dr. Lasse Lindahl

RNase MRP (Mitochondrial RNA Processing) is a ribonucleoprotein capable of in-vitro formation of primers for mitochondrial RNA replication. (Fig. 1) It is localized in the nucleolus, with only minute amounts found in the mitochondria suggesting that its primary function is ribosome biogenesis. Recently, it has been documented that RNase MRP is required for normal processing of 5.8s rRNA in *Saccharomyces cerevisiae*.¹ However, further investigations of RNase MRP is essential because research suggests that mutations in the RNA component of RNase MRP cause a pleiotropic human disease known as Cartilage Hair Hypoplasia - a rare form of dwarfism.² Therefore, the purpose of this project is to determine the role of RNase MRP in mice by means of deletions, alterations, replacements, etc, in the MRP gene. Another aim is to reproduce the phenotype of Cartilage Hair Hypoplasia in mouse system. Primers were designed that amplified 674bp of the MRP region with Mouse DNA as template. Using a series of protocols such as PCR, restriction digest, transformation, plasmid prep, and sequencing, the mouse MRP clone was inserted into a plasmid, pDK38. With the mouse MRP clone in the plasmid, alterations can now be made in the MRP gene in preparation for insertion into a mouse system to observe phenotypic changes. In order to engineer a mouse strain with a mutation in the MRP gene we need to clone 3-6kb upstream and downstream of the MRP gene. To obtain this sequence, a PCR fragment was generated from the pDK38 containing the mouse MRP clone. The PCR fragment contained the amplified 67 4bp of the MRP region, and was purified by means of ethanol precipitation. The fragment was sent to ResGen where it will serve as a probe for hybridization screening in their mouse BAC library. If the screening should yield positive library addresses for the probe sequence, the clone will be isolated from the library address. Verification that it is the correct isolate and a plasmid prep to obtain the sequence will then follow.

Figure 1



Secondary structure model of mouse RNase MRP based on phylogenetic comparisons.³

¹ Chu S, Archer J, Zengel Z, and Lindahl L. The RNA of RNase MRP is required for normal processing of ribosomal RNA. PNAS (1994) , 91: 659-663

² Mutations in the RNA Component of RNase MRP cause a Pleiotropic Human Disease, Cartilage-Hair Hypoplasia. Cell (2001) , 104: 195-203

³ Schmitt M, Bennett J, Dairaghi D, and Clayton D. Secondary structure of RNase MRP RNA as predicted by phylogenetic comparison. FASEB (1993), 7: 208-213

Computer Science

Automated XSL Stylesheet Authoring and Multimedia Extensions of XSL

Ramya Ramakrishnan

Advisor: Dr. Anupam Joshi

The XML and XSL web document creation standards solve the immediate problem of deploying a web service on a client device; however, it introduces a new difficulty-to create XSL style sheets for different types of multiple devices efficiently. In order to cover the largest range of possible users, in the present business and technology environment, it is common to build applications and services for delivering the same content to various devices. Such devices, ranging from personal computers to PDAs or cellular phones, may have widely different input/output capabilities, including display characteristics, interfaces, and ergonomics, each greatly affecting the presentation, feel and usability of the services. Hence, to satisfy all requirements for each device, the task is to build multiple user interfaces that enhance the service usability on each device. The large diversity in capability, however, makes it cost ineffective to develop a user interface for each device manually. Currently, authors of a service must manually write a new stylesheet for each device, often starting from scratch. However, many end devices share certain features. This study investigates the varieties and frequencies of XSL style patterns in order and develops a set of rules that can be applied for automated XSL stylesheet creation. The methodology employed relies on using specified coding standards, mostly in Java, XML, and XSL, as well as hardware interactivity.

Psychology

Attributions of Responsibility of Abusive Behavior, Intrapersonal Interactions and Perceived Value of Treatment in Domestic Violence Group Counseling as a Function of the Enhanced Motivational Intake

Joshua N. Semiatin

Advisor: Dr. Christopher M. Murphy

The purpose of this study is to examine the potential effect of the enhanced motivational intake in group counseling for domestic violence perpetrators on personal attributions of responsibility, role-model behavior, and attitudes towards treatment.

While being contrasted with a standard intake procedure, the following research questions were addressed: 1) Does the enhanced motivational intake (EMI) increase the amount to which clients accept responsibility for their abusive behavior? 2) Does the EMI create a more positive environment within the group in which the clients act as positive role models towards each other? 3) Does the EMI facilitate a

more positive attitude towards the group therapies' effectiveness and ability to make worthwhile and necessary changes in behavior? 4) Are behaviors and attitudes observed within the group predictive of post-group behavior?

Participants are 88 males who sought counseling for perpetration of domestic abuse at the Domestic Violence Center of Howard County, Maryland. On a first come, first serve basis, half of the participants who were admitted for treatment received a standardized intake prior to being assigned to a counseling group, and the other half received the enhanced motivational intake prior to being assigned to a counseling group. The counseling groups were homogeneous (all of the men in each group had received the same intake), and each group received the same counseling program. With the knowledge and consent of each group member, all of the counseling sessions were videotaped and the tapes were later used to conduct analysis. Participants were assessed on a five-point Likert type scale according to the following criteria: 1) Does the participant accept or deny his abusive behavior? 2) Does the participant acknowledge the need to change his abusive behavior? 3) Does the participant attribute his abusive behavior to internal personal factors (e.g., "It's my fault when I'm abusive") or to external factors (e.g., "My wife shouldn't have provoked me" or "It only happens when I'm drinking")? 4) Does the participant see the factors that contributed to his abusive behavior as being controllable (e.g., "I need to learn to stop and walk away when I begin to feel out of control ") or does he see his behavior as being non-controllable (e.g., "I just have a big temper and it always gets the best of me ")? 5) What is the nature of the intrapersonal interactions between the participants in the group in relation to acceptance or denial of personal responsibility and willingness to change behaviors? 6) Is the counseling program itself viewed as a mechanism which can help produce positive changes in behavior, or is it viewed as a detriment and/or a waste of time?

Data are currently being analyzed. These findings have implications for how motivational enhancement techniques will be applied to domestic violence treatment in the future.

Interdisciplinary Studies:

Emergency Health Services

Perspectives in Child Abuse: A Preliminary Investigative Report of Baltimore City Fire Department Prehospital Care Providers

Jason Zahn

Advisors: Professor Dwight Polk and Dr. Bruce Walz, Emergency Health Services

Child abuse and neglect are heinous crimes that are all too common an occurrence within the United States. Child abuse and neglect are encompassed by the following comprehensive definition: "at a minimum, any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse or exploitation, or an act or failure to act which presents an imminent risk of serious harm" (Child Abuse Prevention and Treatment Act, 1996).

This study investigated the perspectives of Baltimore City Fire Department (BCFD) Prehospital Care Providers (Emergency Medical Service [EMS] providers) with respect to the issue of reporting suspected child abuse and neglect. A non-random sample of 250 prehospital care providers employed by the BCFD Medical Bureau were surveyed regarding their overall tendencies-including attitude, frequency, rationale, and patterns - of reporting suspected cases of child abuse and neglect. Variations in the

behavior and perspective of providers were analyzed both quantitatively and qualitatively. The overall findings of this study indicate that the majority of BCFD prehospital care providers regularly report suspected cases of abuse and neglect to the appropriate authorities. The study also brings attention to the need for additional education in the area of child abuse for EMS providers.

MUSICAL PERFORMANCES

Music

Meine Seele hart im Sehen

George Frederick Handel (1685-1769)

Das zitternde Glanzen

UMBC Department of Music Collegium musicum: Baroque Ensemble No. 3

Kriste Belt, soprano

Justine Derrick, oboe

Liesel Kloetzli, harpsichord

Advisor: Dr. Joseph C. Morin

The music of George Frederick Handel, along with that of his contemporary, Johann Sebastian Bach, represents the pinnacle of musical achievement during the Baroque era. Many of Handel's works, such as his oratorio *The Messiah* (1741), one of the best known pieces of Baroque music, are constant reminders of his compositional talent and mastery. Less known are his two German 'hymns' for soprano, oboe and continuo, which we perform this morning. They belong to a collection of nine arias composed between 1724---27, that were composed to texts written by the poet Barthold Heinrich Brockes and published in his *Irdisches Vergniigen in Gott* in 1721. These pieces hail from a time when Handel's career as a composer of Italian opera in London had reached its zenith, and the finely etched vocal and oboe melodies reveal the attractive style which was then at Handel's full command. These arias, which are in da capo form (ABA), display the careful coordination between the mood of the music and that of the text between the contrasting A and B sections of the piece. We know little of Handel's motivation for composing these works; but like the larger church cantatas of Johann Sebastian Bach, Handel's songs were perhaps intended to be sung during Lutheran services, though their texts are more general in a sacred sense than designed to reference specific feasts during the Lutheran liturgical year.

Texts

Meine Seele hart im Sehen

George Frederick Handel

My soul hears in seeing how to exalt the creator, everything rejoices, everything laughs. Only listen, the blossoming spring splendor is the language of nature, which speaks with us clearly by its sight everywhere.

Das zitternde Glanzen

George Frederick Handel

The trembling brilliance of the playing waves silvers the bank, bespeckling the beach. The rushing flows, the gushing sources fertilize, enrich, refreshen the country and announce the quality of the wonderful creator in a thousand delightful events.

Translation Joseph C. Morin ©

Artistic Statement

The UMBC Collegium musicum is an undergraduate vocal and instrumental ensemble that specializes in the intensive study of Baroque music. Within the framework of this small ensemble, students must simultaneously polish their musicianship skills and carry out research into the unique techniques and styles of each piece. The small size of the ensemble provides an intimate environment in which students can learn from each other and sharpen their individual skills, as well as receive direct feedback from expert faculty members. The musical pursuits of this ensemble are more than simply a musical performance; in order to succeed we attempt to the best of our abilities to recreate or 'reenact' the performance of this music as it took place some 300 years ago. In order to succeed students must research many musical aspects that are not indicated in the original musical scores: tempi, bowing, vocal ornamentation, phrasing, dynamic range, fingerings for the keyboard, characteristics of pronunciation, and resolution of the figured bass are but a few of the essential details that must be determined for a successful performance. Even simple issues - such as how does the oboist best blend her part with the singer's melody - require careful consideration. All of these elements are fully examined, analyzed and fleshed out in the process of rehearsal. It is a time of experimentation, where students attempt to bring old practices back to life. A satisfying performance is achieved only through the success at negotiating the complex interplay among many elements. At times, the challenge for the ensemble is finding an equilibrium between the research, with the options it presents for performance, and performance of the piece itself. When this is accomplished, it is the most gratifying of artistic experiences. Through this process the ensemble is able to bring Baroque chamber music back to life. This experience is quite rare among undergraduate institutions and is one of the most unusual and exciting parts of the UMBC Music Program.

Music/Art Luxophone

Leigh Ann Rose

Advisor: Professor Lisa Moren

The luxophone is an electronic musical instrument that is played using beams of light. Traditional musical instruments fall into four major classes: aerophones, chordophones, idiophones, and membranophones. This new instrument did not fall into any of those categories so it is given a name that puts it in a class of its own. I derived the word luxophone from the Latin word lux, meaning light, and from the Greek word phone, a device producing or transmitting sound. The luxophone is an instrument that combines light, sound, form, and gesture.

The project works conceptually between the theremin instrument of the 1920's and David Rokeby's "Very Nervous System" of the 1990's. Leon Theremin developed the theremin, a wooden cabinet with a vertical antenna controlling pitch and a horizontal tubular loop controlling volume, in Russia while he was a student at the University of Petrograd. Clara Rockmore, a professional violinist, became aware of the musical potential of Theremin's invention and spent several years collaborating with him until he developed it into a wide-range musical instrument. His invention astonished listeners because he took seemingly inaccessible technology of electronics and enabled a musician to make music simply by waving his hands in the air. Leon Theremin licensed the Radio Corporation of America to manufacture the theremin in 1929. Clara Rockmore gave her first solo theremin concert at New York's Town Hall in 1934. Contemporary artist David Rokeby uses the levels of gray as they change within a video camera

lens as an input device. These changes in light are used to trigger sound. Therefore, light as an input device for the luxophone is similar to Rokeby's use of light via the camera lens and Theremin's use of radio frequencies to create sound and control pitch.

My objective was to incorporate these ideas of light with sound, gesture, and form, working together to create a functional musical instrument. My technical research involved electronic experimentation, modifying an existing tone-producing circuit and adding a solar cell that would vary the pitch. A light beam from a flashlight held in one hand allows the performer to have control of finding pitches in the air. The luxophone produces a continuous tone; its sound has an eerie human quality. A steady hand is important because slight movements can change the pitch drastically. Spatially, the pitches compare to the positions on stringed instruments such as a violin. The lower pitches are further apart, while the higher pitches are closer together. I composed a series of sketches for forms for the instrument, considering how the user would interact with the instrument, the gestures involved, and how the form would relate to the position on the body if it were held. The form I chose is pear-like in shape so that it would rest comfortably on the thighs if the performer were sitting. I then carved it out of Styrofoam and cardboard, followed by building the electronic components into the prototype. I chose pine as the medium for my final version and worked hand in hand with skilled carpenters. After countless hours of filing, sanding, and staining, the result was a beautifully unique and functional electronic instrument. I plan to create a musical performance and dance collaboration on videotape, documenting the capabilities of the luxophone.

ARTISTIC EXHIBITS

Art History

Creating a Database of Funding Sources for Multicultural Art Exhibitions

Najah Duvall

Advisor: Dr. Preminda Jacob

My project, *Creating a Database of Funding Sources for Multicultural Art Exhibitions*, investigates the availability and impact of sponsorship for the installation and promotion of innovative art exhibitions in which the artist or artists are from a culture that is traditionally underrepresented in American museum exhibitions and collections.

I focused my research on art exhibitions that have taken place during the past ten years (1991-2001) in eight major art institutions located in four metropolitan areas: Baltimore, Washington, New York City, and Philadelphia. These art institutions range in size and collection.

I collected specific information on the funding sources of particular exhibitions to analyze the relationship between the particular art exhibition and its funding organization's philanthropic history and mission. I undertook a detailed case study of an exhibition by the artist Fred Wilson at the Maryland Historical Society to gain an in-depth understanding of this relationship.

My methods included studying museum catalogs of past exhibitions either by visiting the art museums targeted in my survey or searching for the information on the web; interviewing museum personnel;

gathering information about the policies of major funders by e-mailing or calling their representatives. I also consulted with various individuals in the art world who shared their knowledge on this subject.

I have consolidated my results in a database format with explanatory comments in an accompanying essay. I intend to submit this manuscript for publication.

Imaging and Digital Arts Interactive Visual-Aurality

Bette Lawhon and Steve Fall

Advisors: Dr. Joseph C. Morin, Music, and Professor Alan Price, Visual Arts

Our research involves a presentation that can best present the ideas we have pursued in the area of synaesthesia-the primary goal being to create a virtual interface in which sound can be modified in the virtual space by manipulating objects in real time. In the ideal case, the presentation model would be sophisticated enough in terms of harmonious synthesis of sound and geometry, yet simple and intuitive enough to facilitate easy exploration of its capabilities, a prototype could be made that could engage the imagination of the user to see the potential of this kind of visual and musical exploration. Part of our exploration is to reverse or toy with the accepted practice (have images generate out of the rhythms of music). In our case it is rather to play with the preconceived ideas that we associate with sounds and imagery, possibly giving the "user" the opportunity to create harmonious discordances, forming new aesthetics. By encouraging experimentation, by enabling one to manipulate geometry in order to create and change sound, and by creating spatial forms that contain inherent visual qualities, the user can manipulate the sound at will. Objects would be programmed to react to contact in various ways, such as a simple model with a ball that would bounce from wall to wall, changing its "pitch" depending where you moved the walls.