The Fourth Annual

Undergraduate Research & Creative Achievement Day 2000

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 0. Kuhn Library & Gallery
Poster Sessions, 7th Floor, Albin 0. Kuhn Library & Gallery
Musical Performances, Room 767, Albin 0. Kuhn Library & Gallery
Dance and Theatre Performances, Library Location
Visual Arts Exhibits, 7th Floor, Albin 0. Kuhn Library & Gallery

1:00 p.m. – 2:00 p.m. **Formal Program, Room 767**

Remarks by:
President Freeman A. Hrabowski, Ill
Provost Arthur T. Johnson
Charles Woolston, Vice Provost
Diane Lee, Vice Provost for Student Academic Affairs

The Importance of Undergraduate Research and Creative Achievement

- Dr. Lynnda M. Dahlquist, Associate Professor, Psychology
- Dr. Jay M. Freyman, Director, The Honors College
  Associate Professor, Ancient Studies

2:00 p.m. **Reception**

7th Floor, Albin 0. Kuhn Library & Gallery

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

April 12, 2000

Dear Participants and Visitors:

I am pleased to welcome you to UMBC's fourth annual Undergraduate Research and Creative Achievement Day. This is a time when we recognize the outstanding work of our undergraduates in all academic areas-the arts, the sciences, the humanities, the social sciences, and engineering. Please discuss with our undergraduates their projects and broader research goals. We take great pride in their accomplishments and their aspirations.

UMBC has a strong tradition of supporting and encouraging the involvement of our undergraduates in the scholarly work of the university. In laboratories, studios, and classrooms across the campus, undergraduates work with their faculty advisors on a variety of projects that add to our knowledge. This is important and meaningful work for our students, faculty, and the university. Today's event also unites the agendas of this year's planning task forces in our examination of, and commitment to, student life, the research environment, and UMBC as an honors university.

UMBC supports undergraduate research in a number of ways, one of which is the Provost's Undergraduate Research Awards. These are $1,500 awards given annually on a competitive basis to support students in their research efforts. Awardees have produced many sophisticated and impressive projects, some of which you will see today. Several of our presenters have been selected to represent UMBC at the National Conference for Undergraduate Research later this month at the University of Montana. Also, this year marks the inaugural issue of the UMBC Review, a new journal dedicated to the research and creative work of our undergraduate students.

Thank you for being here today. I am certain that you will be impressed with our students and gain an appreciation for the high quality of work in which they engage with their faculty. The future of UMBC and its students is very promising.

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.

** 1999 - 2000 Undergraduate Research Award Winner*
*** Participant in the National Conference on Undergraduate Research (NCUR)*

Oral Presentations

Adya, Nidhi*	Visual Arts: Studio, Art History and Theory
Elyassi, Ali*	Chemistry
Gabriel, Alicia	American Studies
Hadermann, Cynthia	American Studies
Hoh, Daniel	Interdisciplinary Studies
Lorentz, Susan	Psychology
McClure, Joy	Visual Arts: Studio, Art History and Theory
Marx, Christine*	Psychology
Nataraja, Sruti**	Health Science and Policy
Nestor, Michael * **	Philosophy and Psychology
Patterson, Autumn	American Studies
Vreatt, Jacqueline	American Studies
Wert, Kathleen	American Studies
Whittington, Paula**	Biological Sciences

Poster Presentations

Akinmade, Damiola	Biological Sciences
Azari, Amir	Chemistry
Bahadur, Faisal	Chemistry
Benhorin, Rona	Psychology
Benhorin, Shira	Psychology
Bolton, Erin*	Geography & Environmental Systems
Childers, Marshal*	Mechanical Engineering
Coles, Derron*	Mechanical Engineering
Farivar, Behzad	Chemistry
Foard, Renee	Chemistry
Frank, Kryst!*	Biological Sciences/Neurology
Harrigan, Patricia*	Modern Languages and Linguistics
Harrington, Kimberly*	Interdisciplinary Studies
Higgins, Luke*	Biochemistry
Holsborg, Janice	Political Science
lheagwara, Chioma	Molecular Biology
Javadi, Som	Chemistry
Kao, Elsa*	Biological Sciences/Pre-Pharmacy
Kolejian, Dzovig	Chemistry and Biochemistry

Korah, Lino*	Chemical and Biochemical Engineering
Logmanni, Mandana	Chemistry
Lyon, Amanda*	Visual Arts
Mahavadi, Madhavi	Chemistry
Matsuo, Reiko*	Visual Arts
Mcinerney, Joan*	Social Work
McKenna, Kristine*	Psychology
Mitchell, Eileen*	Dance
Morrison, Brian	Psychology
Ndassa, Yasmine**	Biochemistry and Molecular Biology
Nimit, Melissa	Political Science
Njage, Yvonne	Biological Sciences/Immunology
Olson, Mark	Chemistry
Peyrot, Sara	Biological Sciences
Sarratt, Kendra	Chemical Engineering
Satnarain, Meena*	Visual Arts
Simmons, Keith	Biological Sciences
Stark, Wayne	Biological Sciences
Wang, Chenwei	Chemistry and Biochemistry
Wright, Michael*	Social Work
Zeiger, Diana N.	Chemistry and Biochemistry
Zimble, Dan*	Geography and Environmental Systems

Artistic Presentations

Baldwin, Kassie	Music
Froehly, Karen	Music
Harrison, Kristin	Theatre
Lazzaro, Greg	Music
Lemnah, Mark	Music
Metheny, Rebecca	Music
Mitchell, Eileen*	Dance
Seiple, Stewart S.	Music

Artistic Exhibits

Adya, Nidhi*	Visual Arts: Studio, Art History and Theory
Britton, Adrian K.	Film
Cynkar, Isaac	Film
Lawhon, Bette*	Imaging and Digital Arts
McClure, Joy	Visual Arts: Studio, Art History and Theory
Torres, Gabriel	Film

2000 PROVOST'S UNDERGRADUATE RESEARCH AND CREATIVE ACHIBVEMENT DAY COMMITTEE

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

Steve Bradley
Associate Professor
Visual Arts

Katherine Keller
Associate Director of the Honors College
Associate Professor, English

Alan Kreizenbeck
Associate Professor
Theatre

Joseph C. Morin
Assistant Professor
Music

Beth Pennington
Assistant to the Provost
Academic Affairs

Kathy Sutphin
Coordinator of Special Projects
Biological Sciences

Tim Topoleski
Professor
Mechanical Engineering

Zoe Warwick
Associate Professor
Psychology

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

SPECIAL REVIEW COMMITTEE

The Committee wishes to thank additional faculty who assisted in the proposal reviews:

Nessly C. Craig
Associate Professor
Biological Sciences

Stephen M. Miller
Assistant Professor
Biological Sciences

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. Provost's Office staff members Linda Hatmaker, Sue McMillian, and Susan Mocko have provided essential administrative support to this event, as has student assistant Kim Wilhelm.

In addition to the students' faculty advisors, we are indebted to Professors Nessly Craig and Steve Miller of Biological Sciences for their assistance to the committee in reviewing the science proposals this year. The tremendous effort made by members of the 1998-1999 and 1999-2000 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 the committees whose reviews have contributed to selecting today's participants: Rebecca Boehling, Rebecca Brown, Mauricio Bustos, Robert Deluty, Raphael Falco, Doug Hamby, Ramachandra Hosmane, Vin Grabill, Preminda Jacob, Marjoleine Kars, Willie Lamousé-Smith, Claudia Lawrence-Webb, Gust Mitchell, Wendy Salkind, Gavin Watson, and Ken Young. Faculty members Lisa Moren and Dwayne Arola attended meetings on behalf of colleagues as well.

We are honored that Professor Lynnda Dahlquist, Department of Psychology, and Professor Jay Freyman, the Honors College and Department of Ancient Studies, will speak on the importance of undergraduate research. Their personal mentorship of many of the students who have participated in this event has been noteworthy. For their assistance in moderating the oral presentations, we thank Professors Ed Orser, Gavin Watson, and Hollie Lavenstein.

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 0. Kuhn Library. Among the many individuals who have assisted in the publicity and planning for this event are Lisa Akchin, Jack Suess, John Fritz, Sandra Dzija, Karen Ludwig, Charlie Melichar, Michelle Healy, JoAnn Peroutka, Sandy Campbell, Joanna Raczynska, Jose Barata, Patrick Campbell, Kim Leisey, Erin Senack and Jennifer Dress. Special appreciation goes to Joe Ferraro, Kristin Brings and Kristen Campbell for the design and production of this program, invitations, and various displays. Gabe Marcus and staff of The Retriever have also supported of our publicity efforts, and we appreciate the announcements of WMBC Radio Station.

Nancy Decesare and staff of Wood Food Service have worked to provide an enjoyable reception, and Brian Shipley and the Student Workforce staff have again provided 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.

An added gesture of hospitality compliments a unique art exhibit this year. Women's Center Director Mikhel Kushner extends an invitation to guests of our event to see the original mural installed by students Nidhi Adya and Joy McClure in the Women's Center. Please save time to visit and enjoy this exhibit.

We appreciate the support of Vice Provost Charles Woolston and Kathy Raab for assisting students who will be representing UMBC at the National Conference for Undergraduate Research later this month at the University of Montana. Doug Pear, Karen Wensch, and Sue Bosley provided assistance for this event and have facilitated the participation of President Freeman Hrabowski, whose spirited leadership continually inspires 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 presenter each year. Your encouragement is often unacknowledged, though not unnoticed or unappreciated.

Although our list is lengthy, we can never include the entire cast of individuals who help with this event.

To all who have assisted in any way, we are most grateful.

ORAL PRESENTATIONS

Visual Arts: Studio, Art History and Theory

Threads of Different Colors Interwoven Together

Nidhi Adya and Joy McClure
Advisor: Professor Tim Nohe

This mural project is based upon research: to collate and represent experiences of women at UMBC in an attempt to portray the different cultures and ethnic groups of our community at large, in the smaller setting of our campus at UMBC. The research was used to create a synthesis of their diverse experiences seeking a common bond. Our aim is for the mural to address the audience in such a striking manner that walking through the space in front of it will create an entirely different experience. This mural strives to hold a conversation with its audience: relating the stories of various women in order to make the viewer question the way the audience labels themselves.

We both came to UMBC four years ago and found a place to grow in the Women's Center as volunteers in the beginning, and then as student employees. The center has given us a vast number of experiences in different settings that have enhanced our lives. The Women's Center provided us with a base from which we were not only able to meet new friends and gain a much more well rounded view about things, but also learn to communicate at a better level with people around us. With the creation of this mural we would like others to know of the vast number of opportunities that are at one's disposal if one chooses to utilize them.

In addition, this project provides a structure within which the community of women on campus can draw closer together: mural is a form of dialogue with the community that it addresses. This project has combined various voices endeavoring to achieve dialogue. The process of bringing women together to gather raw materials, images and ideas for the mural promoted conversation and friendship. It also serves to visually enrich the space of the Women's Center, to further the sense of place that they give to women across campus.

The mural is a public art form that has been used throughout centuries for bringing about social and political reforms. Great twentieth century artists such as Diego Rivera and David Siquieros adopted it as a language of their own, to create a communication with the public at large. This went on to set a paradigm for the WPA (Work Project Administration), and the FAP (Funded Artists and Painters) of the Roosevelt era to follow.

The work of Faith Ringgold contributes to our creative and intellectual process. She incorporates handwritten texts, painted images, and quilting techniques into telling a story, leaving no part of life unquestioned-from what is broadly regarded as beauty, to family life; from what is high art, to revising history as one might read it through the art of the time. It is interesting to note that Ringgold uses quilts to tell stories almost as folklore of past that were passed down from word of mouth. Both are traditional art forms with a vast history behind them, yet her quilts broadcast modern, postmodern and feminist ideas.

Chemistry

Intermolecular Hydrogen Bonding of Epoxy Alcohols

Ali Elyassi
Advisor: Professor Dale Whalen

The purpose of this research experiment was to synthesize optically pure and racemic cis-2, 3-epoxycyclooctanol and determine the nature of the hydrogen bonding interactions in the dimeric complexes formed between two molecules of the same enantiomer and two molecules of the different enantiomers of this compound in solution. In other words, the study proposed to resolve (separate) the mirror image Rand S molecules of cis-2, 3-epoxycyclooctanol and examine the hydrogen bonding interactions between like molecules (R-R and S-S complexes) and between the mirror images (R-S complexes). This will serve to gain a better understanding of hydrogen bonding in epoxy alcohols, which will be of great significance since hydrogen bonds have many biological applications. First, they are important in determining the structure and properties of water, a substance vital to all life on earth. Second, hydrogen bonds form between many large biological molecules. One example is the DNA molecule, a molecule that serves as the genetic material of all cellular organisms. The large number of hydrogen bonds between the strands stabilizes the double helical structure of DNA. Third, hydrogen bonds can, stabilize molecules, complexes, and transition states, and thus, make certain reaction pathways more favorable than others. Finally, many unsaturated organic molecules are metabolized to compounds containing "epoxide" groups, groups that contain a three-membered ring possessing an oxygen atom. These groups are now known to be responsible for the carcinogenic properties of certain organic molecules, including aromatic hydrocarbons. Hydrogen bonding to epoxide groups from hydroxy groups plays an important role in determining their chemical reactivities and understanding the nature of these hydrogen-bonding interactions in forming tumor-inducing cells. Therefore, these applications make it significant to study and learn more about hydrogen bonding of epoxy alcohols. Previously, a racemic mixture of cis-2, 3- epoxycyclooctanol (equal amounts of Rand S) has been synthesized in the laboratory, and a crystal structure of the compound has been determined in collaboration with Dr. Jenny Glusker of the Fox Chase Cancer Center in Philadelphia. The crystal structure shows that the R and S forms of this compound associate very strongly to form a R-S complex, and that this complex is stabilized by hydrogen bonding between the OH group of one molecule and the "epoxide" oxygen of the second molecule. In this experiment, a racemic mixture of cis-2, 3-epoxycylclooctanol was synthesized from 2-cyclooctenyl acetate and then purified by sublimation and recrystallization. Nuclear magnetic resonance (NMR) techniques were then used to observe the bonding between the same and different enantiomers of the purified racemic mixture as a function of concentration. Next, the racemic mixture was resolved into diastereomeric esters using Mosher's Acid, R-(+)-(-methoxy-(-(trifluoromethyl) phenylacetic acid. The diastereomeric esters were physically separated using chromatography techniques. Then, each diasteromer was converted to its corresponding alcohol by base-catalyzed hydrolysis, using potassium hydroxide solution. After isolation of the R and S forms of cis-2, 3-epoxycyclooctanol, infrared spectroscopy (IR) and nuclear magnetic resonance (NMR) techniques will be used to observe solutions of R or S enantiomers and of the racemic mixture as a function of concentration and temperature. This information will allow us to estimate the equilibrium constants for formation of R-R, R-S, and S-S complexes and the energy of the hydrogen bonds. The completed experiment will then be submitted to the Journal of the American Chemical Society.

American Studies

Are You A Good Witch or a Bad Witch?

The Cultural Significance of Pop Culture Representations of the American Witch

Alicia Gabriel
Advisor: Professor Jason Loviglio

The purpose of this project is to uncover cultural attitudes about women in power as represented through popular culture images of the American witch. The image of the witch is neither idle nor passing, but it is a part of our culture that is equated with women. Therefore, within this project I hope to discover why the image of the American witch has shifted from the social pariah of the Salem witch trials to the benign, yet misunderstood, pop culture icon that has increased in visibility and popularity within recent years in film and television. Though this will not be an analysis of the Salem witch trials, I will be using the trials as a backdrop to my research since that event served as a social force which defined not only rules and allowances for women's power, but the image of the American witch for centuries to come. With these definitions in place, I intend to analyze the shift in representations of the American witch in film and television from the 1930s through 2000 in terms of the social forces which may have led the witch from "bad" to "good." Finally, I will suggest how this redefined image of the witch may influence and be interpreted by its contemporary audience, primarily the next generation of American women.

Several questions will be addressed as I conduct my research and within my final analysis: Why was the witch commodified? To what extent is feminism a force, which led to the contemporary version of the witch? Has women's power been accepted and embraced, has the image been merely manipulated to fit social norms of women's power, or is the contemporary witch considered a unique version of woman? Is there cultural power in marginality-is the unique now considered more powerful than the norm?

Much of my research will entail documenting the shifting image of the witch as presented in primary sources from American popular culture dating from the 1930s. This historical survey of popular culture representations of the witch will be analyzed through secondary sources of feminist theory on women in power and the cultural meanings of the Salem witch trials. To further my understanding of the meanings and uses of the redefined image of the witch in film and television for the next generation of women, I will consult various websites and chat-rooms built around these images.

American Studies

Distorted Images: How Exhibitions Shape Cultural Interpretations of Photographs

Cindy Hadermann
Advisor: Professor Leslie Prosterman and Professor Kathy Scales Bryan

As part of the student research team, my honors project will expand and reflect upon my contribution to the development and execution of Cynthia Wayne and Leslie Prosterman's exhibition titled Framing the Exhibition: Multiple Constructions currently being shown in the Albin 0. Kuhn Library Gallery. By gathering information on photographic artists and their work and presenting it in different "hangs," including art history, history/culture, and media/photojournalism, we will introduce the touring audience to a critical analysis of cultural presentation and its effect on the interpretation of cultural objects. My project will be a continued examination of these implications. I will explore the role of

cultural presentation in assigning meaning beyond the pure aesthetics of the photographic work using this exhibition as a guide. I aim to illuminate reasons why the politics of representation and context of photographic work in exhibitions are important due to the cultural value of museums and their implicit cultural authority. To conclude I will hypothesize how others and I might apply this information to the possible presentations of other exhibitions or my own photographic artwork in the future.

As a cultural study, my methodological approach will be a complex one. My primary information will include the experience with the team and the meetings, seminars, and research of particular artists (such as Judy Dater, Mildred Grossman, and Lewis Hine) for the exhibition. I will consider this an ethnographic experience as a curator who investigates the political economy, contextual implications, and resulting messages of the different hangs. If possible I might consider what a number of visitors think about photographs, meanings, and the hangs before and after viewing the exhibition to provide a more event-specific assessment of the hang's effect on the audience's interpretation of object meanings. Dr. Leslie Prosterman, a guiding authority of the exhibition, will also provide me with a multitude of relevant secondary readings, many from her art and politics class. These readings will be in addition to meetings, guidance from her own experiences, and feedback.

Interdisciplinary Studies

The Effects of CGS and Apamin Upon Bursting Activity in Nigral Dopamine Neurons

Daniel Hoh
Advisor: Professor Patricia LaNoue

Current opinion on the etiology of schizophrenia traces the disorder to an excess of dopamine (DA) released by DA cells during bursting activity in the ventral tegmental area of the brain in diseased individuals. This is due to a decreased background level of tonic DA release, which leads to an overcompensatory amount of DA released during burst firing in response to relevant stimuli. Inconsistencies in recently published reports do not support the contention that tonic activation of NMDA receptors is the sole determinant of DA cell firing behavior. In this study, single unit recording techniques are used to evaluate the effect of a potent NMDA antagonist CGS 1975s on the firing pattern of DA cells in vitro. The results of the work on the basic mechanism of DA firing and the actions of CGS and apamin, a potent blocker of calcium-activated potassium channels, suggest that NMDA receptor activation is not directly responsible for DA neuronal firing. Instead, excitement of NMDA receptors is likely coupled with the actions of other neuromodulators and receptor-binding sites in modulating DA cell firing; disruption of this system may then lead to schizophrenia. Increased understanding of the ionic mechanisms underlying DA firing patterns will allow for production of more effective antipsychotic drugs that can appropriately modify DA cell firing behavior to bring about therapeutic results.

Psychology

Parent-adolescent Communication about Dating and Sex as Perceived by Academically Successful African-American Women: What are the Messages?

Susan Lorentz
Advisors: Professor Kenneth Matan and Professor Monica Greene

The purpose of this study was to explore the messages, which parents communicated to their high-achieving African-American daughters about dating and sex. In addition, the context, or style, in which the messages were presented, was examined.

Teen childbearing is a difficult issue within the African-American community. Zabin and Hayward (1993) report that blacks have the highest rates of teenage births, comprising nearly 23 percent of the African-American birthrate, as compared to the 12 percent national average. (In general, higher rates of sexual activity and non-marital childbearing are related to lower socioeconomic status in all racial groups.) About two-thirds of blacks aged 15-19 are poor or low-income (The Alan Guttmacher Institute, 1994).

This study investigates parent-adolescent sexual communication, as this is one context in which adolescents can be socialized in the formation of values and attitudes regarding sexual behavior. In their review of the literature, Jaccard and Dittus (1993) described the overall picture as somewhat pessimistic concerning the impact of parent-teen communication on the prevention of premarital pregnancy. They concluded that better measures were needed to investigate the complexity of parent-teen talks, and they noted that most measurements did not reveal the content of communications.

Research to date has not focused on academically successful African-American youth, and it is important to study this population. By doing so, we may learn about parental strategies that have contributed to their success.

This was a retrospective study; the participants were UMBC students in the Meyerhoff Scholars Program, and were involved in a larger study on the factors leading to their academic success. The three quantitative items utilized in the present study were taken from the larger study questionnaire. The items assessed the degree to which daughters felt their parents conveyed the following messages: to refrain from having a child until education is finished, to abstain from sexual intercourse until adulthood or marriage, and to be responsible about engaging in sexual activities (e.g., using contraceptives/preventing STDs). A four-point scale was used to rate these items (true, mostly true, mostly false, and false). The majority of the participants received all three messages.

The qualitative items were taken from one question embedded within a longer interview: "How did your parents talk to you about difficult issues such as crime, drugs, premarital sex and dating?" (Only the responses pertaining to dating and premarital sex were analyzed.) Utilization of a qualitative methodology allowed for the emergence of data with fewer pre-conceived limitation~. Transcripts of interviews were analyzed for content, and specific content areas were coded into domains. These domains were then classified into categories and sub-categories that were similar across cases.

The categories of the interview data were classified as messages about dating; messages about sex; and context or style of messages. The messages contain specific contents of communications, whereas the context/style describes the manner in which messages were delivered to daughters. Subcategories for the messages and contexts/styles are explained and analyzed in a longer paper (available upon request),

along with quotations to provide illustration. Overall, the most frequent messages advised abstinence, and most daughters said that parents did not sit down and have talk sessions with them.

References
Alan Guttmacher Institute. (1994). Sex and America's teenagers. New York: Author.

Jaccard, J., & Dittus, P. (1993). Parent-adolescent communication about premarital pregnancy. *Families in Society*, 7 4, 329-343.

Zabin, L. S., & Hayward, S. C. (1993). Adolescent sexual behavior and childbearing. Newbury Park: Sage Publication.

Psychology

Exploring Urban Women's Psychological Sense Of Community Across Two Communities

Christine Marx
Advisor: Professor Anne Brodsky

This study explores variations in the existence and operation of psychological sense of community (PSOC) in two settings-an education and job training center serving urban women and these women's home neighborhoods. This presentation will report quantitative and qualitative data collected as part of a larger study examining the risk and protective factors operating in the lives of women attending this program. The center was designed to meet the needs of urban Baltimore women affected by welfare reform, as well as women who are working poor. The students are predominately African American, range in age from 21 to mid-50s, and the majority are currently parenting children.

Data previously collected in this setting found that program participants describe a positive PSOC for the Center, viewing each other as a group of sisters, and subsequently as a resource to each other. There is a dearth of social science research on African American women's relationships with other African American women (Collins, 1991). While there is research focusing on the "centrality" of African American women to their communities, little attention has been given to relationships among African American women. The utilization of each other as a resource is especially important because low-income urban communities are often resource-poor. Reports of positive PSOC among the women within the Center is often described as surprising and accompanied by a "disclaimer" regarding how this is different from these women's normal experience of relationships with other women. In other settings, they describe distrust and a lack of PSOC with other women. These qualitative differences were also seen quantitatively in a significant difference between PSOC of the Center and PSOC of neighborhood ($t(74) = -9.762$, $p<0.001$, Marx, Brodsky, & Cover, 1999).

In the present study, 25 students at the Center completed two revised versions of the Sense of Community Index (SCI) (Chavis, Florin, Rich, & Wandersman (1987) in Linney & Wandersman, 1991). Once again, significant difference was found between Caroline Center and neighborhood PSOC ($t(24) = -10.944$, $p<0.001$). Six participants whose responses were in the quadrant with the highest PSOC for Caroline Center and the lowest PSOC for their neighborhood and three participants whose responses were in the quadrant with the highest scores on both versions were interviewed for the qualitative portion of this study.

Qualitative, in-depth individual interviews with the nine interviewees were semi-structured and lasted approximately 1.5 hours. Interviews were designed to capture the similarities and differences in how relationships and PSOC operate among women at Caroline Center and among women in participants' home neighborhoods. The interviews also explored how PSOC develops in one setting versus another. In this presentation, development and operation of PSOC in these two settings will be demonstrated through exploration of all four components of PSOC-membership, mutual influence, fulfillment of needs, and shared emotional connection. The examination of these components will show how positive PSOC occurs in one or both of these communities and what contributes to negative PSOC.

These findings suggest that positive PSOC occurs where resources are optimized and risk exposure is limited. Settings play an important role in the provision and perception of resources, risks, and relationships.

References:

Collins, P. H. (1991). Black feminist thought. New York: Routledge.

Linney, J. A. & Wandersman, A. (1991). Prevention Plus Ill-Assessing alcohol and other drug prevention programs at the school and community level: A four-step guide to useful program assessment. (DHHS Publication No. (ADM) 91-1871). Washington, DC: U.S. Department of Health and Human Services.

Marx, C.M., Brodsky, A.E., & Cover, M.R. (1999, June). Layers of identity: The influence of multiple psychological senses of community within a community setting. Poster presented at the Biennial Conference of the Society for Community Research and Action, New Haven, Connecticut.

McMillan, D.W., & Chavis, D.M. (1986). Sense of community: A definition and theory. Journal of Community Psychology, 14, 6-23.

Health Science and Policy

HIV/ AIDS: Knowledge, Attitudes, and Behavioral-Risks Among Indian Youth

Sruti Nataraja (UMBC)
Amar Nijagal (Duke University)
Advisor: Professor Thomas Mathew, UMBC

The purpose of this research is to assess the knowledge, attitudes, and behavioral-risks of youth regarding HIV /AIDS in India. India has the greatest number of HIV cases in the world, and a large proportion of these cases affect youth, ages 15-24 (UNAIDS). India's highly sexually conservative climate retards open communication with youth regarding sexual activity. This has made youth-specific assessment a high priority.

4, 725 self-administered surveys gauging knowledge, attitudes, and behavioral-risks regarding HIV/ AIDS were administered to urban high school and college students in Bangalore and New Delhi, India. Surveys were administered prior to comprehensive HIV educational workshops on an anonymous and voluntary basis.

We expected students to have a knowledge deficit regarding HIV transmission and to engage in risky

behaviors. However, analysis of data revealed that the majority of respondents (68%) correctly answered knowledge-based questions regarding HIV transmission. Students' attitudes indicated that HIV-positive individuals should: (a) reveal their HIV status to their immediate family (79%); (b) abstain from marriage (81%), and (c) abstain from having children (88%). Few respondents admitted to engaging in risky behaviors. Specifically, only 4% of the respondents provided an answer to the question of whether they had engaged in sexual activity. Of the few who responded, only 15% admitted to having had sex.

Given the students' knowledge about HIV transmission but reluctance to respond to questions about personal sexual risk, this is an area that warrants further examination and discussion. Highly imposed cultural pressure to abstain from sexual activity outside of marriage may be strong enough that youth are unwilling to admit and thus confront their risky behavior.

Currently, there is little emphasis on HIV/AIDS within the urban Indian school system. We plan to use our research to strengthen the present HIV /AIDS curriculum in schools and to provide more focus in HIV peer education workshops targeting Indian urban youth. Considering 70% of India's population lives within rural villages, further research will also explore rural youths' knowledge, attitudes, and behavioral-risks regarding HIV/ AIDS.

Philosophy and Psychology

Don't Burn Your Bridges! Disjunctive Predicates and Neurophysiological Reductionism: Implications of Multiple Realization Theory and Eliminative Materialism.

Michael Nestor
Advisor: Professor Jessica Pfeifer

The multiple realization argument against the reduction of psychological to neurological terms developed by Fodor is analyzed. Nagel's classic formulation of intertheoretic reduction requires the use of bridge laws. Fodor argues the same psychological properties can be realized in different types of physical entities, which requires the use of disjunctions in bridge laws. According to Fodor, disjunctions cannot be used in law-statements. Therefore, there can be no bridge laws connecting the terms of neurophysiology to the terms of psychology. In response, it is argued that contemporary views of laws of nature do not preclude the use of disjunctions. Moreover, disjunctions are in fact required in all law-statements. A distinction is made between ontological and semantic reduction. Based on this distinction it is concluded that although ontological reduction could occur, semantic reduction could not. This conclusion is used to critique both anti-reductionism and eliminative materialism by suggesting that what is important to science is ontological reduction regardless of the ability to reduce semantically.

American Studies

Can the Alternative Exist Within the Mainstream? A Case Study of Sassy Magazine

Autumn Patterson
Advisor: Professor Jason Loviglio

The purpose of this research is to examine Sassy magazine as an unconventional voice for teenage girls existing within the boundaries of mainstream American culture. I will assess the problems, successes, and failures of the magazine's eight-year run, paying particular attention to the logistical problems created because of contradictions between the magazine's editorial content and its advertisers. My final project should include a brief history of the magazine from its inception in 1988, to its boost in popularity in the early 1990s, its sale to Peterson Publishing in 1994, and finally its demise in 1996. Also important are the perceptions surrounding the magazine throughout its history-how the magazine was viewed by readers, their parents, editors, and members of the press. Finally, it shall include a detailed analysis of the relationship of Sassy to the mainstream and how its vision and its readership were eventually destroyed by these tensions.

Ultimately, I hope to realize sufficient explanations for the following questions: In exactly what way did Sassy differ from other magazines marketed towards girls between the ages of 14 and 17 (such as Seventeen and YM) and why were these differences appealing to their audience? Even though Sassy eventually fell, was the magazine successful in bringing an alternative voice into mainstream discourse? Can the alternative exist in the mainstream or are the two mutually exclusive?

Primary Sources:
The magazine itself will serve as the primary source for my research. Additionally, I may use interviews with former readers or writers and copies of rival magazines Seventeen and YM for comparison. In order to understand popular perception regarding the magazine, I will consult discourse about Sassy in other magazine and newspaper articles.

Secondary Sources:
Amy Farrell's study of Ms. Magazine, Yours in Sisterhood

Dr. McDermott's study on feminist periodicals, Politics and Scholarship: Feminist Academic Journals and the Production of Knowledge

Stephen Duncombe's Notes From Underground: Zines and the Politics of Alternative Culture

Methodology:
The majority of my research will be a close textual analysis of the writing styles and graphic representation of articles and advertisements in Sassy and its rival magazines.

American Studies

$tagnation: Can American Radio Be Saved From Itself?

Jacqueline Vreatt
Advisors: Professor Ed Orser and Professor Jason Loviglio

The increasing consolidation and incorporation of American media in recent years, exemplified by the recent Time Warner-AOL merger, has resulted in a stifling of creativity in the medium of radio. This hypothesis will be proved by studying the reaction of American corporate radio to the innovations in broadcasting style and musical programming offered in the early 1970s by the emergence of the FM band and the proliferation of stations that sought to serve new social communities springing up nationwide. This situation will then be compared to a similar case in the United Kingdom in the late 1960s when the state-controlled British Broadcasting Corporation was faced with opposition in the form of "pirate" radio stations, which sought to serve both geographic and social communities who lacked representation on the airwaves. Investigation into the present-day legacies of both revolutions will show that the BBC used this infusion of fresh ideas to better serve its listeners than did American corporate radio, which throughout the 1980s and into the 1990s focused on selling a demographic to advertisers rather than serving as the voice of a community.

At this stage, my readings of case studies and cultural histories of 1960s British radio and 1970s American radio reveal that both systems were offered the chance to more fully realize the creative and functional potential of radio to not only speak to an audience but speak for and about a particular community. The events of the succeeding decades will show that only the BBC took full advantage of this crucial opportunity. Currently, I am constructing an organizational model of the BBC of today, using interviews with BBC personnel, Internet resources and personal experience from my semester abroad to show the legacy of pirate radio and the BBC's incorporation of its practices and ideas. As a parallel, I am doing interviews with American disc jockeys and using knowledge acquired during my fall internship at WHFS 99.1 FM to suggest the effects of American radio's decision to grow financially instead of creatively. I plan to incorporate recent Federal Communications Commission proposals regarding low power radio into a portrayal of an emerging American solution to the radio drought. A national network of localized, community-oriented low-power stations, such as the student-run station here at UMBC, offer the best hope in decades for filling the airwaves with a multitude of fresh voices and musical forms again. The end product of this research will demonstrate that a measure of independence from financial concerns would greatly benefit American radio in terms of creativity and innovation. By diagramming the recent mergers and consolidations in American media industries, I will show emerging entertainment monopolies that have had visible negative impacts on American airwaves. These conglomerates limit musical possibilities to those most desirable to the greatest number of listeners in order to maximize profits and appeal to advertisers. If allowed to continue in its current direction, this dangerous trend may result in the homogenizing of other forms of American media and the silencing of many vital voices that currently enrich our daily lives.

American Studies

Legal Uses and Public Perceptions of Cultural and Parental Rights Defenses in Child Abuse Cases

Kathleen Wert
Advisor: Professor Kathy Scales Bryan

The purpose of this study is to analyze the similarities and differences in public perception and legal use of cultural and parental rights defenses in child abuse cases. Exactly what constitutes child abuse is highly contested. The cultural defense argues that people should not be prosecuted for child abuse when their actions are an integral part of their culture of origin. The parental rights defense argues that parents have a right to discipline their children according to their beliefs. This study will determine how each of these defenses is regarded in legal actions. It will also determine how the public views each of these defenses. Finally, the study will reveal how the degree to which a person is deemed "American" influences the cases and public perception.

The study will address the following questions: How does public opinion differ between the use of cultural defense and parental rights as defense in child abuse cases? Are the two defenses similar or different in theory? Does the public perceive these defenses as similar or different? If these cases are similar in theory, why does the public perceive them differently?

The research will be conducted in two parts. First, I will analyze two specific cases and their outcomes. The first case is State v. Kargar, a case in Maine where a recent (residing in America for 5 years at the time of arrest) immigrant from Afghanistan was convicted of two counts of sexual assault for kissing his infant son's penis. This conviction was eventually overturned with the use of the cultural defense. The second case is Sweaney v. Ada County, Idaho where a mother filed action against a sheriff and deputy sheriff who arrested her for child abuse when she struck her son several times with a belt on school grounds. The mother was acquitted of misdemeanor charges. These two cases will be analyzed for defense strategies and verdicts. They will be analyzed to determine how these elements are similar and how they differ.

Next, I will compare public discourse surrounding these cases. Newspaper accounts of the cases as well as printed public accounts will be used to determine public perception of the cases within the communities they occurred. I will examine how the public viewed these cases, determine their similarities and differences, and determine the extent to which the public was influenced by the degree to which the defendants were deemed "American."

This analysis will be viewed within the framework of law reviews dealing with the use of culture and parental rights as defense strategies and analyses of the history of child abuse in America.

Biological Sciences

Inhibitory Effects Of VN/125-1 On Sα-Reductase

Paula J. Whittington, Ivo Nnane, Ph.D., Vincent Njar Ph.D.
Advisors: LaMont F. Toliver, UMBC Meyerhoff Program and
Professor Angela Brodie, University of Maryland, Baltimore

Testosterone (T), a primary androgen, is produced in the testes and in smaller amounts by the adrenal glands. In the prostate, T is converted to dihydrotestosterone (DHT) by 5α-reductase. Both T and the more potent DHT promote prostatic tumor growth. In this study, we evaluated the inhibitory effects of some novel steroidal compounds on 5a-reductase activity in human prostatic microsomes. The incubation mixture contained [7-^{3}H]T (600,000 dpm), T (4.8 ng), indicated candidate inhibitors, sodium phosphate buffer (0.1 M, pH 7.4, 400 µl) and 100 µl of NADPH generating system. Control tubes were prepared in the same way but without inhibitors. Of several compounds tested, VN/125-1 (40 nM) inhibited the enzyme activity by 60%. In comparison, Finasteride (40 nM), a clinically available inhibitor of 5α-reductase caused 61% inhibition. The marked inhibitory action of VN/125-1 makes it a potential agent for the treatment of prostate cancer.

(Supported in part by USPHS training grant ES07299-04 and NIH grant CA27 440.)

POSTER PRESENTATIONS

Biological Sciences

Role Of Serine Sites On Rhodopsin Carboxyl Tail In Arrestin-Medicated Deactivation

Damilola Akinmade
Advisor: Professor Phyllis Robinson

Serine residues on the carboxyl tail of rhodopsin, in combination with a threonine at position 340 play an important role in deactivation. Rhodopsin, a pigment in the rod cell, triggers the phototransduction cascade when activated by a light photon. Rhodopsin is deactivated when rhodopsin kinase phosphorylates four threonine and three serine residues on the rhodopsin carboxyl tail by rhodopsin kinase. This is followed by the binding of a regulatory protein, arrestin.

Previous studies have shown that a rhodopsin mutant with only a threonine at 340 (T340A) had a low level of arrestin binding. A mutant with a threonine at 340 and all endogenous serines had an arrestin binding level close to wild-type. This project aims to determine what combination of serines with T340 are necessary and sufficient for wild-type deactivation.

Mutants were constructed by adding a single serine residue to the T340A mutant. The constructed mutants were sequenced using the fluorescence dideoxy sequencing method to verify accuracy of serine addition. COS-7 mammalian cells were transfected with the mutant rhodopsin genes and the expressed rhodopsin was verified using a Western blot. The ability of these rhodopsin mutants to bind arrestin will be determined indirectly by measuring transducin activation.

Chemistry

Computing and Comparing the Energetics of MonoRing and Diring Nitrogen Containing Compounds

Amir Azari, Behzad Farivar and Som Javadi
Advisor: Professor Joel F. Liebman

The energy of various isomers of isoelectronic nitrogen heterocycles of monoring and diring were calculated employing electronic structure methods. The total energy of the geometrically optimized isomers was obtained by applying ab initio calculation at the basis set level of 6-31G* using the SPARTAN molecular modeling program. A theoretical approach was utilized to deduce a simple relationship between the monoring isomer of C5H9N and diring isomers of C9H9N. The results of these calculated systems were analyzed to understand the effect position of nitrogen heterocycles in the monoring and diring systems. Several factors were thought to be responsible for difference in the total energies of the isomers of each type. One factor, which is the aromaticity was studied based on looking at total energy of all the resonance structures. A pattern tried to be made between the position of nitrogen atom and its contribution to aromaticity; another approach was to look at the number of carbon-carbon sigma or pi bonds and find a pattern between stability of a certain mono or diring and the number of carbon-carbon sigma or pi bonds.

Reference: Garret and Grisham, Biochemistry, 1998

Chemistry

Energetics Behavior of Carbon and Silicon in Aliphatic Compounds.

Faisal A. Bahadur, Renee Foard, Mandana Logmanni, (thanks to Haneen Aibak)
Advisor: Professor Joel Liebman

Ab initio quantum chemical calculations are performed on geometry optimized molecules using **SPARTAN Molecular Modeling Program**. This program enables one to get the total energies of different molecules. Since carbon and silicon are in the same group in the Periodic Table and are expected to have similar properties, this research is performed to examine energetics behavior of carbon and silicon in aliphatic compounds. Two set of reactions have been designed in this research. In the first set of reactions, the reactants are "**hetero-atomic**", where hetero-atomic would be defined as a molecule containing carbon, silicon, and hydrogen, and the products are "**homo-atomic**", where homo-atomic defined as molecule containing carbon, and hydrogen. All of the reactions are Predicted to be endothermic if the effect of the positive and negative Charges of silicon and carbon in the reactants respectively destabilizing the presence of symmetry in the products; molecules. In the second set of the reactions, in order to examine the difference in energetics in similar compounds of Carbon and Silicon (sharing same skeleton pattern), certain reactions are constructed involving Carbon and Silicon molecules.

The following series of molecules are constructed: aliphatic XnH2n+2, where X=C or X= Si, n= {1-5}.

References:

Periodic Table from General Chemistry by Harwood, Seventh Edition.

"Basic Concept of Chemical Bonding" from Chemistry the Central Science by Brown, Lemay, and Bursten, Eight Edition.

Organic Chemistry Structure and Reactivity by Syhan Ege, Fourth Edition

Psychology

Changes in Maternal Self-Efficacy from 4 to 12 Months and Their Relation to Attachment

Rona Benhorin, Amie Ashley Hane, and Stanley Feldstein
Advisor: Professor Stanley Feldstein

The purpose of this study is to examine the relations among 4- and 12-month ratings of maternal efficacy infant attachment at 12 months. It was hypothesized that the relation of self-efficacy to attachment is stronger when the former ratings are obtained when the infants are 12 months old than when they are four months (Halpern & Mclean, JR, 1997). Also investigated was the implied question of whether ratings of self-efficacy are relatively stable from 4 to 12 months.

Donovan and Leavitt (1985) asserted that a mother's perceived self-efficacy is an important determinant of the sensitivity with which she responds to her infant's cues. Some previous studies have shown that, for four-month-old infants, maternal self-efficacy is related to certain interactive maternal behaviors that presumably reflect the quality of mother-infant attachment (Donovan & Leavitt, 1985; Teti & Gelfand, 1991). On the other hand, Halpern and Mclean (1997) found that mothers' ratings of their self-

efficacy when their babies are four-months-old do not influence quality of mother-infant interaction. Another study (Carmen, Pederson, Huffman, & Bryan, 1993), however, indicated that the self-efficacy of mothers with three-months-old infants did predict type of attachment when the babies were 12 months old. With regard to the type of attachment, Donovan and Leavitt (1989) found that extreme overestimation or underestimation of maternal self-efficacy appears to result in insecure attachment, while mothers who score moderately or high on maternal self-efficacy will be more likely to be classified in the secure category.

Although recent studies have begun to explore the relation between maternal efficacy and attachment, no study has yet investigated the possibility of a change in ratings of maternal efficacy during the first year of the infant's life. Maternal self-efficacy was measured only once in each study (Halpern & Mclean, 1997; Tedi & Gelfand, 1991; Donovan & Leavitt, 1985; Donovan & Leavitt, 1989; & Carmen et. al, 1993). It may well be that the experience of mothering an infant for the period of from 4 to 12 months may change the extent to which a mother feels competent in the caring of her infant (Shifter and Bono, 1998).

It was the disparity among the previous studies with regard to the relation between ratings of maternal efficacy and attachment, and the absence of a second assessment of maternal efficacy in other studies, which served as the impetus for the present one.

In the current study, mothers and infants are seen first when the infants are four-month-olds. During this four-month assessment, the Parenting Self Efficacy (PSE) Questionnaire (Fish, Stiffer, & Belsky, 1991) is administered. This scale has 20 items that rate the degree to which the parent reports feeling efficacious in the parenting role. The higher the score, the higher the self reported level of parenting efficacy. A second visit to the lab takes place when the infant is 12 months old, during which the PSE Questionnaire is administered again. Two weeks after the second visit to the lab, the dyads are assessed again in a home visit during which mothers complete the Attachment Q-Sort (Water & Dean, 1985), which assesses the strength of the relation of each child's reported attachment behaviors to the prototypically securely attached infant (based on expert opinion). The higher the correlation coefficient, the more securely attached to the mother is the child. The data collection phase of this study should soon be complete.

Psychology

The Effect of Mother Verses Father Presence on Children's Distress Behavior During a Painful Medical Procedure

Shira Benhorin, Lisa Hilley, Wendy Sulc, and Lynnda M. Dahlquist
Advisor: Professor Lynnda Dahlquist

The current study investigated the effect of father presence versus mother presence on child distress behavior during painful medical procedures. Children diagnosed with cancer receive painful medical procedures as part of their treatments over periods of months or years. In order to help young patients cope, parents are typically present during the procedures (Manne, Bakeman, Jacobsen, Gorfinkle, Bernstein, & Redd, 1992). In most cases, the mother accompanies the child and therefore, the vast majority of studies that have investigated the influence of parental behavior on child distress have focused on mothers.

The developmental literature has shown that children attach to both their fathers and mothers, and depend on them for healthy development. It has been found, however, that the roles of fathers and mothers are not identical, which results in differences between mother-child interaction and father-child interaction.

Studies on the effect of maternal presence on child distress have been inconsistent. While some studies have found that maternal presence during a medical procedure is correlated with decreased child distress (Vernon, et al., 1967 & Frank et al., 1962), other studies found that maternal presence increases child distress behaviors (Schwart, 1968; Gross, et al., 1983; Shaw & Routh, 1982; Gonzalez, et al., 1988; Shirley & Poyntz, 1941; O'Laughlin & Ridley-Johnson, 1995; Broome & Endsley, 1989).

Learning theory is one way to explain why children may exhibit more distressed behavior (crying, protest, uncooperativeness) during mother presence. From this perspective, "children's crying in their mothers' presence may be regarded as an adaptive learned response" (O'Laughlin & Ridley-Johnson, 1995, p. 178). One of the major roles of the mother as the primary caretaker is to protect and comfort a child before and after painful experiences (Gross et al., 1983). Children learn that their mothers rescue them from aversive situations and provide comfort and reassurance; thus, child distress behavior (e.g. crying) is negatively reinforced by the mother who removes the aversive stimuli. In the pediatric medical setting, the mother cannot eliminate the aversive stimulus (e.g. a medical procedure), thus an extinction contingency is formed which results in increased responding (crying) (Dahlquist, 1992). Therefore, children may exhibit more emotional distress if their mother is present (Gonzalez, et al.,1989).

The current study investigated the effect of father presence versus mother presence on child distress behavior during painful medical procedures. Specifically, we predicted that participants would exhibit more distress in the mother present condition and less distress in the father present condition because we speculated that fathers may not be as salient cues for rescue as mothers.

The study included 21 pediatric oncology patients, ages 2-15. Behavioral distress was assessed by the Observation Scale of Behavioral Distress (OSBD; Jay, Ozolins, Elliott & Caldwell, 1983). The OSBD consists of 13 operationally defined verbal, vocal, and motoric behaviors, which are coded as either present or absent in 15-second intervals. OSBD scores were computed for three phases of the medical procedure; anticipatory period, the procedural period, and the recovery phase. The medical procedures included intramuscular injections (IMs), intravenous needle insertion (IVs), Portacath needle insertion (PCs), and lumber puncture (LPs).

Results revealed a negative correlation between child age and child distress during the procedural ($r = -.42$, $p < .01$) and the recovery ($r = -.55$, $p < .01$) phases. Specifically, younger children demonstrated significantly more distress compared to older children. In addition, multiple regression results revealed a significant relationship, though opposite to the one that was expected; When the effect of age was controlled, OSBD scores were higher during the anticipatory phase when children were accompanied by their father rather than their mother ($R2$ change = .098, $p < .05$).

Results are discussed in terms of mothers' versus fathers' roles and parent behaviors during stressful medical procedures.

Geography And Environmental Systems

The Effects of Urbanization on the Channel Morphology of Watts Branch, Maryland

Erin Bolton
Advisor: Professor Andrew J. Miller

The purpose of this research is to investigate the changes in channel morphology through time in an urbanizing drainage basin. Eight monumented cross-sections of the Watts Branch stream in Rockville, Maryland were resurveyed to further the study of the action of geomorphic processes through time initiated in 1953 by Luna B. Leopold (Leopold 1973, Leopold et al. unpublished manuscript). Since the cross-sections were established, portions of the Watts Branch watershed have been transformed by the process of urbanization from relatively rural areas to areas of considerable urban development (Leopold 1973). Different variables of channel geometry are analyzed over time and in the context of the urbanization process to determine the relationship between urbanization of the drainage basin and changes in channel morphology.

This research has five primary objectives: 1) To examine changes in bankfull width, maximum depth, and cross-sectional area at each cross-section through time; 2) To compare bankfull elevation and minimum elevation of the channel at each cross-section to determine if the bed and bank are aggrading or if the channel is incising over time; 3) To consider trends in bankfull width, maximum depth, cross-sectional area, bankfull elevation, and minimum elevation in the longitudinal plane; 4) To account for anomalies in the record of change with a more complete understanding of the human management of the stream and drainage basin; and 5) To analyze the changes in channel geometry in the context of quantified changes in the land cover of the drainage basin.

The pins marking the cross-sections originally established by Leopold were found using a Schonstedt magnetic locator and resurveyed with a Leica Geosystems total station. The total station was then used to survey coordinates and elevation of points along each cross-section at approximately 3 ft intervals, with adjustments made to capture significant slope changes. Government agencies in Montgomery County and the City of Rockville will be contacted to gather information on the past and present management of the Watts Branch stream system and drainage basin, particularly the park within which the study site is located. Present and historical land cover/land use data in Geographic Information System (GIS) format will be used to determine the percent of impervious cover in the drainage basin for each year this data is available.

Resurvey of the channel cross-sections has been completed. This data has been analyzed in the context of the existing record. The remaining parts of this analysis will provide a more accurate picture of the urbanization process and the extent of hydrologic modification in the Watts Branch drainage basin that can be compared to the observed changes in channel morphology. It is anticipated that the analysis of change in the percentage of impervious surface in the drainage basin and of the relationship of this change to channel morphology will be completed by the presentation date.

References:

Leopold, L. B. 1973. River channel change with time: an example. Geological Society of America Bulletin, v. 84, p. 1845-1860.

Leopold, L. B., Huppman, R., and Miller, A. J. Unpublished manuscript. Geomorphic effects of progressive urbanization, 41 years of direct observation.

Mechanical Engineering

Effects of Carotid Artery Geometry on Blood Flow

Marshal Childers
Advisor: Professor Charles Eggleton

A numerical model of flow in the carotid artery bifurcation is used to study the effects of geometry on flow characteristics. Stroke killed nearly 160,000 people in the U.S. in 1997 and when considered separately from other cardiovascular diseases, it ranks as the third leading cause of death behind diseases of the heart and cancer1. The objective of the current research is to determine the effects of wall compliance on smoothing of pulsatile flow for one-dimensional and three-dimensional numeric models. Radiologists from the University of Maryland at Baltimore have observed flow smoothing in the carotid artery in vivo. A one-dimensional model, based on an analogy of blood flow to electric circuit theory, was employed to determine the role of compliance in flow smoothing. Matlab computational software is used with the circuit model to determine the effects of various component parameters on flow smoothing. A rigid, three-dimensional model of a human carotid artery was created using Computational Fluid Dynamics, CFD, and computer software to examine the effects of geometry variation on flow smoothing. The model is based on that proposed by Perktold2 and is constructed of physically relevant geometry and flow boundary conditions. Pulsatile flow is used to examine the ratio of flow pulsatility for the carotid artery outlets and inlet as a function of geometry. A sinusoidal input of the form

$$c+a \sin \omega t$$

consisting of physically relevant coefficients is applied to the common carotid inlet. Geometrical variables such as diameter of the common, internal, and external carotid arteries, maximum sinus diameter, and bifurcation angle are adjusted and the effect of these variations on flow smoothing is examined. Results from the one-dimensional circuit model show qualitative agreement with the flow smoothing observed in vivo while the three-dimensional analysis indicates an absence of smoothing for a non-compliant model. Observation of steady flow velocity magnitudes reveals regions of vorticity and flow stagnation within the carotid sinus. Future research objectives include establishing a compliant three-dimensional model carotid artery and examining the effects of compliance and occlusion on blood flow.

References:

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2. K. Perktold, R.O. Peter, M. Resch, G. Langs, Pulsatile non-Newtonian blood-flow in three-dimensional carotid bifurcation models: a numerical study of flow phenomena under three different bifurcation angles. J Biomed Eng 1991; 13:507-515.

Mechanical Engineering

Pollution Detection in the Chesapeake Bay through Satellite Remote Sensing

Derron Rafiq Coles
Advisor: Professor Severino L. Koh

This study is to determine the feasibility of using passive microwave satellite remote sensing to detect concentrations of pollutants in the Chesapeake Bay through emissivity. Recent studies in the Bay area include a spectral analysis of phytoplankton (Richardson [3]). This paper discusses the use of optics to identify pigments found in aquatic systems. By identifying these pigments characterized by the unique light absorbency features, the amount and types of algae present can be obtained. Once this data is obtained, one will have important information about water quality, as well as knowledge of prevalent algae forming greater toxin production. Although this method is effective, it focuses on the result of pollutants, i.e. the algal bloom, instead of the cause. If the polluted areas and the sources of pollution are instead identified, the problem can be stopped before it reaches catastrophic proportions.

In determining the potentiality of using passive microwave satellite remote sensing data to detect concentrations of pollutants two types of studies will be done:

(1) A correlational study between in-situ data, NOAA sea surface temperature data, NOAA albedo data, and NOAA chlorophyll load data.

(2) A temporal study of aberrant areas of the Bay. Finally, once the evaluation is completed, record of all polluted areas will be observed, and the communities and industries located there.

All data to be used in the evaluation has been collected and catalogued. Currently, the evaluation of the sea surface temperature data is being completed. The evaluation and temporal study is expected to be completed by the presentation date. If the proposed technique is reliable in the Chesapeake Bay area, a record of all polluted areas with corresponding communities and industries will also be provided.

Biological Sciences/Neurology

Benefit of Topiramate in a Transgenic Model of Familial Amyptrophic Lateral Sclerosis

Krystl Frank
Advisors: Professor Richard Tankersley, UMBC, and Professor J.D. Rothstein, Johns Hopkins University Hospital

The effectiveness of Topiramate to slow the progression of amyotrophic lateral sclerosis (ALS) symptoms was tested using an animal model of the disease. ALS, often referred to as Lou Gerhig's Disease, is a progressive, neurodegenerative disorder that results from the loss of neurons in the ventral spinal cord, brainstem, and motor cortex. Clinical symptoms are present in the form of a gradual loss of voluntary muscles that leads to paralysis. ALS is usually fatal within five years after diagnosis, due to respiratory failure.

ALS is divided into two forms, sporadic (SALS) and familial (FALS). Several hypotheses about the basis of ALS exist, including glutamate excitotoxicity, oxidative stress, and calcium channel autoantibodies (6). The familial ALS cases are an inherited autosomal dominant trait, which comprises around 10% of the

total ALS population (1). Approximately 15-20% of familial ALS cases are caused by a Cu/Zn superoxide dismutase-1 (SOD-1) gene mutation (2).

Transgenic mice expressing the mutant human SOD-1 enzyme develop progressive, fatal muscular deterioration, similar to that seen in humans (3). Their change in muscular strength and coordination can be monitored using a Rotorod. The transgenic mice have a short survival time (4-5 months), which makes them an ideal system for testing new drug therapies. The disease progression in transgenic mice parallels changes observed in the human disease, extending its validity as an animal model of FALS (4).

In a sibling-paired trial, the onset of disease and the survival times for Topiramate versus non-drug treated SOD-1 mice were compared. Topiramate, a previously FDA approved anti-epileptic, is known to antagonize activation of the AMPA glutamateric excitatory amino acid receptor. The AMPA receptors are a subtype of non-NMDA receptors. Based on animal/ culture studies it appears that motor neurons are most susceptible to acute and chronic glutamate toxicity via non-NMDA receptors (5). The proposed effectiveness of Topiramate is based on culture paradigms that have shown that non-NMDA receptor antagonists can be neuroprotective for motor neurons.

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Modern Languages and Linguistics

Incorporation of Authentic Spanish Language Video Materials into the Spanish Curriculum at UMBC

Patricia Harrigan
Advisor: Professor Alan Bell

This project will investigate the effectiveness and integration of Spanish-TV Magazine in the Spanish curriculum of the MLL Department. The Spanish-TV Magazine Video Archive is a significant UMBC resource. The use of audiovisual material in teaching is well accepted, especially in foreign language instruction. Featuring carefully selected segments from Spanish television, TV Magazine is a valuable learning tool for students. It offers examples of natural speech and colloquial language use in context.

The project will identify video segments appropriate for the Spanish Program in MLL Once the segments are identified, it will be necessary to work with different individual instructors and course syllabi to integrate their use. First, students of Spanish in various courses will be polled as to subjects of interest. The Spanish TV magazine archive will be searched for appropriate video segments. Then several segments will be integrated into a section of Spanish 101.

Results of that effort will be assessed via a survey to determine effectiveness of the video segments in the learning process. Finally, segments will be identified and integrated with the themes in the syllabi of the first two years of Spanish instruction as an additional resource for instructors. Results will be posted in the Spanish TV Magazine web page at some later date by the webmaster.

Interdisciplinary Studies

Photorealistic Visualization and Fly-through of Hurricane Data

Kimberly Harrington
Advisor: Professor David Ebert

The goal of this research is to create a photorealistic fly-through animation of a hurricane, utilizing data from NASA's Tropical Rainfall Measuring Mission Satellite (TRMM). This satellite has a number of measuring instruments on board including three dimensional rain precipitation radar and microwave data. The data describes volumetric rainfall amounts, such that at each voxel, the data represents the instantaneous rainfall for that area. This will be used to model the hurricane using newly developed volumetric cloud modeling and photorealistic rendering algorithms.

Currently, there are no photorealistic three dimensional models of hurricane data with true volume rendering, so this animation will be used to visualize the hurricane for educational and research purposes. The fly through will give a never before seen view of internal structures that are not visible with current bird's eye view imaging techniques and animation sequences. This research will aid current hurricane studies, such as those of Fritz Hasseler of NASA Goddard Space Flight Center, improve science education programs, and demonstrate the feasibility of new visualization techniques for atmospheric data.

The following methods were employed in this research:

- literary research on current hurricane models to understand their limitations and needed improvements as well as current volume rendering methods for cloud particle systems
- extraction of the TRMM data and analysis of its structure
- creation of a base model of the hurricane utilizing Dr. Ebert's current volume rendering methods
- creation of additional software to achieve a photorealistic model
- production of the fly through animation sequence

An evaluation of the research will be performed in a technical paper. It is anticipated that the animation will be completed by the presentation date.

Biochemistry

Screening of possible inhibitors of DNA Topoisomerase

Luke Higgins
Advisor: Professor Paul Smith

I. Statement of Specific Aim(s), Purpose, or Goal(s):
To evaluate a series of DNA minor groove binding compounds that have been synthesized in our laboratory as inhibitors of the enzyme Topoisomerase I (Topol). Two sets of compounds will be tested using different electrophoresis experiments. The first set of compounds are analogs of substances known to inhibit Topol. The second set of compounds have been shown to bind to DNA, but have yet to be tested as Topol inhibitors. These studies will test the effectiveness of ligands to inhibit enzyme-mediated relaxation of supercoiled plasmid DNA and to stabilize the enzyme-bound intermediate. Binding constants of effective inhibitors with various DNA substrates will be determined. These studies will provide insight into the structural characteristics possessed by effective Topol inhibitors and may identify new viable anti-cancer compounds. Although these assays are precedented for the activity of camptothecin as a Topol inhibitor (1, 2), the procedure has yet to be performed in our laboratory. It is my responsibility to develop an expertise for applying this method to the analysis of our synthetic compounds.

II. Motivation
Topoisomerases are enzymes that are essential for DNA replication and transcription in normal as well as cancerous cells. Inhibitors of these enzymes are effective anti-tumor agents. Camptothecin is a prototypical example of a topoisomerase I poison and its activity in this regard is well-documented (3). Camptothecin is thought to stabilize a covalent complex between the enzyme and DNA preventing the DNA from being relegated and thereby disrupting DNA replication and/or transcription. Terbenzimdazoles, a class of compounds structurally distinct from camptothecin, have recently been shown to inhibit Topol, possibly via an analogous mechanism (1). Analogous derivatives are currently being synthesized in our laboratory. The ability to make structural variations of these derivatives via a unique synthetic pathway provides the means for a rapid evaluation of each derivative's relative effect on topoisomerase activity. The assay performed will allow the efficiencies of these inhibitors to be determined. In addition, DNA binding experiments will determine if there is any correlation between Topol inhibitory activity and DNA binding affinities/sequence selectivity.

III. Methods:

The compounds described above will be evaluated as possible Topol inhibitors using two standard assays. First, the ability of each compound to inhibit the enzyme-mediated relaxation of supercoiled plasmid DNA will be determined. Supercoiled DNA will be treated with Topol in the absence of an inhibitor ligand which will allow the transformation of the plasmid to the relaxed closed-circular form. Another assay will be run with supercoiled DNA and Topol in the presence of an inhibitor, which will lengthen the time of relaxation. Aliquots of the reaction mixture will be quenched over a specific time interval. The half-life of relaxation will then be used to provide a quantitative measure of each ligands relative activity. The second assay will test the ability of each ligand to stabilize the cleavable complex between nicked DNA and Topol. In the presence of ligand, radioactively labeled DNA restriction fragments will be used as a substrate for Topel. After a specified incubation period, the DNA will be run on a denaturing polyacrylamide gel. Phosphorimaging technology will be used to identify the cleavage sites produced in the reaction. This will provide insight as to the relative efficiency of each ligand to inhibit the enzyme as well as the sequence selectivity of inhibition.

IV. Evaluation and Dissemination

A precedented Topol assay of camptothecin will be performed as a positive control to confirm that reproducible results can be obtained. The compounds synthesized in our laboratory will then be tested via this assay. The results obtained will be used to determine the relative efficiencies of the individual compounds as Topol inhibitors. The results will then be published in a peer review chemistry or biochemistry journal.

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Political Sciences

The Path of Sovereignty

Janice Holsborg
Advisor: Professor Cynthia Hody

Sovereignty is an ever-changing evolving concept. It has been around since the beginning of man and been debated about since practically the same time. On the precipice of the new millennium we are facing an era of change in the realm of sovereignty. It has come from being in the hands of individual man, to being held by empires and dictatorships, with many stops in between. The most current face of sovereignty has been the nation-state. While it is a fairly new concept, it is already on its way to becoming obsolete. When the world emerges at the other end of this change it will appear with sovereignty taking a new form. The nation-state will dissolve and be replaced. Foreshadowing of this outcome can be seen throughout the world by looking at current trends in governmental sovereignty.

The rise of advanced technology-i.e. the Internet, and the enlarging role of NGO's is laying the groundwork for this new structure of sovereignty. The Internet is making information available across borders instantaneously. This increase of information has made an environment in which NGOs breed. Regionalism as well as fragmentation is also sure signs of a changing order. A new vehicle of sovereignty will emerge from the impact of these current trends.

Molecular Biology

Structure of RNase MRP

Chioma Iheagwara
Advisor: Professor Lasse Lindahl

Assembly of ribosomal subunits from rRNA and ribosomal proteins requires posttranscriptional cleavage and modification of rRNA. In eukaryotes, this processing requires small nucleolar RNA-protein particles referred to as snoRNPs. One such snoRNP is RNase MRP, which cleaves precursor rRNA of *S. cervisiae*.

Currently, it is thought that RNase MRP is related to RNase P. These enzymes have at least one protein in common. Furthermore, these two enzymes have a common antigen that binds similar structures, thus indicating that the two enzymes themselves may have similar structure. By comparing the sequences of several yeasts a probable structure for RNase P was created. Based on this structure, a structure for RNase MRP was developed. Currently, laboratory research is trying to test the proposed structure. Previously, a one base pair mutation has been created that results in changed phenotype, unwinding one of the RNA hairpin domains. This mutation was created by the Soeing PCR method. Using this same technique, I have created a complimentary base mutation that should return the RNA to its normal structure of the current model.

If the structure is confirmed, then functional comparisons between RNase MRP and RNase P can be made and the possible catalytic properties of RNase MRP can be better understood and characterized. Currently, I am testing phenotypes of the compensatory mutants. Northern analysis is used to screen the mutants.

Biological Sciences/Pre-Pharmacy

Cloning and Expression of the Long Wavelength- Sensitive Cone Opsin Gene of *Phoca vitulina*

Elsa Kao
Advisor: Professor Phyllis R. Robinson

This study investigates the hypothesis that the harbor seal, *Phoca vitulina*, possesses a functional long wavelength -sensitive cone opsin gene. Cones are the receptors in the retina responsible for visual acuity in bright light, as well as for color vision if an organism possesses two or more cone types. Most terrestrial diurnal mammals possess two types of cone photoreceptors, long wavelength-sensitive (LWS) and short wavelength-sensitive (SWS) cones.

Different types of cones absorb light maximally at different wavelengths. Visual pigments embedded in the membranous discs of the outer segments of rods and cones are responsible for the different spectral sensitivities of the photoreceptors. The pigments consist of an opsin protein, formed by seven transmembrane α- helices, and 11-*cis*-retinal, the chromophore. Conformational changes of retinal initiate the phototransduction cascade when the chromophore absorbs a photon of light.

Phoca vitulina has a canine ancestor with dichromatic color vision. Since it depends on visual perception when foraging, and a wide range of wavelengths of light is transmitted near the water surface where it forages, it is unlikely that the harbor seal has lost the ability to discriminate colors. Therefore, mutations in the LWS cone opsin gene, that would result in the loss of functional LWS cones, would most likely not be retained through evolution. For these reasons, this project investigates whether or not the harbor seal possesses a functional LWS cone opsin gene. A complete test of whether or not the seal has color vision will also require the cloning and expression of the SWS cone opsin gene.

In addition, this project will test the hypothesis that the photopigment containing the LWS cone opsin absorbs light at the λ_{max} typical of terrestrial diurnal mammals. The electrostatic interactions between the protein and chromophore determine the spectral sensitivity of the photopigment. Shifts in the λ_{max} of some mammalian visual pigments have been correlated with changes at specific amino acid sites involving a change in charge or gain or loss of a hydroxyl group. However, a shift in the λ_{max} of the LWS cone would not be advantageous to an amphibious animal such as the harbor seal. Instead, it seems probable that the harbor seal possesses LWS cones that have λ_{max} values typical of diurnal terrestrial mammals.

To test these hypotheses, the LWS cone opsin gene was reverse transcribed from total RNA obtained from *Phoca vitulina* retina. Degenerate primers were designed based on the LWS cone opsin sequences of other mammals and used for PCR of the cDNA. The PCR product was cloned into a cloning vector and several clones were sequenced. Restriction enzyme digestion has been used to remove the gene from the cloning vector, and the gene will be ligated into a mammalian expression vector, PMT3-1D4. Transfection of COS cells with the gene in PMT-1D4 will be followed by reconstitution of the protein with 11-cis-retinal, the chromophore. The photopigment will be purified with immunoaffinity chromatography and the absorbance spectrum will be measured to determine the λ_{max} value of the pigment.

Chemistry and Biochemistry

Vibrio Cholerae 0139 Polysaccahride Capsule's Degradation

Dzovig Kolejian
Advisor: Professor C. Allen Bush

Vibrio Cholerae 0139 has recently been identified as a cause of epidemic cholera in Asia. Vibrio Cholerae 0139 Bengal has a polysaccharide capsule. The capsular polysaccharide of Vibrio Cholerae 0139 Bengal strain A11837 has residues in the repeating subunit; this includes one residue each of N-acetylglucosamine, N-acetylquinovosamine (QuiNac), galacturonic acid (GalA), and galactose and two residues of colitose.

The purpose of this project is to cut the Vibrio Cholerae 0139 polysaccharide into its oligosaccharides by using B-elimination method. This degradation is to take place at the (alpha-D-Gal*p*A) or galacturonic acid residue. However, for experimental purposes, pectin polysaccharide is a model because the pectin polysaccharide has a methoxyl group next to the carbonyl as compared to a hydroxyl group in the original galacturonic acid residue. Having a methoxyl group next to the carbonyl favors the formation of the B-eliminated product.

The procedure was done as follows: after mixing the pectin polysaccharide with an appropriate buffer solution at different pH ranges, the mixture was placed in a hot water bath at 95°C, and the B-elimination product was detected over several increments of time.

A UV spectrophotometer and a viscometer were used to detect the B-eliminated product. The UV spectrophotometer was expected to give an absorbance band between 225-240 nm, and the viscometer was observed to increase the flow rate of the degraded material over several increments of time.

Chemical and Biochemical Engineering

Blood Volume Changes in the Leg of Deep Vein Thrombosis Patients at Various Leg Positions

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Advisor: Professor Kyung A. Kang

The goal of this study is to utilize near-infrared continuous wave spectroscopy (NIR-CWS: MicroRun-Man 96) to diagnose deep vein thrombosis in legs and to possibly determine the damage status of veins. Deep Vein Thrombosis (DVT) is a clot formed in the deep veins. If not treated early, it can lead to skin necrosis, limb amputation, stroke, heart attack, or even death. In the United States, complications due to DVT have lead to 50,000 deaths and almost a million hospitalizations each year. Usually the clots begin to form in the leg. Therefore, an effective, highly accurate and non-invasive method for the detection of DVT in the leg is needed.

The Micro-Run -Man 96 contains a probe and a monitor. The probe has two light sources and two filter detectors that record deoxy- and oxy-hemoglobin changes by measuring the absorbed light at wavelengths 760 and 850 nm. These changes are recorded over a time period in which the subject undergoes a series of light leg exercises. The subject pool consists of patients visiting Johns Hopkins Hospital Vascular Surgery Department and of normal subjects as a control. The test protocol is designed

to determine the muscle tissue blood volume capacity, rate of blood filling in their veins, and efficiency to promote one-directional venous flow.

The normal and patient blood flow profiles can be clearly differentiated by analyzing the three values. The test results indicated that this NIR device can be used as a real-time, non-invasive, highly accurate, inexpensive portable device to detect deep vein thrombosis in the leg.

Chemistry

The Effect Of Halogenation On Strain Energies Of Small Cyclic Organic Compounds

Madhavi Mahavadi, Diana Zeiger
Advisor: Professor Joel Liebman

Quantum chemical techniques are used to examine the effect of substitution of the halogens, chlorine and fluorine, on cyclopropane. Ab initio calculations were performed on geometry-optimized molecules using the SPARTAN Molecular Modeling Program. The following series were constructed: cyclic C3HnX6_n, where X=Cl, F and n={O - 6}. Their strain energies were calculated using the diagonal and ultra-diagonal approaches as developed in the references listed below. These methods compare the heat of formation of a definitionally "strainless" species with the heat of formation of the strained species. The difference between these two values is understood to be the strain energy.

An example of a calculation using the diagonal approach is as follows: $C_3H_4F_2$ (1,1-difluorocyclopropane) = (2/6) * C_6H_{12} (cyclohexane) + (1/6) * C_6F_{12} (dodecafluorocyclohexane)

An example of a calculation using the ultradiagonal approach is as follows:
$C_3H_4F_2$ (1,1-difluorocyclopropane) = (1/2) * $C_6H_8F_4$ (1,1,4,4-tetrafluorocyclohexane)

Results of these calculations were analyzed for comparison between the effects of substitution chlorine versus fluorine. In addition, these results were compared to admittedly sparse experimental data.

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(This primary, invited, refereed article is in honor of N. L. ("Lou") Allinger on the occasion of his 70th birthday.)

Visual Arts

Gift Project: UMBC as a Microcosm for Resurfacing Global Discrimination and Subjugation in the 20th Century.

Reiko Matsuo, Meena Satnarain, and Amanda Lyon
Advisor: Professor Alan Rutberg

We are three visual arts students who work collaboratively under the name Optic Tongue. We were given the Provost's Undergraduate Research Award last year to pursue public art at the University of Maryland, Baltimore County. The Gift Project deals directly with discrimination and subjugation due to cultural differences such as ethnicity, gender, and class. Most of the voices embedded in the accounts were excerpted from sources gathered from this century. Two thousand packages were distributed around campus during the end of November 1999, primarily at the library as approved by Director Dr. Larry Wilt.

The impact of cultural differences is an issue that affects everyone. The three of us come from very different cultural, social, and ethnic backgrounds. The accounts were collected from various sources: online journals, personal interviews with students, and our own personal experiences. It is important to acknowledge a broad range of often paradoxical and contradictory personal and anonymous voices within the work.

We intended that this piece be challenging and that it provoke discussion of controversial issues among university students, faculty, and staff. The university setting, as an institute of higher learning with a commitment to freedom of expression and support of the arts as a mechanism for open discourse, seemed to be an ideal setting to introduce this artwork.

It is unfortunate that some people misinterpreted the piece, but its ambiguity was central to its intent. Perhaps these individuals have not been exposed to alternative approaches within art to address these complex issues. When one is encountered with a new idea or approach, one's first instinct is to react negatively. Our project was essentially an alternative way to examine a set of difficult problems. We had hoped to engage a participant's curiosity enough so that he/she would visit the website and discuss issues in the forum and follow links to organizations that are dealing with various kinds of discriminations. To foster this forum, a website address was affixed to each package.

In spite of the misinterpretations and problems that this public artwork generated, we see these responses as proof of our success and are encouraged to continue these activities.

Social Work

Overcoming Underachievement During Latency in High Risk Populations

Joan Mcinerney
Advisor: Professor Karen Adkins

The study examines the nature of school underachievement during latency in a sample of third and fourth graders in an at-risk population in Baltimore County. An intervention of parenting seminars focusing on factors related to achievement in elementary children was designed and offered in the pilot sample. In this case study, the barriers encountered and strengths of the systems and populations are

detailed. Intervention strategies are discussed to overcome barriers and implement programs.

Children struggle in school for a myriad of reasons. The underachievement problem is complicated in at-risk populations. Ignoring underachievement in school causes significant societal problems. The negative outcomes include teen pregnancy, substance abuse, low graduation rates, chronic unemployment, and criminal behavior.

The research model recognizes the impact between interdependent systems, whose cooperation is required to ensure educational success. The macro system, the educational institution; the micro system, the family; and the subsystems, relationships between parent and child and their internal and external environments, are considered. In addition, alliances between parent and school and connections between child and school are investigated.

The intervention consists of three ninety-minute seminars, held during the second through fourth weeks in October at two elementary schools. One set of seminars was conducted during early evening hours and the second set was conducted on three consecutive Saturday mornings.

The intervention is detailed. The seminar literature and presentations focus on twelve content areas-pyscho-social issues and treatment; passive-aggressive behavior; behavioral reinforcement and modeling; attribution theory and cognitive restructuring; locus of control; improving self concept and self esteem; parental participation and home routines; and working as a team with school personnel. The intervention includes contracts with parents and homework assignments to reinforce the concepts and their applications.

The method includes the selection of two schools from a population of six at-risk schools chosen to increase the racial diversity of the research population. One school, primarily Caucasian, was located in east Baltimore County, Maryland, and the other school, primarily Afro-American, was located in west Baltimore County, Maryland. The study further examines how the effort to apply scientific methods to at risk school systems can beleaguer researchers. Successfully negotiating macro systems requires time, skill, knowledge and ample funding. Implications for further research in the quest to overcome underachievement during latency in high risk populations is discussed.

Psychology

Parenting Styles of Language Minority Families During Pediatric Cancer Treatments

Kristine McKenna
Advisor: Professor Lynnda M. Dahlquist

In an effort to determine the effects of parental communication styles on child distress in the medical setting, this study compared the distress levels of language minority (i.e. non-English speaking) pediatric oncology patient families and their English-speaking ethnicity and non-ethnicity matches during their cancer treatment sessions. In the setting of a medical clinic, immigrant parents may feel overwhelmed by the health care provider's vocabulary and the overall rushed atmosphere (Die Trill & Holland, 1993). This may affect how the parent handles the diagnosis and subsequent treatment of the child's disease, especially if they feel the medical community is critical towards their culture's coping methods. Though Cohen (1995) argues that culture has a considerable impact on parental distress when a child has a chronic serious illness, few studies have been conducted to determine the specific effects.

The following research questions were addressed: 1) Do language minority parents use different verbalizations during their child's cancer treatment session? 2) What are the subsequent effects of such statements on the pediatric patient's distress levels?

There were three categories of parental communication patterns that underwent investigation:

Protection variables are trickery (lie) and distortions (misrepresentations) regarding the impending medical procedure, as well as apologies to the children.

Authoritative parenting style includes praise, empathy, encouragement, checking the child's status, and reassurance.

Authoritarian parenting style variables involve criticism and threats.

Evidence of these three communication patterns in language minority (i.e. non-English-speaking) families, English-speaking Hispanic and Asian families, and English -Speaking Caucasian and African American families was determined. The sixty-six participant families in this study were part of a larger group (N=183) recruited for a pain and anxiety treatment study by Dahlquist (1991), except for one family recruited at the University of Maryland Medical Clinic. The children ranged in age from 2 to thirteen years of age and had an ethnicity composition of 50.8% Hispanic, 34.0% Caucasian, 9.0% Asian, and 6.2% African American.

Protection and authoritative parenting style variables were expected to be negatively correlated with child distress, while authoritarian parenting style verbalizations were expected to be positively correlated. The Pediatric Medical Interaction Scale (PMIS; Dahlquist, Power, Cox, & Fernbach, 1994) and Observation Scale of Behavioral Distress (OSBD; Jay, Ozolins, Elliott, & Caldwell, 1983) were used in order to measure the effects of protection variables (e.g. lies, distortion and apologies), authoritative parenting style statements (e.g. praise, empathy, encouragement, checking child status, and reassurance), and authoritarian parenting style statements (e.g. criticism and threats).

Results of gender by language group analyses of variance indicated that English-speaking Hispanic and Asian parents use more empathic and encouraging statements before the procedure begins. No significant correlations within the protection, authoritative parenting style and authoritarian parenting style groups were found. However, positive correlations between parental criticism, reassurance, lies, and distortions and child distress were found. Hispanic and Asian children, regardless of language usage, demonstrated higher distress throughout the medical procedure when their parents used these types of statements. This study has implications for the potential differences in family dynamics and communications during invasive medical procedures.

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Dance

Eileen Mitchell **-see Artistic Performances**

Psychology

Relations Among Maternal Parity, Parenting Stress and Perceptions of Marital Harmony

Brian Morrison
Advisor: Professor Stanley Feldstein

The purpose of the present study is to investigate how parental relationships are affected by maternal parity and the mothers' perceptions of their level of parenting stress. Several studies have evaluated dyadic adjustment after an infant enters the family. Spanier (1976) viewed the parental relationship as a process whereby couples can be evaluated along a continuum based on their proximity to the extremes of good versus poor adjustment. Furthermore, dyadic adjustment is influenced by interpersonal anxieties and by dyadic differences, satisfaction, cohesion, and agreement on matters that are considered important.

The notion that parental dyadic adjustment can be changed as a result of interpersonal anxieties, disagreements, and interpersonal differences lends support to the idea that a new child has the ability to change marital happiness. Russell (197 4) described the onset of parenthood as a time of crisis. She defined crisis as a change in the self, spouse, or in significant relationships that could be described as "bothersome." Other researchers have noted a relationship between mother-infant interactions and marital quality. For instance, Almeida, Wethington, and Chandler (1999) proposed that "negative emotions in one family relationship are likely to transfer to other family relationships" (p. 49). Thus, if a parent has been having negative experiences with a new infant, he or she is likely to have negative experiences with his or her partner as well. Almeida and his colleagues call this phenomenon spillover, which takes place when a mood is transferred from one setting to another.

Previous research has also demonstrated that parity influences mothers' relations with their infants. Moreover, parity has been found to have a main effect on maternal perceptions of marital harmony, with first-time mothers being more likely to report higher levels of marital ambivalence (Fish & Stifter, 1993).

Two hypotheses were tested. One was that mothers of first-born infants report decreased marital harmony. The second was that higher parenting stress is negatively related to marital harmony.

Nineteen mother-infant dyads participated in this study. Infants ranged in age from 11. 7 months to 15.2 months, with a mean age of 12.4 months (SD =. 7 months) and eleven of them were male. During a laboratory visit, mothers and infants were asked to complete a battery of questionnaires. The

questionnaires used for this study were the Parenting Stress Index (PSI) (Loyd & Abidin, 1983), the Dyadic Adjustment Scale (DAS) (Spanier, 1976), and a demographic questionnaire that requested infant gender and parity information. The PSI consists of a parent and a child stress domain. The present study used the total of the two scores.

An hierarchical multiple regression analysis was performed to examine whether maternal parity and parenting stress were separately related to marital harmony and whether they interacted with each other to influence marital harmony. The results yielded nonsignificant findings for both of the main effects of parity and parenting stress, (F, 1, 15) < 1, r_{sp} = .16; $F_{(1,15)}$ = 2.358, r_{sp} = .36, respectively) and for the interaction (F, $_{(1, 15)}$ < 1, r_{sp} = .19).

The results of the study were not consistent with past research. Thus, maternal parity did not affect marital harmony. Moreover, a mother's perception of her marriage was not significantly influenced by her level of parenting stress. However, the effect size (r = .36) between parenting stress and marital harmony is not inconsequential and suggests the possibility that the lack of significance may be attributable to insufficient power.

Biochemistry and Molecular Biology

Cloning and Determination of the Catalytic Activity of the td and nrdD introns in Bacteriophage T4

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HHMI, University of Colorado, Boulder**,** *UMBC
Advisors: Professor Michael Summers, Howard Hughes Medical Institute, UMBC and Thomas Cech, HHMI, University of Colorado, Boulder,

This research aims to clone and determine the catalytic activities of bacteriophage T 4 *td* and *nrdD* self-splicing introns in two ribozyme forms. In one form the 3' end of the intron contains the last guanosine nucleotide (Gω), while in the other form Gω is deleted and the 5' end starts at the internal guide sequence (IGS). Cloning of the latter form was done using Polymerase Chain Reaction (PCR). The introns containing Gω were transcribed with T7 RNA polymerase and purified on 4% polyacrylamide gels. Kinetic studies were conducted on both intron forms using ^{32}P -labeled ("hot") 11-nucleotide substrates. The reactions were triggered by addition either of "hot" substrate or guanosine triphosphate and proceeded for 30sec-60min in 10mM $MgCl_2$, pH 7.5 and at 37°C. Both *td* and *nrdD* introns were successfully cloned in their ribozyme form. The catalytic activity of the td ribozyme was characterized by a Kcat/Km value of $2x10^6$ M^{-1} min^{-1}. The characterized intron will be subjected to crystallization trials with the eventual goal of generating the 3D structure of a complete intron at high resolution using X-ray crystallography.

Political Science

A Study of Maryland's Public Defense System

Melissa Nimit
Advisor: Professor Carol Barner Barry

The Political Science Honors thesis I am writing is about the public defense system, focusing on the felony division of Maryland's Public Defender Office. My intention is to look at the effectiveness of the system in light of the legislation passed by Congress that stipulates provisions for the formation of a public defense system. Specifically, the establishment of a public defender office, the duties of the public defender, who qualifies for the appointment of a public defender, the resources available to aid in public defense, and other major provisions in the legislation. I will determine the effectiveness of Maryland's system by studying how well the felony division of the Office of the Public Defender in Baltimore meets the standards set up in Maryland's public defense legislation, which is Article 27 A of the Annotated Code of Maryland. In order to determine how well the office meets the standards, I will interview attorneys in the felony division and use statistics from the office. I will also analyze the research I have acquired in light of several law review articles on the public defense system, which discuss the perception of public defenders and inherent problems in the system, and suggestions for improvement.

To date, I have completed the background research, namely the history of the public defense in the United States, the major cases that helped form the current judicial standard regarding public defense, the legislation passed by Congress with provisions for a public defense system, and the legislation passed by Maryland with provisions for a public defense system. I have also looked at Congressional Reports to determine the political environment at the time of the passing of the legislation.

Biological Sciences/Immunology

The Effects of HIV Infection on Measles in Zambian Children

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Advisors: Professor Charles Bieberich, UMBC, and Professor William Moss, Johns Hopkins University School of Hygiene and Public Health

Measles kills one million children each year worldwide. The World Health Organization has proposed the goal of measles eradication by 2020, but HIV-infected children may be unrecognized reservoirs of measles virus and hamper eradication efforts. This may be due to lower antibody responses to measles vaccine, more rapid decline in measles antibody levels following vaccination, prolonged shedding of measles virus after natural infection, and absence of rash leading to misdiagnosis. The purpose of our project in Zambia is to characterize the clinical manifestations of measles and the duration of measles virus shedding in hospitalized HIV-infected children, to characterize the effects of measles virus infection on progression of HIV infection (specifically HIV viral load), and to characterize the effect of dual infection with measles and HIV on the immune system. We found that levels of HIV RNA are elevated in the blood after measles, and that immune markers of activation and particular cytokine patterns were exaggerated and prolonged in children co-infected with measles and HIV. These markers remained elevated even after the measles infection had been cleared. We also applied an RT-PCR assay to

determine whether HIV-infected children shed measles virus longer than HIV-uninfected children. The majority of HIV-infected children were shedding measles virus one month after hospital discharge, compared to only half of the HIV-negative children, suggesting that HIV-infected children shed measles virus longer. Co-infection with measles and HIV has significant effects on the immune system and viral replication, and HIV-infected children may be important transmitters of measles virus. The implications of these findings for measles control and eradication must be considered in regions of high HIV prevalence.

Chemistry

Detection of Microsomal P450 Metabolized Xenobiotics by MALDI-TOF Mass Spectrometry with Application of a Binary Phase Extraction

M. Olson and D. Fabris
Advisor: Professor Dan Fabris

MALDI-TOF mass spectrometry1 is capable of providing accurate mass analysis not only for medium and large molecules (in excess of 0.5 MDa molecular weight), but also for relatively small analytes (below 1000 Da). In this work, we describe the use of MALDI-TOF for the detection and mass analysis of metabolites produced by reaction of P450 enzymes on selected substrates, *in vitro*.

Cytochrome P450 enzymes are of significant interest due to their substrate non-selectivity and their roles in substrate activation and inactivation. They are responsible for the metabolism of natural chemical species such as the endogenous steroids progesterone, pregnenolone, ehydroepiandrosterone (DHEA) and oestrone, 2 as well as many xenobiotics. Xenobiotics are typically metabolized or conjugated and excreted in the urine or feces in order to reduce the duration of action in the body, and are of particular interest in the fields of pharmacology and toxicology.

This study investigates the feasibility of detection by MALDI-TOF mass spectrometry of xenobiotic compounds, in particular tamoxifen, an important chemotherapeutic used in breast cancer treatment, and the antihistamines promethazine and diphenhydramine, following their *in vitro* metabolism.

The alternative detection method applied to these compounds avoids the need for radioactive tracers and lengthy separation procedures to monitor the P450 reaction. Other advantages in using this technique are the need for only minimal sample volumes (less than 200 nanoliters) and the ability of making quick analyses. Also, the specificity of mass determination prevents any ambiguity that may arise from the presence of similar chromophoric species in whole microsomal extracts, which include lipids and co-factors for the necessary full enzymatic activity.

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Biological Sciences

Determination of the Role of Transcription Factor *POP-1* in a Putative Wnt Signaling Pathway in *C. Elegans* Vulval Development

Sara Peyrot and David M. Eisenmann
Advisor: Professor David Eisenmann

Multicellular organisms consist of many different cell types, all of the same genotype, originating from one single, undifferentiated cell. We are interested in how extracellular signaling is used during cell fate specification in animal development. As a model, we are investigating a putative Wnt signaling pathway involved in vulval development of the nematode *Caenorabditis elegans*. The vulva develops from six equipotent cells called the vulval precursor cells (VPCs) that make up the vulval equivalence group. Early in larval life, the VPCs are prevented from fusing with the surrounding epithelial syncytium due to their expression of the Hox gene *lin-39*. These six cells can adopt one of three distinct cell fates called 1°, 2°, and 3°. Although equivalent in developmental potential, these six cells invariably adopt the following pattern of fates: 3° /F (fused) 3° 2° 1° 2° 3°. The 1° and 2° cells then divide to generate the vulva. These cells adopt their cell fates via the action of extracellular signaling pathways. Specifically, an inductive signal from the anchor cell of the somatic gonad activates a Ras signaling pathway in one cell to specify the 1° fate. This cell then sends a lateral signal to induce the adoption of the 2° fate by its neighbors through a Notch signaling pathway. Both the Ras and Notch pathways are evolutionarily conserved, used in all animals during development.

Our lab is studying the role of the *bar-1* gene in vulval development. In *bar-1* mutants many of the VPCs adopt non-vulval, fused (F) fates. *bar-1* encodes a beta-catenin homolog and is required for LIN-39 expression in the VPCs. Beta-catenin proteins function in cell adhesion and are known components of the Wnt extracellular signaling pathway, another evolutionarily conserved pathway used during animal development.

Our hypothesis is that bar-1, as a beta-catenin homolog, functions in the VPCs through a previously unidentified Wnt signaling pathway to activate vulval genes. To test this we are identifying other known Wnt pathway components active in the VPCs. One such component is pop-1, which functions in Wnt signaling during embryonic development. *Pop-1* encodes a T-cell specific transcription factor (TCF) homolog, and TCF proteins are known to activate target genes in a Wnt-dependent manner. Without Wnt signal, TCF represses target genes; with signal, the N-terminus of TCF interacts with 8-catenin to activate transcription of target genes.

A variety of different techniques to test for *pop-1* function in vulval development has yielded negative results. First, by two different methods of antibody staining, we have failed to detect POP-1 in the VPCs at the time of vulval induction. Second, microinjections (performed by D. Eisenmann) of antisense (loss-of-function) and N-terminus deletion (dominant negative) *pop-1* constructs produced stable mutant lines, but they lack an obvious vulval mutant phenotype. Third, RNAi, a procedure which has been shown to knock out gene function by the introduction of double-stranded RNA, produced no obvious vulval mutant phenotype when early LI stage worms were soaked in a range of pop-1 dsRNA concentrations.

These results suggest that although pop-1 functions in another known Wnt signaling pathway in C. elegans development, it is unlikely to function in the putative Wnt signaling pathway involved in vulval development.

Chemical Engineering

Effect of Shear Stress on *Staphylococcus aureus* Becker Adhesion to Collagen

Kendra Sarratt
Advisor: Professor Julia Ross

Staphylococcus aureus is a major cause of hospital-acquired infections. *S. aureus* infections are becoming incurable, as many of these strains are becoming resistant to antibiotics. In an effort to prevent bacterial infections, which can lead to such diseases as endocarditis and osteomyelitis, this research studies *S. aureus* adhesion to collagen Type II. This study specifically focuses on the clinically isolated strain, *S. aureus* Becker. According to previous research, this strain is believed to be less pathogenic than other strains since it exhibits low levels of specific binding under static conditions. This research tests the adhesion of the strain to collagen Type II under low and high shear stresses, utilizing a parallel plate flow chamber and video microscopy system with digital imaging processing. Using this system allows for visualization and quantification of cells adhering to the collagen surface, which will characterize the effect of shear stress on *S. aureus* Becker and its attachment kinetics to collagen. In these experiments, the adhesion of *S. aureus* will be compared to two controls, *S. aureus* Phillips, another clinically isolated strain and *S. aureus* Phillips (PH100), a deficient strain that does not exhibit firm adhesion to collagen. Since *S. aureus* Becker is considered a low binder, it is hypothesized that it will not firmly adhere to the collagen surface at any of the shear stresses.

Biological Sciences

Factors Affecting Competitive Exclusion in Mixed Cultures of Paramecium spp.

Keith Simmons, Jr. and Wayne Stark, Jr.
Advisor: Professor Lark Claassen

The biological principle of competitive exclusion was established based on the observations of the interactions between two species from the genus *Paramecium-a* genus of fresh water protists. In his classic 1934 experiments, G. F. Gauss showed that when cultured together, one of the species would "exclude" the other. However, students in the Biology 100L class at UMBC have been unsuccessful at replicating his results. While Gauss' experiments showed a perfect exponential curve for the two species grown in isolation, and gradual competitive exclusion when the two species are mixed together, when this was repeated in Dr. Claassen's class, the results have been highly variable with each attempt.

An examination was completed on whether either or both of two factors could explain the differing results: 1) the presence of another contaminating species in the commercial inoculum, and 2) any of the deviations from the original Gauss protocol that were adopted in order to adapt his experiment to a classroom exercise. The kinetics of population growth of two species-*Paramecium tetraaurelia* and *Paramecium caudatum*-were compared. The species were cultured separately and in combination, before and after extensively purifying the stocks from contaminating co-cultured organisms, and with and without replacing the media (as in the original Gauss protocol). While none of these modifications to the class procedure alone were successful at repeating Gauss' results, evidence is shown that each species differs in its sensitivity to the changes in either factor.

Chemistry & Biochemistry

Investigation into the Nature of Cooperative Binding Affinity Exhibited by Bacteriophage T4 Gene 32 Protein

Chenwei Wang
Advisor: Professor Richard L. Karpel

Bacteriophage T4 gene 32 Protein has been a model for studying single-strand specific nucleic acid binding proteins for over three decades. This project is designed to examine the effect of certain mutations on the DNA binding behavior of the protein, specifically with respect to the cooperativity of binding to single stranded DNA.

Wild type gene 32 protein contains three domains: N-terminal domain, central (core) domain, and C-terminal domain. Previous experiments have indicated that the interaction between core domain and C-domain plays a critical role in the helix-destabilizing activities of the protein. It suggests that the C-terminal creates a kinetic barrier to natural DNA helix destabilization.

In this project, we are identifying the binding region within the core domain responsible for the protein's cooperativity. Then by deleting various portions of this region, we are trying to determine its importance in protein-protein interaction at molecular level.

For locating the essential binding surface, a series of mutagenic experiments and protein techniques are performed. These approaches include:

1) oligonucleotide mediated site-directed mutagenesis

2) restriction endonuclease analysis

3) DNA sequencing

4) vector subcloning

5) vector transformation

6) induced gene expression

7) protein purification

8) protein solubility assay

In addition to the methods above, various physical chemistry experiments, such as DNA melting assay and fluorescence quenching analysis, are used to determine the binding activities of the region.

Two truncated mutants (at residue 201 and 216 in the C-terminal domain) of the protein have been successfully obtained and studied, and the data suggest that these two truncated forms are insoluble in water. The third truncation at residue 227 is in progress.

If the third mutant is insoluble in water, it will suggest that the deleted residues are related to the solubility of the protein. Then, various approaches will be carried out to solubilize the mutants in aqueous solution, and a series of fluorescence quenching analyses will be performed in order to determine the effect of the mutation on cooperativity. The binding mode is indicated by the shape of

the binding isotherm, namely sigmodal for cooperative binding, and hyperbolic for non-cooperative binding.

Social Work

Geriatric Social Work: Assessing Student, Agency, and Educational Needs

Michael Wright
Advisor: Professor Nancy Poe Wingfield

By the year 2030, 20% of the U.S. population will be elderly. Labor force projections suggest that the demand for gerontologically trained social workers can reach 60,000 to 70,000 by the year 2010 (Greene et al., 1990). Yet, only 10% of social work students take a gerontology course (Damon-Rodriguez et al., 1996). Of particular concern is the virtual absence of content on aging in undergraduate programs of social work, whose graduates are most likely to be in positions of providing direct services to older persons in human service and social agencies (Lubeen et al., 1992).

This presentation explores the current state of geriatric social work preparation/education from the dual perspective of University of Maryland, Baltimore County social work student interns and social service agencies that serve elderly clientele in Baltimore City. The focus of the research is to assess the components that comprise "gerontological competence" in social work education and practice, a professional standard currently being explored by SAGE-SW, an initiative of the National Council on Social Work Education.

Past research has been carried out under a dichotomy, focusing on either of two realms: curriculum or practice. This study bridges that dichotomy by focusing on student interns in BSW-level field placements, with the premise that such interns and their field instructors occupy unique positions in the academic/practice nexus and are particularly situated to identify salient issues related to building gerontological competence in undergraduate social work programs.

Data are being collected via questionnaires and in depth interviews with student interns performing field placements in geriatric settings. In addition, job descriptions were gathered from Baltimore area social service agencies serving older adult clientele. The data are being analyzed using content analysis and open coding to determine whether- and how-the requirements of agencies are congruent with that of the preparation and experiences of undergraduate social workers in direct service to elders.

Preliminary findings indicate geriatric social work as a "pioneer"" field, rife with questions and disagreements about what constitutes "best practices" and "competence." Implications for curriculum and instructional innovation are discussed.

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Geography and Environmental Systems

Applied Biogeography: Modeling and Monitoring the Occurrence of Lyme Disease in Baltimore County and City

Daniel Zimble
Advisors: Professor Kenneth R. Young and Professor Tim Foresman

With new and reemerging health threats, such as viral and bacterial vector-borne diseases, a need has been identified to provide to the public, information that can help identify risk areas for various vector-borne diseases. One such example is in developing applications that analyze and disseminate information related to the occurrence of Lyme disease. A project was initiated to investigate the potential benefits of collecting, analyzing and disseminating spatial information related to Lyme disease through the utilization of spatial information technologies; notably geographic information systems (GIS), remote sensing (RS), and geographic positioning systems (GPS) for the Baltimore County and City areas.

A multidisciplinary approach to monitoring and analyzing Lyme disease in both Baltimore County and City can be accomplished by combining and analyzing epidemiological and other environmental data with the use of technologies such as GIS and RS systems. These systems will be used to incorporate ecological/habitat data (derived through remotely sensed imagery) and epidemiological data with other environmental data to display spatially related information to the occurrence of Lyme disease. This information can then be analyzed through basic spatial analysis techniques, such as query and overlay procedures to determine areas likely to contain Lyme disease. Once compiled, this data may then be displayed through the World Wide Web using internet map serving (IMS) technologies that can provide wider access to information related to the occurrence of Lyme disease.

Many private and public organizations are currently funding research related to analyzing the occurrence of diseases spatially using these technologies (see URL below). It is anticipated by many that future developments in this arena will foster better decision-making tools that will be used to better understand the complex patterns and processes associated with infectious vector-borne diseases. Visit http://geo.arc.nasa.gov/sge/health/chaart.html for more information.

ARTISTIC PERFORMANCES

Music

Cantata, Tircis et Climéne, for soprano, baritone, flute, and continuo
Michel Pignolet de Monteclair (1667-1737)

UMBC Department of Music Collegium musicum: Baroque Ensemble No. 2

Kassie Baldwin, soprano; *Gregory Lazzaro*, baritone; *Rebecca Metheny*, flute; *Karen Froehly*, harpsichord
Advisor: Professor Joseph C. Morin

Michel Pignolet de Monteclair's *Tircis et Climéne* is exemplary of vocal compositions from the first half of the eighteenth century representing the culmination of French secular cantata. This cantata is a form of chamber music that presents a narrative text on unrequited love as expressed through Greek or Roman myth or history. The sections of text that convey the story-line are set in recitative- a half-sung, half-spoken form of song-while sections of text that portray emotional reaction to the story's action are sung as melodious airs. The vocalist is supported by a small instrumental ensemble. This work is somewhat more complex than the typical cantata in that it features two voices that not only sing individually, but combine in duets as well. While the performance of cantatas was non-theatrical and generally intended for presentation in a chamber or salon before a small audience, this work lies closer to opera. Not only does it contain an 'operatic' recitative in which both characters engage in dialogue, but its airs also feature instrumental introductions, interludes and conclusions which establish a musical mood or atmosphere- a concept related to the 'descriptive symphonies' of the French *Jyrique tragédie*.

Text

Air á deux:	On these fertile banks, Jet us lead our flocks. Row peaceful waves sing, happy birds.
Air (Tircis):	Here the sun and the dawn enrich us through their gifts. And they make the fruits, flowers, and harvest blossom for us.
Air (Climéme):	We flee from artifice and deception. Our hearts shine in our eyes, and the freshness of our complexions is due to nature herself.
Recit a deux:	How happy we might be in so beautiful a setting if Love were not troubling its charms. Whence come these unjust alarms, Shepherd: Can you complain of Love? No, I do not complain at all of his sweet bondage. He has made you tender and I believe in your vow. But you treat my passion as mere banter; I always sigh while you laugh incessantly.
Air (Tircis):	Languishing passion, enchanting sighs, fill our souls with your flattering charms. The empire of Love would languish without you. When one sighs, Love is sweet.
Recit (Climéme):	Oh! Why sigh when the favoring Gods have enchained our hearts with the most pleasant bonds? Sighs, cares, and languors are made for those whom Love has rendered miserable.
Air (Climéme):	Somber sadness frightens Love. Let us love without ceasing, but Jet us laugh

always. The anger of Aeolus chases off the Zephyrs and Love flies away when pleasures fade.

Recit (Tircis): If Love can please you only at this price, I consent to love you, what have you better to do than to live happy under his law?

Air á deux: Flee vain fancies, sad languors, vexing boredom. Tender pleasures, pleasant games, take care to seal our bonds.

Translation after James R. Anthony and Diran Akmahian

Notes on the Ensemble:
Among its many activities, the UMBC *Collegium Musicum* provides intensive study of Baroquestyle music. By working in this small ensemble, students are able to develop a solid foundation for their musicianship and knowledge of the Baroque period. The small size of the ensemble provides an intimate environment for the students to learn from each other and sharpen their individual skills, as well as receive direct feedback from expert faculty members. It also allows the student an opportunity to explore a type of music that they are not exposed to otherwise, to study foreign languages, vocal, and instrumental styles unique to the Medieval/Renaissance/Baroque periods. The students in the ensemble gain a sense of accomplishment when they are able to perform a polished, finished product.

Theatre

pinklinetunnelvision: Collaborative Process Drama Functions as a Tool of Feminist Pedagogy

Kristin Harrison
Advisor: Professor Alan Kreizenbeck

How can a group of theatre practitioners inspire audience members to assess and subvert gender oppression in their lives? Drama theorist, Augusto Boal proposes that social oppression may be questioned under the artistic microscope of The Forum Theatre. In it, oppressive social situations are extracted from ordinary life and played out on the stage. Instead of simply watching the action, audience members replace actors to role-play new responses to familiar oppressive circumstances.

pinklinetunnelvision entitles the collaborative piece of Forum Theatre that the Distilled Theatre Collective presented in November 1999. But the process to create the work began some months before. In order to create a Forum Theatre that would speak to the forms of gender oppression experienced by the peers of the theatre group,[1] the group culled their own lives for examples of gender oppression.

A process developed whereby a real-life experience could be distilled into a scene for the theatre. The group realized an egalitarian organizational structure that facilitated open discussion of emotionally sensitive topics. Sparked by these discussions, members brought in stories of gender oppression and sexual harassment they had experienced. Improvisational drama techniques, synthesized from Zaporah, Wirth, and Boal, developed the stories to a theatrical aesthetic. Then, group members used creative writing techniques to completely transfer the ownership of the experiences from the real world to the artistic and malleable world of the Forum Theatre.

After the second performance, the group held a feedback session for audience response. That discussion

and other informal discussions elicited qualitative findings to the question of whether theatre can inspire its audience to assess and subvert gender oppression. Men who participated in the Forum Theatre felt that the socially therapeutic nature of the role-playing made them more sensitive to occurrences of sexual harassment in their daily lives. Whether having participated in the Forum or not, women under thirty responded to pinklinetunnelvision, saying the Forum Theatre had made them consider gender oppression within certain social situations with a new perspective.

Overall, the Feminist Pedagogy, within this context of Forum Theatre, was successful because the target audience, who was the same age, race, and sex as the majority of the theatre group, did experience social learning; and this learning may inspire social change.

Though the process to create pinklinetunnelvision included readings and discussions about the matrix of oppression, where gender, class, race, ability and age intersect to form complex power relations in social interactions, the group really only addressed gender oppression. A future attempt to assess and subvert gender oppression through collaborative process theatre would attempt to dismantle all of these matrices. This alteration would adjust the racial, sexual and age composites of both actors and audiences in combinations relevant to progressive sociological, feminist and drama theories, to affect a truly profound psychosocial change.

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[1] Participants were: 8 Caucasian Females; 1 African American Female; 5 Caucasian Males; 1 African American Male.

Music

Cantata, Europe, for tenor, flute, and continuo

Michel Pignolet de Monteclair (1667-1737)
UMBC Department of Music *Collegium musicum*: Baroque Ensemble No 1.
Mark Lemnah, soprano; *Rebecca Metheny*, flute; *Stewart S. Seiple*, harpsichord
Advisor: Professor Joseph C. Morin

Monteclair's cantata, Europe, exemplifies the refined vocal chamber music centered at the heart of the

Parisian high society in the opening decades of the eighteenth century. Developed in early seventeenth-century Italy, the cantata is a form of chamber music that presents a narrative text on lyric, dramatic, or religious topics, although most often it concerns unrequited love. The sections of text that convey the story-line are cast in recitative-a half-sung, half-spoken form of song-while sections of text that depict emotional reaction to the story's action are sung as melodious airs . Featuring a voice supported by a small instrumental ensemble, performance was non-theatrical and generally intended for presentation in a chamber or salon before a small audience. The genre was embraced by French composers and audiences at the dawn of the eighteenth century, and becomes the chief genre for vocal chamber music.

As with Monteclair's other cantatas, Europe draws on Roman myth: Jupiter's love for the nymph Europe, who first rebuffs and then woos the 'king of Gods,' demonstrates that majesty and love cannot be reconciled.

Text

Recit: Europe had wounded the heart of Jupiter. To allay his passion, the sovereign king of the Gods sends his son Mercury to pass over the fields of Sidon and drive the flocks to the sea.

Air: Leaving his glory and thunder Jupiter descends to the earth. The flame that Love has just kindled in his heart has transformed him into a bull. To his supreme rank he prefers to state to which his passion has reduced him, which one does not do except when in love to become happy.

Recit: Already the god bounds over the grass. The whiteness of his superb brow, the beauty of his body and the fire in is eyes attract all attention of the Nymphs in their places. They are eager to adorn him with flowers, and with her beautiful hands Europe caresses him, she mounts his back, and the lover bearing his mistress runs and hurls himself into the waves.

Air: Tender love, fly over the waves, flee noisy tyrants of the air; come out deities of the sea in honor of the master of the world, make your harmonies resound. Sing, Tritons and Nereids, celebrate the object of his passion.

Recit: Jupiter reaches the shores of Crete. He resumes his august features; he appears as he really is, seated on the clouds. "For you, for your divine attributes, Europe, I have forsaken the abode of my glory." The Nymph, ceding him the victory of her heart, put an end to her regrets, dries her sad tears.

Air: Demigods who desire to please, cast off your grandeur. The severest Nymph will soften your sternness. Love and majesty cannot be reconciled together; Love would have us resemble him, have his simplicity.

Translation after James R. Anthony and Diran Akmahian

Notes on the Process of Performance:

Monteclair's French Baroque cantata Europe presents both scholastic and technical challenges for the performers. The process of learning a piece of music (with the goal being performance) is one involving many steps. For the singer, the process begins (learning the notes being a given) by addressing the language of the piece. In this step, the issues of the text's pronunciation and meaning are looked at. For this piece, the issue of pronunciation is one of great import because it is unfamiliar. Add to that the task

of arriving at the text's meaning (derived from both translation and some educated guess work-some of the language is no longer common) and the first step is complete. Another step in this process is being able to utilize one's technique to convincingly portray not only the text's meaning (to an audience made up largely of people not familiar with the language), but the elements of the music separate from the text. To execute successfully the melismatic passages and ornamentation required of music composed in this time period, a solid technique is necessary. A third element is the broader historical context that the cantata resides in. With this piece, the historical context being the Humanistic movement sweeping Western Europe during this time (as evidenced by the many allusions to Antiquity and its mythology). With all of these elements in place (and many others), one is closer to a successful execution of the music.

Dance

Skin Is Burning originally choreographed by Ballet Magnificat! (1998)

Eileen Mitchell
Advisor: Professor Doug Hamby

Last summer, with great thanks to God and UMBC's Office of the Provost, I was able to attend a summer dance intensive workshop at Ballet Magnificat! of Jackson, MS, that equally enhanced my dance training and enlightened my spiritual walk. During the four weeks I danced six hours a day, five days a week in various classes including ballet, pointe, pas de deux, jazz, modern, repertory, and improvisation. My goal upon returning was to create a dance reflecting the new insights and styles of movement I learned. Ballet Magnificat's Skin Is Burning is a choreographic challenge of modern-jazz dance, emulating the individual battle of good vs. evil that is warring in every person's mind. Developed by a member of Ballet Magnificat!'s professional touring company, the dance energetically moved to a Latin flavor of the Christian band Burlap to Cashmere. The dance took its name directly from the song title and took its shape through interpretation of the poetic song lyrics. During the first minute of the piece, the music is slow and the solo dancer contemplates her state of aloneness as inner turmoil rages within her. Then the lyrical movement fires up as the good, or the spirit of the person, gets to face and fight the bad, or flesh of the person. In this duet the audience is exposed to the idea of one human soul struggling against itself; for a few moments the spiritual realm becomes visible. As an audience member, I was enthralled by the collaboration of advanced technical dancing and true expressive movement working together. This piece only represents a single dance from one of the company's many thematic collections of contemporary dance. As one of few inter-denominational dance ministries, this unique establishment has grown considerably from its start in 1985. Although the influence of biblical and religious themes can commonly be found all throughout dance history and as an undeniable part of ancient civilization worship, Ballet Magnificat! has shown exceptional strides in bringing liturgical expression into the level of renowned dance artistry today. The director, Kathy Thibodeaux, was principle dancer for Ballet Mississippi when she felt lead to create a company for the sole purpose of praising God through dance. Her newfound faith gave her the courage to back out of the world's spotlight and step into God's plan for her to use dance as a facet to share the ultimate message of love as told in the Bible.

To intertwine the physical discipline of dance with the spiritual discipline of devotion to God, I reconstructed Skin Is Burning with the desire of shrinking the gap between: the choreography and the emotion, the choreographer and the dancer, and between the audience and the dancer. My rendition consists of three couples, along with one spirit and one flesh dancing the parts alone. This shows that the inner struggle is both universal and individual. I also added some of my own choreography, while

deleting portions of the original in order to experiment with my own thematic ideas and choreographic manipulations. From the beginning, I conducted my rehearsals unlike any ordinary dance practice. First of all, we began every rehearsal with prayer and a time to share past or present experiences of when our "Skin [has or is] burning with the fire of the world". Each dancer told a different experience, from a different perspective and from a different spiritual place, but all could relate to the wide spectrum of emotions common to all humans. After breaking the dance down into several short phrases and rehearsed technical aspects of the choreography, I worked with the dancers to incorporate their own experiences and emotions into the actual movements. The introduction to the musical section of the dance I created myself. You see a man fighting, yet nobody else is there. Then the rest of the dancers enter, each in their own fit of different emotions. All come together in the same fire, which burns faster and faster out of control. The vocal overlay for this section I assembled from each dancers' own interpretations of the lyrics and their testimonies of personal inner battles. Four of the dancers then simultaneously read aloud and recorded these testimonies in chaos, to resemble the constant fury of thoughts wrestling in one's mind.

My reconstructed work was already performed in its entirety last semester in UMBC's Dance Department Performance. For the Undergraduate Research and Creative Achievement Day I will present both a video of last semester's performance and a live excerpt from the dance. My prayer is that each viewer will not only enjoy the artistry of the performance, but delve deeper into what the dance as a whole is speaking to them. Afterwards, I will certainly be free for any comments or questions concerning the performance, Ballet Magnificat!, or my personal faith. Be sure to keep a watch out for upcoming student dance concerts to see the progression of my future choreography and performance, as well as works of other talented dance majors.

"Praise the Lord With Dancing!" - Psalm 149:3

ARTISTIC EXHIBITS
Visual Arts: Studio, Art History and Theory
Nidhi Adya **-see Oral Presentations**

Film
Reflections an AKB Film
(13 minutes 16mm B/W Reversal with final VHS format)
Adrian Britton
Advisor: Professor Mark Street

One autumn Saturday afternoon thirteen UMBC students of differing backgrounds gathered in a living room set up in Patapsco State Park. With sofas and libations, in a relaxed and calming environment, they met to discuss interpersonal communication and the hesitations each have with opening up to others.

This conversation never occurred.

Reflections is the nostalgic recreation of events based on several types of visual and aural media recorded during the event, and over three hours of participant interviews recorded afterwards. The intermingling of the recorded goings-on and the post-happening commentary provide a multifaceted glimpse of the afternoon, allowing one to discern for oneself the success of the endeavor.

Reflections attempted to expose the narrative nature of traditional documentary film by blatantly creating the event to be documented, rather than feigning objectivity while influencing and affecting "actual" events. The film also strove to shatter the omniscient role of the voiceover by presenting multiple guides through the event, allowing the viewer to sink into the multi-layered soundscape at will. Reflections was concerned with presenting a specific event's multiple realities, including the differing views and accounts of this shared happening. The afternoon opened in a free-flowing and spontaneous manner to avoid locking into one driving and manipulative thesis, which would then influence the event's unfolding.

Reflections strove to present more than one way to "see" what happened that afternoon. The filmmaker captured the feel of the surroundings, recording the look and sound of the natural environment, but the actual documentation of the event was undertaken by five of the participants utilizing Bolex and Arri-S movie cameras, as well as several still photography cameras.

The film itself consists of five chapters:
• Part one introduces the surrounding area in which the happening occurs.
• Part two introduces the participants and in what ways they classify themselves.
• Part three discusses the set-up of the environment and the happening, itself.
• Part four meditates on the conversation that ensued with the recorded conversation and the participants' thoughts about it.
• Part five discusses the process and execution of the happening, as well as comments on the success or failure of the afternoon.

Although the conversation fails to occur, the film succeeds in documenting participant hesitations in

interpersonal communication and fears of opening up to others. By finding a thesis in the documentation, rather than documenting the thesis, Reflections asks the viewer to become an active participant in the film's questioning, rather than a passive observer of a succinct story.

Film

... Fells Point '99

Isaac Cynkar
Advisor: Professor Mark Street

We all inhabit a 'space'. For some, space is merely a location, a place to attend to daily functions. Others view their space as a definitional aspect of who they are, an extension of their identity. A few fortunate people are able to reinterpret and redefine their surroundings with enough regularity to develop a deeper understanding of 'where' they are. For them, location isn't simply geographic, it's something more essential.

Enter C.T. Newton, longtime Baltimore resident and self-defined 'picture painter'. Newton has been painting for over 40 years and many of his sketches and paintings (approx. 9,000 to date) focus on the neighborhood of Fells Point, a space the filmmaker has also inhabited for the last five years. Newton's renderings of this small community on the harbor comprise a history that spans several decades. His observations aren't just personally relevant, they are 'documents' in the truest sense of the word. The resulting images, although created by one individual with an eye towards his market, are an honest representation of a specific place and time.

This film uses footage of Newton's work, his observations and those of Chuck Cephas, another longtime resident; commentator intercut with images of daily life. Ideally the viewer will leave with a fuller understanding of the significance of one space on the two men, each using a different medium to express it. The tension between observer and participant, between 'local' and 'tourist' is apparent in the popular saying, "Welcome to Fells Point ... now go home." Beneath that however, is a sense of identity, an appreciation, and a relationship to 'space' that is worth exploring.

Imaging and Digital Arts

Cedar Park 300 Years after the Digital Reconstruction of a Historical Structure

Bette Lawhon
Advisor: Professor Steve Bradley
Animation Still, 3D Model

Digital modeling and animations using LightWave and Director 7 are utilized to illustrate and support archeological research by archeologists, architectural historians, and material culture experts at Cedar Park. Cedar Park is one of the oldest and best surviving examples of earth-fast architecture on the east coast. The purpose of this study explores how art, archeology and computer technology can be used to enhance and illustrate historical interpretation.

This project will demonstrate how digital reconstruction is a key factor in making the enhanced study of Cedar Park possible, in relation to the most visually intriguing and problematic aspect of Cedar Park: the

original 300 year old structure cannot be seen because it is now encased between the walls of later buildings built around it.

Analysis of architectural field drawings as well as videotaped footage of what archeologists refer to as a "field check" of Cedar Park were used to collect and formulate data. Consultations with architectural historians provided the guidelines and goals for the imaging of the Cedar Park. Developing creative and artistic techniques using software such as LightWave, Director 7, and Photoshop to engage the imagination of the viewer were an integral part of the process.

Visual Arts: Studio, Art History and Theory

Joy McClure **-see Oral Presentations**

Film

"YOGI" Documentary

Gabriel Torres
Professor: Mark Street

YOGI is a documentary which explores how a child with a disability interacts with the world around him. The film began as a study of the inclusion program within the Maryland-National Capital Park and Planning Commission, but slowly evolved into a deeper study of one individual child within the program. The child's name is Yogi. As a participant of the inclusion program of M-NCPPC, Yogi learns how to interact with other children who do not have disabilities. This program is meant to work for both types of children. First, it helps Yogi interact with others on a daily basis. It also helps the children around Yogi to become educated about what it means to have a disability. The ultimate goal of the program is to eliminate the differences between the children. Yogi should be treated as a peer by all of the children in the program and he should feel comfortable being himself. This documentary helps the audience slowly delve into the world of Yogi until they are completely immersed by it, giving them a small glimpse as to what it feels like to be a part of the inclusion program.