2006-2007 Undergraduate Research Award Scholars
Statements of Specific Aim(s), Purpose, or Goal(s)

Haroon Ahmad, Biochemistry
"Determination of the Structure of *Salmonella typhimurium* Membrane Derived Oligosaccharides"
Faculty Mentor: Dr. C. Allen Bush, Department of Chemistry and Biochemistry
Expected Graduation Date: Spring 2007

The bacterium *Salmonella typhimurium*, a cause of food poisoning in humans, has been a subject of study for many years now. Like most other Gram-negative bacteria, large amounts of membrane derived oligosaccharides (MDOs) are found in the bacterium's periplasmic space. The purposes of these oligosaccharides vary, some provide structural support, some aid in the opening and closing of porins, and others are unknown. Preliminary research has shown that the Salmonella MDO is composed of many different monosaccharide subunits, as opposed to the glucans (containing glucose only) found in most other bacterial periplasmic spaces. The structures of some bacterial MDOs have been identified, including those of E. coli, E. chrysanthemi (plant pathogen), and a few others. Through NMR, HPLC, and HPAE spectra, the aim of this project is to determine the size, composition, and structure of the Salmonella MDO.

Mya D. Ajanku, Dance and Education
"Study and Analysis of Dances of Africa's Ivory Coast"
Faculty Mentor: Professor Carol Hess, Department of Dance
Expected Graduation Date: May 2008

This research project will focus on the study, analysis and performance of cultural dance practices specific to Africa's Ivory Coast. In January of 2006, I was invited to join *Afric-Agba'de,'*a traditional West African dance company, on their tour of the Ivory Coast which will take place in August. The company is made-up of artists from Maryland, Washington, D.C., Florida and the Ivory Coast - all hand chosen for their specific talent. It is an honour to be a part of this special group of dancers. In August, the company will take a two-week sojourn to the Ivory Coast, to study and perform with companies and villages native to the Ivory Coast. This could be a once-in-a-lifetime opportunity for me to study and to document dances that I have not previously studied. I will be able to observe and participate in indigenous cultures in their natural environment. Because some of the dances are performed only in the village, I will gain knowledge and experience that would be for me to obtain in America.

Megan B. Anders, Psychology
"Effects of Culture on Violence Acceptance and the Effectivenes of the Abused Persons Program (APP) of Montgomery County's Victim Empowerment Group"
Faculty Mentor: Dr. Laura Ting, Department of Social Work

Expected Graduation Date: Spring 2007

The goal of this study is to explore whether women who come from cultures in which domestic violence is generally tolerated will share such beliefs and have more difficulty accepting help. The purpose is to determine the effectiveness of a six session Victim Empowerment Group on abused women from various cultural backgrounds. The specific aims are to prove the following hypotheses: 1) Women from cultures/countries with high rates of domestic violence will have greater acceptance of violence against women. 2) Women from cultures/countries with high rates of domestic violence will find the Victim Empowerment Group less helpful.

William Becker (Billy), Bio-Chemical Engineering
"Developing a Platform to be used for the Detection of Beta Amyloid Protein, a Protein Associated with the Development of Senile Plaques Found in Alzheimer's Disease"
Faculty Mentor: Dr. Theresa Good, Department of Bio-Chemical Engineering
Expected Graduation Date: May 2008

Currently, there are no diagnostics available for use in Alzheimer's disease prior to the death of the individual. Many people are investigating the development of different in vivo imaging and in vitro diagnostics that would enable the definitive pre-mortem diagnosis of the disease. While there are many possible markers for the disease, one protein that has been consistently associated with progression of Alzheimer's disease is beta amyloid. Beta amyloid is a 40 to 42 amino acid protein whose production and aggregation has been linked to different forms of Alzheimer's disease. The goal of this research is to create a platform able to specifically detect beta amyloid pre-mortem.

Jonathan Bryant, Biochemistry
"Structural Study of RFX5 Dimerization Domain"
Faculty Mentor: Dr. Colin Garvie, Department of Biochemistry
Expected Graduation Date: May 2008

MHCII molecules are required to initiate immune responses against bacterial infections in mammals. The production of the MHCII molecules is regulated by a cell-specific multi-protein complex. The regulatory factor X5 protein (RFX5) is the key DNA binding protein that initiates formation of this complex. Little is known about the structure of the domains of RFX5, yet previous studies in the Garvie lab have identified a 165 amino acid region of RFX5 that comprises the dimerization domain. However, this domain did not provide crystals that were suitable for solving the crystal structure of the dimerization domain. Previous studies have shown that crystallization of small protein domains can be induced by crystallizing the domain fused to the maltose binding protein (MBP). We hypothesize that the dimerization domain of RFX5 will crystallize as a fusion protein with MBP. To address this hypothesis, I intend to express and purify the MBP-dimerization domain fusion protein, confirm that it forms a dimer, and then

perform crystallization trials. Crystals obtained will be used to solve the structure of the dimerization domain by X-ray crystallographic methods. This information will help our understanding of RFX5's role as part of the regulation complex, as well as provide a further understanding of protein-protein interactions between the proteins that regulate MHCII production.

Irene Colorado, Visual Arts-Animation
"Body"
Faculty Mentor: Professor Cathy Cook, Department of Visual Arts -- Film/Video
Expected Graduation Date: Spring 2006

The goal of this project is to create a rotoscoped animated film approximately 6 minutes in length that will allow me to analyze human anatomy and show a mastery of live-action human movement through the study of dance. To produce this I will be collaborating with dancers, as well as an actress to explore the aesthetics of the movement our bodies are capable of. I plan to work with a student from the Music Department at UMBC to compose an organic and instrumental soundtrack. As a junior in the animation track of the Visual Arts major, I have gained experience in timing, organization, and software packages for animation. However, there are other important skills I would like to acquire to succeed in the world of animation. Through this venture I will be exploring and gaining knowledge about anatomy, movement, acting, and dance. For example, choreographing the dance will give me the opportunity to investigate both the abilities and limitations of human physical movements. I look forward to collaborating with Dance and Music majors, something I would like to do more of in the future.

Sumita Das, Information Systems
"Improving Software Maintenance through Better Documentation"
Faculty Mentors: Dr. Wayne Lutters and Dr. Carolyn Seaman, Department of Information Systems
Expected Graduation Date: Fall 2006

Finding and using software documentation has long been a challenge in supporting (modifying, enhancing, adapting) operational software. Time, money, and human resources are often wasted in creating documentation that is not helpful to software maintainers. These resources can be used more efficiently if we are able to identify what types of documentation are useful during the maintenance process. The purpose of this study is to better understand the sources of information that are helpful when maintaining software and to identify practices in using these resources. Our goal is to make documentation a more dependable and valuable source of information during the maintenance process.

Jenélle Dowling, Biological Sciences

"Field Research on Female Streak-Backed Oriole Behavior: Why Are Females as Brightly Colored as Males?"
Faculty Mentor: Dr. Kevin Omland, Department of Biological Sciences
Expected Graduation Date: May 2007

Over the last few decades, biologists have been intrigued by color variation of birds in different geographic regions. A sharp contrast exists between birds that live in northern latitudes and those living in southern latitudes. In many cases, northern species have bright males and dull females, whereas both sexes of southern species often have bright plumage. One species that exhibits bright coloration in both sexes is the Streak-backed Oriole of Mexico (*Icterus pustulatus*). In the summer of 2006, I will join a project to study the coloration of the Streak-backed Oriole in Mexico, where I will collect behavioral information on this tropical oriole species. The project will focus on testing two prominent hypotheses for the purpose of bright female coloration in tropical species. This project closely parallels the previous behavioral work that I have conducted with two northern oriole species that breed on UMBC's campus. Completion of this current project will allow me to make temperate/tropical behavior comparisons. Overall, this research will contribute significantly to our understanding of the function of bright female coloration in birds. This project will take place in Morelos, Mexico within the Sierra de Huautla Biosphere Reserve. The research will be conducted over approximately three months between May and August of 2006.

Jessie Dulaney, Theatre
"Acting from a Musical Approach"
Faculty Mentor: Professor Colette Searls, Department of Theatre
Expected Graduation Date: Spring 2007

As a Theatre major pursuing a Bachelor of Fine Arts in Acting degree, I have found enjoyment in many types of drama and theatre, but the interest I have for musical theatre does not compare. This research will help me to explore the discipline of musical theatre at one of these three training programs: Manhattan School of Music, Collaborative Arts Project 21, or Circle in the Square Theatre School. The Manhattan School of Music Professional Musical Theatre Workshop features classes in song and scene preparation, dance and movement, audition technique, career management, and individual vocal and dramatic coaching. The Collaborative Arts Project Professional Musical Theatre Training Program offers most of the same courses with an addition of musical theory and a full dance program. The Circle in the Square Summer Musical Workshop also offers those courses along with classical text analysis, speech, and physical acting. All of these workshops are located in New York City which is the best resource for an actor. While in New York City I can become familiar with directors, producers, and casting agents while appreciating the great theatre the city has to offer. With the new skills I gain in musical theatre, I will become more ready for my career field and find a new enthusiasm for my art.

Lisa Fecteau, Dance
"Expanding My Horizons: Summer Study at Broadway Dance Center"
Faculty Mentor: Professor Doug Hamby, Department of Dance
Expected Graduation Date: Spring 2007

I will create an original choreographic work for the UMBC Senior Concert. The piece I choreograph for the concert will be based on the various styles I will learn while dancing at the Broadway Dance Center in New York this summer. I will also be teaching a master class for the UMBC Dance Department implementing what I have learned while dancing in New York.

Christie Finn, Music
"Movement and the Singer"
Faculty Mentor: Professor David Smith, Department of Music
Expected Graduation Date: Spring 2007

With the Undergraduate Research Award, I plan to continue conducting my personal investigation in the field of classical (operatic) vocal studies. This time, my research will be centered in the area of movement—the physical relationship and presence of the body of the singer and how this relates to the music and drama produced. I plan to use the Undergraduate Research Award to attend the highly acclaimed summer vocal/movement program at the Wesley Balk Institute in order to study with well-known experts on this topic. Through this research, I will become more educated on the human body and the methods with which to engage oneself entirely in singing and acting, and this concentrated work will ultimately help me become a better singer. Side products of my research will include my senior recital (and perhaps a second recital during my senior year), graduate school auditions, and a performance of Luciano Berio's "Sequenza III" at URCAD 2007 (a piece which combines movement, acting, and singing and is exceedingly difficult). I also plan to teach other singers at UMBC what I have learned as I work in and with the UMBC Vocal Arts Ensemble.

DeLeon L. Gray, Interdisciplinary Studies
"Social Predictors of Academic Achievement Motivation in Adolescent Mothers"
Faculty Mentor: Dr. Charissa Cheah, Department of Psychology
Expected Graduation Date: Spring 2007

This study focuses on social support received as a predictor of the academic achievement motivation of approximately 100 adolescent mothers ranging from ages 15-19 in Baltimore City. The quality of the relationship between the adolescent mother and her biological mother is expected to be the key predictor of academic achievement motivation. The data for this study will come from an ongoing study at UMBC entitled project ADVANCE. Adolescent mothers will be recruited from the Paquin alternative school for adolescent mothers and various hospitals and clinics in Baltimore, MD. The results from this study will be used by policy makers in

assessing and funding current and future educational programs for the educational attainment of adolescent mothers.

Eric Anthony Grollman, Sociology
"Traditional and Modern Homophobia at UMBC"
Faculty Mentor: Dr. Fred L. Pincus, Department of Sociology
Expected Graduation Date: Spring 2007

Throughout the past century, the world has witnessed the increasing visibility of individuals who are lesbian, gay, bisexual, transgender, and queer (LGBTQ), as well as the emergence of LGBTQ social and political movements. Along with sexism and racism, as well as all other forms of prejudice and discrimination, homophobia - defined as intense fear or hatred of LGBTQ individuals – has, and continues to, plague our world and the lives of LGBTQ people. Within the last few decades, scholars and lay people have declared that homophobia is declining, especially in institutions of higher education. However, much like modern racism and modern sexism, some scholars are saying that it is traditional homophobia that is on the decline, whereas modern homophobia is now on the rise. This study serves to record and analyze the levels of traditional and modern homophobia within the undergraduate student population of UMBC, as well as to explore any relationships that may exist between homophobia and individual attributes, such as gender, race/ethnicity, class, class standing, major, religion, and political affiliation.

Crystal M. Healy, Environmental Science
"Consumption of Transgenic Corn by Aquatic Detritivores: Impact on Higher Trophic Levels"
Faculty Mentor: Dr. Christopher M. Swan, Department of Geography and Environmental Science
Expected Graduation Date: Spring 2007

Laboratory studies have shown that leaf litter from genetically modified Bt corn negatively affects the feeding patterns of aquatic detritivores, specifically isopods. Isopods exposed to Bt corn leaves tend to consume less than isopods exposed to normal corn leaves. This is due to chemical properties of Bt corn that make it less sustaining to consumers, thus providing less energy and lowering resource quality. Since most detritus-based food webs are controlled by food resource abundance and/or quality, low quality detritus may cause changes in consumer size and population growth rate, reducing feeding rate and efficiency for top carnivores (Reutz et al. 2002). Omnivorous invertebrates that consume detritus may become less omnivorous when exposed to Bt corn. Strict carnivores, too, may change their feeding/growth rate in response to low quality detritus. In this study I will attempt to discern more clearly the effects of Bt corn on aquatic predators that feed on detritivores, such as diving beetles and caddisflies, by measuring the breakdown rate of both Bt and non-Bt corn exposed to different combinations of consumers.

Askia Hill, Computer Engineering

"Autonomous Flying Control Systems for Mini-flying Robots"
Faculty Mentor: Dr. Fow-Sen Choa, Department of Computer Science and Electrical Engineering
Expected Graduation Date: May 2008

The complete goal of this project is to construct a reconnaissance robot that can fly autonomously with build-in artificial intelligence to replenish it own power until completing its mission to identify a location with explosive or toxic chemicals. Within the one year period, I will focus on the part of the full project that is to build a flying system controlled by a remote computer through radio channels. Eventually when the control subroutines are completed they will be loaded to an industrial control chip including a CPU and memories and installed into the flying robot.

Serina Jensen, Daniel Staples, Jonathan Williams, Physics
"Evaluating the Predictive Accuracy of the WRF Model in Assessing Wind Resource at High Resolution"
Faculty Mentor: Dr. Lynn Sparling, Department of Physics
Expected Graduation Date: Spring 2007

In light of the human cost of energy sources such as coal and the negative impact on the environment of using oil, an interest in studying renewable energy sources such as solar power, wind power and bio-mass technology has been renewed. Wind energy draws electrical energy from the mechanical energy of spinning turbine blades. It provides a clean, sustainable and inexhaustible energy source. But in order to assess the wind power resource at any site, one must use weather forecasting models to accurately predict wind patterns in the region. On a large scale, these models have relatively good accuracy in determining the patterns of wind, however, in an urban setting, obstacles and terrain complexity affect the wind patterns. The goal of this research project is to evaluate the predictive accuracy of the most recent version of the Weather Research Forecasting model (WRF) at high resolution over complex terrain. With this knowledge, we will then proceed to assess the wind resource on the UMBC campus and the feasibility of using wind power at UMBC.

Simonne Jones, Biopsychology
"Bridging the Gap between HIV/Aids and Awareness in Ghana, Africa"
Faculty Mentor: Dr. Cindy Schaeffer, Department of Psychology
Expected Graduation Date: Spring 2008

The study will evaluate the effects of HIV/AIDS awareness and its impact in the children in Ghana. Working for Full Circle, a non-profit organization, serving as a faculty member a local community around the Akupim South District, I will be responsible for educating children in specified curriculum including math, science, and HIV/AIDS awareness, as part of the program

of the AIDS education. I will be documenting and evaluating the level of AIDS awareness in the children in Ghana and the effect that it has had on their lives. This will be accomplished by a self report instrument given to the children being taught before and after the HIV/AIDS curriculum has been implemented. From this data an evaluation of the effectiveness of the curriculum in the schools and realistically educating the children on HIV/AIDS will be evaluated in order to aid Full Circle in developing their future HIV/AIDS curriculum. The level of awareness in the children may affect the presence of AIDS in Ghana in the future. By educating the children on the facts, it could alleviate anxiety of stigma and discrimination in getting tested. The results from this study could raise awareness about the health disparities specifically caused by HIV in Ghana, a country not immediately brought to mind when considering the AIDS epidemic in Africa, yet it is significantly impacted.

Zach Kaufmann, Interdisciplinary Studies
"The Poetry and Translations of W.S. Merwin"
Faculty Mentor: Dr. Piotr Gwiazda, Department of English
Expected Graduation Date: Spring 2008

Over the past half-century, W.S. Merwin has become one of the most widely read and influential American poets. He has published more than twenty books of poetry and five books of prose, winning the Pulitzer Prize, the Tanning Prize, the Bollingen Prize, and the Lannan Lifetime Achievement Award, among others. Yet W.S. Merwin is also a respected translator of many languages (notably French and Spanish). His translations of *The Song of Roland*, Dante's *Purgatorio*, and the poetry of Osip Mandelstam and Pablo Neruda, have earned him much critical acclaim. My research aims to understand the connections between W.S. Merwin's poetry and translations, focusing specifically on his *First Four Books of Poems*, which often use classical poetic forms (the sonnet, the ballad, the villanelle, etc.) and mythic figures.

Dorothy Kenny, Biology and History
"Seeing through the Smoke: The Interaction between Science and Policy from the 1952 London Smog through the Clean Air Act of 1956"
Faculty Mentor: Dr. Dan Ritschel, Department of History
Expected Graduation Date: 2008

Between December 5th and 9th, 1952, greasy, brown smog had swallowed up London, marking the beginning of a four month environmental epidemic. Four years Later, British Parliament passed the 1956 Clean Air Act which established smokeless zones in a number of industrial areas. These events seem to have an obvious correlation. However when we look at the statistics, along with the social and political factors of the time, things get rather sticky. The Minister of Health later reported that 6,000 had died due to smog in 1952, shoving off excess illness and death in the winter of 1953 as part of an influenza epidemic. This figure has just recently been disproved and doubled by epidemiologists Michelle Bell and Devra Davis in their recent analysis of medical records, insurance claims, health reports, and air pollution concentration levels. My

research will focus on the links between the 1952 environmental catastrophe and the environmental legislation of 1956, focusing specifically on how the human health research available at the time aided and guided decision making. What were the health factors, scientific knowledge and political circumstances that persuaded British Parliament to pass the Clean Air Act? I specifically want to find the scientific research cited, the human health concerns studied, the political or industrial issues raised, and the recommendations discussed by Parliament before passing the Act in 1956. In the end, I will have assessed the degree to which scientific knowledge and expertise played a role in environmental policy, as well as the interplay between science, politics and policy-making in the passage of the 1956 Clean Air Act.

Lynna Kiere, Biology
"Exploring Female Coloration in Streak-Backed Orioles: Variation, Behavior, and Evolution"
Faculty Mentor: Dr. Kevin Omland, Department of Biological Sciences
Expected Graduation Date: Spring 2008

My goal is to carry out a study on female coloration in Streak-backed Orioles (*Icterus pustulatus*) at the Sierra de Huautla biosphere reserve in Morelos, Mexico. Unlike many temperate species with bright males and dull females, this tropical species (related to the familiar Baltimore Oriole *I. galbula*) has strikingly colored males and females (Omland and Hofmann 2006). Quantifying the variation between several age and sex classes will reveal important information about why female Streak-backed Orioles are elaborately colored. In order to further investigate female brightness in Streak-backed Orioles, I will address three questions: 1) is there overlap in color between male and female adult plumage? 2) Is there equal variation in adults of both sexes? 3) How much variation is there between young birds of the same sex? Quantifying variation will lead to important insights about the overall variability of female color, the strength of selective forces on males versus that on females, and the general age at which variation becomes evident. Addressing these questions will contribute to a better understanding of the adaptive function of bright females in this species. Furthermore, the types of questions this project asks are not unique to Streak-backed orioles; the factors responsible for variations in the elaborateness of female coloration are unclear for many species. Therefore, this research is not restricted to birds and could lead to insight across a wide range of species.

Anna Kuklova, Psychology
"Parental Autonomy Development in Immigrants from the Former Soviet Union"
Faculty Mentor: Dr. Charissa S. L. Cheah, Department of Psychology
Expected Graduation Date: Spring 2007

The purpose of the proposed research project is to explore the parental practices and children's autonomy development among the Russian-speaking community in the Baltimore area. Specifically, we aim to examine parental autonomy development in their children, and its relations to (1) academic motivation, (2) psychological well-being and (3) risk-taking behavior. This research hopes to achieve a better understanding of the legacy of Soviet culture and the

parenting practices of post-USSR generations who immigrated to the United States, and their adolescents' development.

Matthew Loftus, Chemistry
"Laser-Stimulated Raman Spectroscopy as a Method for Remote Atmospheric Sensing Technology"
Faculty Mentor: Dr. Lisa Kelly, Department of Chemistry and Biochemistry
Expected Graduation Date: May 2007

This project seeks to use Laser-Stimulated Raman Spectroscopy (LSRS) to probe various gases and vapors and eventually provide both theoretical and experimental fundamentals of LSRS for building remote, or stand-off, sensing systems in homeland defense or other atmospheric applications. Raman spectroscopy is a promising field for optical detection of these agents because it can characterize different substances based on peak wavelength, its peak strength is directly related to concentration, and the remote sensing can be done by monitoring back scatterings. The initial stages of the work have been devoted to finding optimal conditions in terms of pressure and laser power in order to rationalize the signal intensities and developing a system for characterizing gases like hydrogen, methane, and propane. Later stages, which may last until spring 2007 will involve measuring LSRS signals from a variety of pure gases and gas mixtures.

Jacob McGill, Chemical Engineering
"Stochastic Modeling of the Growth of the Influenza Virus"
Faculty Mentor: Dr. Mariajose Castellanos, Department of Chemical Engineering
Expected Graduation Date: Spring 2007

Our goal is to develop a basic mathematical framework that models virus and host interactions, exhibiting all possible outcomes of virus infection. The preliminary stage is to mathematically describe the assembly of a virus multiple components within an infected cell in its different stages, beginning with subviral particles (Webster *et al*, Mar 1992) followed by virion completion (Fujii *et al*, Dec 2002). The first step in modeling any biological system is to begin with the most relevant pathways of the organism of interest (Vreede *et al*, Apr 2004), in this case a virus, and proceed sequentially to form a successful model that can increase in complexity by adding more pathways (Hinshaw *et al*, June 1994) or regulatory schemes and finally removing underlying assumptions. By creating as general a model as possible, we will be able to apply it to any virus system with a minimal number of changes. This general model could allow us to study many different types of viruses without significant time spent creating a specialized model for each new virus of interest.

Truc Nguyen, Visual Arts and INDS: Multimedia Communication and Marketing
"A Window on Immigration: A Documentary on Four Generations' Journey to America"
Faculty Mentor: Professor Christopher Peregoy, Department of Visual Arts
Expected Graduation Date: May 2007

I will research the themes of immigration within the American culture through text and photographic mediums. I will produce a photo documentation with an accompanying text exploring the lives of Post-Vietnam War refugees and their families. I will investigate the social development and personal stories of Vietnamese refugees, immigrants and first-generation Americans. I want to capture a brief history of the Vietnam War and the stories of their refugees, who later came to live in the United States. I will display this by photographing each person's contribution to America and have a complementing interview of their experiences. I will also explore the constant clashes between older generations and first-generation Americans over adapting to a new life and what defines "American Culture". I believe these issues have a universal appeal to all immigrants. My family will be the focus of this documentary. My family is comprised of four generations of Vietnamese descent, three generations of Vietnamese refuges and one generation of first-generation Americans. There are about 101 of us in my extended family.

Irene Pastis, Biochemistry
"Organic Synthesis of Ring Expanded Nucleoside Analogs for the Inhibition of Hepatitis B and C Viruses"
Faculty Mentor: Dr. Ramachandra Hosmane, Department of Chemistry and Biochemistry
Expected Graduation Date: Spring 2007

A major health issue that has been has been distressing many scientists in the past two decades have been the spread of viral Hepatitis. Viral hepatitis is the one of the major morbidity and lethality causing viruses. These viruses cause severe infections and chronic conditions were in the cases of hepatitis B and C include cirrhosis and liver cancer.
Up to this point five different hepatitis viruses have been identified Hepatitis A, B, C, D and E. Hepatitis A and E though do not cause chronic active hepatitis as B and C do.
Hepatitis B is the annual death causing virus for more than 1.5 million people and more than 350 million people are infected with chronic hepatitis B. HBV kills more people than HIV nowadays. But along with Hepatitis B, Hepatitis C is also one of the most lethal viruses. More than 175 million people have been infected with HCV of whom 3.9 million are U.S. citizens and 2.7 of them have chronic HCV. In the light of these outrageous numbers scientists are trying to find a cure. On of the methods this project is focusing on is the organic synthesis of ring expanded bases.

Stephen Pirpiris, Mechanical Engineering
"The Feasibility of Biodiesel from Phytoplankton"
Faculty Mentors: Dr. Tony Farquhar and Dr. Charles Eggleton, Department of Mechanical Engineering
Expected Graduation Date: Fall 2006

The goal of this research is to model and develop a new process for commercially producing Biodiesel by farming phytoplankton feedstock from controlled brackish water and salt water. All Biodiesel manufacturers in the US today produce fuel using land based crops like soy beans. This research aims to provide the conditions necessary to move the production from land to water while finally costing the equivalent or less to produce. Biodiesel from farmland production is limited to competing with food demand, varying weather patterns and the ability of land crops to produce oil. This research will prove from concept to commercial process, the feasibility of Biodiesel manufacturing from our enormous aquatic feedstock here in the United States.

Stephanie Potter, Visual Arts
"Recollections: A Visual Exploration of the Subjectivity of Memory"
Faculty Mentor: Professor Calla Thompson, Department of Visual Arts
Expected Graduation Date: Spring 2007

The purpose of this project is to examine what overlap exists between subjective and collective memory through a series of photographic works. An entity that everyone possesses, memory affects every individual differently. By transforming memory into a visual and tangible form, its complex essence can be considered and understood, and its metamorphosis more fully realized. My goal is to illustrate this idea through imaging a series of 50 photographs, ranging in size from 4"x4" to 4'x4'.

Intrigued by the idea that two people can remember the exact same event completely differently, I conducted informal preliminary research and found that people's memories seem to exist as a sort of fluid that revolves around a specific core. This core is often an object or person. When asked to describe this center, the subject's description is often very accurate, as if a photograph existed inside the psyche. The rest of the memory however, the fluid, seems to be ever evolving and changing, as life experiences and natural development mold and shape the person's perspective. This is why two people can remember the same event in two completely different ways. I want to create a project in which this can be translated into a visual experience.

Christina Ralls, Visual Arts; **Katharine Better,** Visual Arts
"Public Art as Catharsis: Interactive Sculpture and Community Outreach"
Faculty Mentor: Professor Steven Bradley, Department of Visual Arts
Expected Graduation Date: May 2007

According to Richard Owen Geer's *The Field of Community Performance*, community art should be "of the people, by the people, and for the people." My fellow student collaborator, Katharine Better and I have been intrigued by this idea since our exposure to the field thanks to the opportunities provided by UMBC. We truly believe that art can enrich people's lives and prove to be a catharsis. The people of this Information Age are greatly plagued by such things as depression, fear, poverty, violence and more that discourages many from their aspirations and dreams. We intend through our research and the completion of an interactive sculpture situated

in a public city space to motivate people to positively evaluate their lives and say, "I'm going to do something that will make me feel fulfilled and happy." We anticipate to effect a large demographic of people that does not seclude anyone according to age, ethnicity, gender, disabilities, economic status, sexual orientation, and religious beliefs. When one participates in an art piece, its purpose becomes more meaningful and personal to that individual. We want to give people something through artistic interaction that can inspire them to continue reaching for their dreams despite adversity.

Jenette Ramirez, History
"Outcomes of Female Patriotism: The women of the WAVES during and after WWII"
Faculty Mentor: Dr. Amy Froide, Department of History
Expected Graduation Date: December 2006

The purpose of my research project is to explore the expectations and outcomes of the women who chose to serve in the WAVES (Women Accepted for Voluntary Emergency Service), the women's reserve of the U.S. Navy during World War II. I specifically would like to know how the women accepted the challenge to serve in a military capacity while not knowing the outcome of their forthcoming experience. The goal of this project will be to research these women's expectations and find out how the reality of their military experiences led to a continued military career or affected their civilian lives after the war. Did women in the WAVES express the need for more women's opportunities or were they satisfied with their patriotic contribution? Were they able to return to a civilian lifestyle and pursue lives as wives and mothers and not as ranking woman of status? The WAVES were a group of highly motivated individuals that chose an irregular path to independence through patriotism and volunteerism. I believe this path of spirit, maturity, and experience should be explored and shared in an effort to show that America's naval women were a substantially motivated group who proved to be strong role models and activists for America's female society.

Charles Rutter, Biology
"Habituation to the Distractive Properties of Virtual Reality in Pain Analgesia"
Faculty Mentor: Dr. Lynnda Dahlquist, Department of Psychology
Expected Graduation Date: Spring 2007

Recently, immersive virtual reality has become a hot topic within clinical pediatric psychology because of its ability to remove a child from a stressful situation, such as those that occur during invasive medical care. It has been shown that this sort of distraction leads not only to a decrease in patient anxiety, but also lowered pain ratings. Despite these facts clinicians have been wary of investing in this technology that will surely improve the life of their patients, as well as their own lives as caregivers. This is because the clinical applicability of immersive virtual reality has not been thoroughly investigated, and therefore clinicians are unsure if the potential applications of the equipment outweigh the costs.

One question that has been left unanswered is, does the novelty of immersive virtual reality lead to the observed decrease in pain and anxiety ratings? In more scientific terms, will patients habituate to distraction by immersive virtual reality with repeated treatments? Current literature on the topic is composed of a small number of case studies, as well as a handful of small empirical studies of less than ten subjects with a limited number of repeated treatments. Because the experimental populations in these studies have been small, the results are not as generalizable to society as a whole, thereby limiting their clinical import. The proposed study will be testing the phenomenon on a much larger scale, using 30-40 college age students over the course of 8 weekly treatments, to yield a much more controlled and powerful study of habituation to virtual reality distraction.

Trevor Simpson, Music Technology
"Study and Archiving of Impulses for Convolution Reverb"
Faculty Mentor: Professor David Kim-Boyle, Department of Music
Expected Graduation Date: Spring 2009

In obtaining this grant I wish to facilitate my further research and understanding, as well as create a comprehensive library of impulses and responses involved in the creation and use of convolution reverbs. Reverb, or ambience, is an often-overlooked phenomenon that plays a pivotal role in how all people perceive sound. A specific sound, a male voice for example, can instill a wide variety of different emotions on a listener based solely on the sonic character of the acoustic space. For example, a voice recorded in an empty parking garage may cause some people to feel uneasy. The science of convolution reverb allows an individual to "sample" an acoustic space and its signature sound and decay for use at a later date through a computer plugin. If awarded, I plan to use the grant to sample a variety of spaces at UMBC for use in the UMBC Recording Studios. Spaces to be sampled will include the Fine Arts Recital Hall, both Live Rooms in the recording studios, the Commons, the Commons Garage, and various stairwells. I feel that this will not only be beneficial to myself, but will also provide extremely useful and interesting tools for many generations of UMBC Recording students to come.

Christina Stanley, Political Science and Interdisciplinary Studies
"Perceptions (or Misperceptions) and the Troubled State of US-Iranian Relations"
Faculty Mentor: Dr. Cynthia Hody, Department of Political Science
Expected Graduation Date: Spring 2007 (M.A.)

The purpose of this research is to publish a comprehensive research paper discussing the foreign policy stances of the United States and Iran dealing with nuclear proliferation. This paper will start with a history of modern US-Iranian relations, examining cultural, socio-economic, political, and international factors which affected foreign policy. Then the paper will briefly discuss the theories of international relations, and the utility that certain levels of analysis contribute to the discussion. Next the paper will look at empirical data from the decision/policy makers from both countries to ascertain the perceptions versus the reality of the nuclear situation.

Also the paper will discuss whether the US foreign policy positions encourage or dissuade states like Iran from becoming nuclear powers. Finally, and most importantly, this paper aims to create a solid, actionable, policy recommendation for the US government in the aim for eventual peace in the Middle East region, and nuclear non-proliferation in Iran.

Aaron B. Stoler, Environmental Science
"Microbial Respiration on Mixed Leaf Substrates"
Faculty Mentor: Dr. Christopher Swan, Department of Environmental Science
Expected Graduation Date: Spring 2007

My research concentrates on the effect of bacterial and fungal decomposition of leaf mixtures in stream. It is common knowledge that leaf litter in streams break down by a series of processes. After leaf senescence, bacteria and fungi immediately colonize leaf litter and begin the decomposition process, as well as making the leaves more satiable to insect shredders who further decompose the litter. It is not known, however, whether mixtures of different leaf species affect bacterial and fungal colonization. This is certainly a real issue, since multiple tree species provide input into most streams. Furthermore, many scientists are now asking what would happen if one or more tree species within riparian systems were to become extinct. The goal, therefore, of my research is to examine the trend of bacterial respiration rates (which directly reflect their amounts and activity) on mixed leaf litter. Respiration rates will also be examined in the presence of shredders to discern if shredders have any effect on bacterial / fungal activity. By continuing our understanding of leaf and organic matter breakdown within aquatic systems, we hope to increase our ability to predict trends in nutrient and energy cycling within streams.

Erin Terwilliger, Music Education; **Danielle Durbin,** Music Education;
Jacob Jensen, Visual and Performing Arts; **Jonathan Pack**, Animation;
Una Petrovic, Dance; and **Kim Patrick,** Music Recording
"Miracle: A Reaction Integration of Dance, Music, and Visual Art"
Faculty Mentor: Dr. Anna Rubin, Department of Music
Expected Graduation Date: 2009

We would like to further our research of Mariko Mori's piece, *Miracle*, to create an in-depth reaction project involving dance, music, and visual art. *Miracle* is a collection of eight circular photographs that are both micro- and macrocosmic. *Miracle* gave us an uncanny feeling of supernaturality because the photographs captured images of objects that we would not have normally noticed or even thought about examining closely under normal circumstances. However, that feeling was outshone by the beauty of the colored glass and sparkly crystals. We would like to convey the same emotions as *Miracle* through our own combination of different artistic mediums namely dance, music, and visual art. Each medium will be shown through a different artistic view (e.g. an artistic structure will be shown through dance and the spatiality of the piece will be shown through music.) We will emulate the spirit of the piece in our own style.

John Weller, Philosophy
"Role of Mental Stages on Moral Thought and Ethical Theory"
Faculty Mentor: Dr. Susan Dwyer, Department of Philosophy
Expected Graduation Date: May 2007

My research will focus on the study of stages of mental thought as specifically concerns moral/ethical thinking, to determine patterns relevant to philosophical debate and issues within ethical theory. This will focus mainly on trends which have relevance to aspects of traditional, and contemporary ethical theory in order to gain a better understanding of how ethical values are initially constructed/viewed during ethical reasoning and how decisions are made, with an emphasis on the inter-relation of separate ethical theories, as well as using this information to potentially clear up, and/or advance resolution of the disagreements between conflicting theories, and also possibly moral dilemmas (examples of situations or aspects that seem not to have any clear answer via any of the traditional moral theories).

Jeannie Yoon, Biochemistry and Visual Arts
"Camera-Less Photography; Bob Creamer's Innovative Approaches to Botany"
Faculty Mentor: Professor Lynn Cazabon, Department of Visual Arts -- Photography
Expected Graduation Date: Spring 2008

In the short history of photography, there is little documentation of the actual process of photography aside from the photograph produced. My project is to create a short documentary about the photographer Robert Creamer that will screen at the Smithsonian to accompany his artwork. The film will attempt to capture the spirit of the creative process and the innovative "camera-less photography" techniques involved in creating Creamer's images. Creamer, an accomplished photographer, began his career as a botanist, which has heavily influenced his work. In this body of work he uses scanners to create images, primarily of flora and fauna. I plan on filming him while he works with these scanners in his home studio, in his greenhouse, in Florida at the Fairchild Tropical Botanic Garden, and at the Smithsonian as he works with their botanical archives. His specific process echoes the themes in the images he creates; the process is a form of art itself, and I'd like to convey that to an audience, so they can better appreciate Creamer's work.