2010-2011
Undergraduate Research Award
Scholars and Projects

David Bartee, Biochemistry and Molecular Biology

Michelle Brandenburg, Dance

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Vanessa Cheng, Psychology

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Geoffrey Clapp, Mathematics, Computer Science

Theresa Columbus, INDS: Performance Art

Colleen Courtney, Chemical Engineering

Thomas Dakermanji, Biochemistry and Molecular Biology

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Meredith Donaho, Music and English

Emily Doughty, Bioinformatics and Computational Biology

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Casey Gray, English and Secondary Education

Krystyna Horn, Biological Sciences

Megha Jacob, Music Education/Pre-Physical Therapy

Natée Johnson, Mechanical Engineering

Sheriff Jolaoso, Computer Engineering

Achsah Joseph, INDS

Nathaniel Kim, Chemistry

Emily Kimak, Interdisciplinary Studies

Dora Korewa, American Studies

Margaret Kott, Biological Sciences

Julianna Kuhn, Geography and Political Science

Colin Leach, History

Chinhui Lin, Biochemistry and Molecular Biology

Elizabeth Lynch, English

Richard Maduka, Chemistry

Stefanie Mavronis, Political Science

Eliana NessAiver, Soutry De, and Ryan Valenza, Engineering and Physics

Christine Osazuwa, INDS

Asmara Qamar, Biological Sciences

Hannah Rider, Music Education

Christina Ross, Ancient Studies/MLL

Annah Seo, Biological Sciences and Psychology

Sarah Sexton, Anthropology

Shiva Sharma, Information Systems

David Shyu, Computer Engineering

Gary Thompson, Bioinformatics and Computational Biology

Andrea Thomson, Political Science and Economics

Franki Trout, Dance

Amond Uwadineke, Political Science

Shaun Vain, Theatre

Shelby Vargo, Chemical Engineering

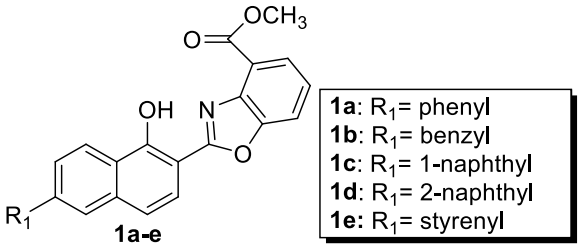
Salma Warshanna, English, Communication and Technology track

John Winder, Computer Science

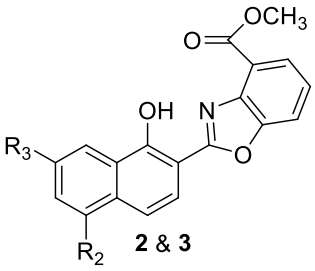
Jojo Yeoba, Biochemistry and Molecular Biology

David Bartee, Biochemistry and Molecular Biology
"Second Generation UK-1 Analogues"
Faculty Mentor: Dr. Paul Smith
Expected Graduation Date: Spring 2011

Our goal is to synthesize 2-(6-aryl-1-hydroxy-naphthyl)-benzoxazoles (1a-e) in an effort to identify highly effective compounds to treat patients with Hepatitis C virus (HCV). Previous analogues of UK-1 (2 and 3), exhibit very similar sub-micromolar activity in both whole cell and replicon assays. It is hypothesized that this similarity is because the 5- and 7- benzyloxy groups in 2 and 3, respectively, occupy the same hydrophobic binding pocket on HCV helicase. The present target compounds will place a number of different aromatic moieties directly into the hypothesized hydrophobic pocket, thus allowing the compounds 1a-e to bind more effectively than 2 or 3. The substituents for 1a-e have been specifically selected to not only affirm the existence the hydrophobic pocket adjacent to the 6-position of the naphthyl ring, but also to better characterize the spatial dimensions of the pocket itself, as each substituent provides different steric demands and orientation.



1a: R_1= phenyl
1b: R_1= benzyl
1c: R_1= 1-naphthyl
1d: R_1= 2-naphthyl
1e: R_1= styrenyl



2: R_2= OCH_2Ph, R_3 =H
3: R_2= H, R_3= OCH_2Ph

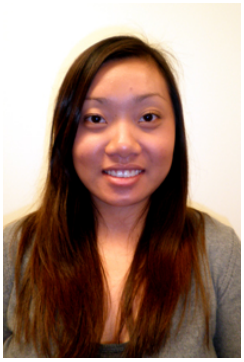
Michelle Brandenburg, Dance and Mathematics
"Body Awarness: New Discoveries in Movement"
Faculty Mentor: Mr. Doug Hamby
Expected Graduation Date: Spring 2011

"Body Awareness: New Discoveries in Movement" is a statement of the ever important study of the body and how it moves. I would like to study new ways of dancing by studying how the body works in movement. Identifying un-healthy movement habits that develop over the course of a person's life and replacing these habits with technically correct movement can achieve injury prevention. A dancer's career is relatively short in comparison to that of other artists. However, the length of a career can be maximized through injury prevention. Melissa Wolfe Rosebro is a leader in body awareness research as it relates to dancers. She combines functional anatomy with the principles of Pilates (physical fitness system) to create her own set of highly efficient exercises and movement concepts for dancers. Her exercises build muscle strength healthfully and allow a person to dance technically correct. I will work closely with her, studying her

techniques and soaking up all of the knowledge she passes to me. My series of studies, ten private lessons, will allow me to develop my own set of movement exercises and concepts to benefit dancers and prevent injuries. I will spread my knowledge to my fellow UMBC dancers and others through leading three movement workshops. In these workshops people will be able to better their dancing and gain new understandings about their body.

Abigail Bratcher, History and Russian
"Reclaiming Maryland: Confederate Nationalism in Popular Print Culture"
Faculty Mentor: Dr. Anne Rubin
Expected Graduation Date: Fall 2012

During the Civil War, Maryland occupied a unique position as a divided state in a divided nation. President Lincoln needed to keep Maryland in the Union because otherwise Washington, D.C. would have been surrounded, and the industrial powerhouse of Baltimore would have fallen to the South. At the same time, Confederates claimed Maryland as their own, using Maryland's plight as a powerful symbol of national aspiration. This research will focus particularly on the Southern reaction to Maryland's position as seen in popular print culture of the time: broadsides, editorials, political cartoons, and other manifestations. Rather than conducting a literary analysis of these artifacts on the micro-level, I will research how these broadsides reflected Confederate nationalist propaganda on the macro-level. An analysis of popular print media contributes to an understanding of the civil culture of nationalism in the Confederacy, and how Confederate ideals permeated beyond military or political actions. I will also investigate the relationship between Southern identity and Confederate Nationalism as manifested by pulp writers during the Civil War. Understanding how these broadsides functioned in Confederate states reveals how nineteenth-century Americans consciously viewed their powers of persuasion



Vanessa Cheng, Psychology
"Chinese Mothers' Immigration Experiences in the U.S. and in their Young Children's Socioemotional Adjustment"
Faculty Mentor: Dr. Charissa Cheah and Ms. Christy Leung
Expected Graduation Date: Spring 2011

Between 2000 and 2006, the number of immigrant parents and their Maryland-born children has increased dramatically, accounting for 35 percent of the state's total population increase. China was the second largest immigrant-supplying country in the year 2000. The growing Chinese population in Maryland warrants research on their immigration experiences and their children's development and adaptation. Societal attitudes towards immigrants and the social resources available to them in the receiving country are crucial in determining immigrants' adopted acculturation strategies and

adaptation skills. Therefore, this study will examine: (1) the positive and negative immigration-related experiences of Chinese mothers, (2) the associations between these mothers' immigration experiences and their expectations for their children's adaptation and success, and (3) the associations between these mothers' immigration experiences and their children's socio-emotional adjustment in school. Fifty immigrant Chinese mothers with preschool children will be interviewed regarding their immigration experiences. Their children's social, emotional, and behavioral strengths and difficulties will be assessed by their teachers. Findings from this study can help inform community leaders and service providers about best practices that may contribute to the advocacy and promotion of the successful adaption of Chinese immigrant mothers and the healthy development of their children.

Laurentina Cizza, Political Science
"Identity and Voting Behavior Among Jordanian Palestinians"
Faculty Mentor: Dr. Brigid Starkey
Expected Graduation Date: Spring 2012

This research will examine the formation of the political identity and political culture of Jordanians of Palestinian descent. As a Diaspora community in Jordan, the Palestinians prove particularly interesting in regards to their political identity and how this identity translates into political activity. Preceding the 1967 Six-Day War, Jordan administered the West Bank. The Jordanian government granted Palestinians living in the West Bank Jordanian citizenship in return for "Jordanization," or espousal of Jordanian nationality. Many educated West Bankers moved to the East Bank and came to form the backbone of the urban-middle class of Eastern Jordan. The 1988 Arab Summit in Rabat recognized the Palestinian Liberation Organization (PLO) as the sole legitimate representative of the Palestinians, Jordan abandoned all claims to and control of the West Bank. These events complicated the political identity and national allegiance of Palestinian-Jordanians still living in the East bank and refugee camps. Today, the fact that Palestinians constitute more than half the Jordanian population further complicates the national identity of Jordan and the political identity of Palestinian Jordanians. In light of this history, this research will focus on how the political identity of Jordanians of Palestinian origin may differ from that of other Jordanians. More specifically, I will be investigating Palestinian identity across socio-economic divides in order to gauge its value as an indicator of political party affiliation and voting behavior in Jordan.

Geoffrey Clapp, Mathematics, Computer Science
"Modeling Sensory Input to the Lamprey Spinal Cord"
Faculty Mentor: Dr. Kathleen Hoffman
Expected Graduation Date: Spring 2011

We will develop a mathematical model of the central pattern generator (CPG) of the lamprey spinal cord in order to better understand the effects of

sensory input on vertebrate locomotion. The lamprey, a relative of the eel, is a model system for studying vertebrate locomotion because its spinal cord contains the same types of neurons as its human counterpart, except in smaller quantities. Biological experiments have revealed that the lamprey's swimming behavior is modulated by input to the spinal cord from edge cells, sensory organs that measure the body's curvature. A mathematical model has become essential to advancing our knowledge on this topic because of the degree of complexity and precision required to obtain accurate experimental data. We will consider two types of models of the CPG: neural and phase. In both cases, the CPG is represented as a chain of connected oscillators. However, a neural model provides representation for multiple groups of neurons within each oscillator, making it more biologically detailed than a phase model, which represents each oscillator by only one variable. Previous work has compared results from our neural model to results from an unrelated phase model. The goal of our project is to derive a phase model from our neural model using phase reduction techniques, which will allow us to make direct comparisons between the models. Our results will help us to determine the appropriate degree of biological detail for a model used to study the role of edge cells in the lamprey swimming behavior.

Theresa Columbus, INDS: Performance Art
"*Nostalgia for Everything*: Experimental Video and Performance Art Piece"
Faculty Mentor: Ms. Preminda Jacob
Expected Graduation Date: Fall 2010

I will make a video about memory, longing, the emotions involved in making a piece of art, and cross-cultural communication. The script will be based on a play in which I draw parallels between the act of making art– communicating with an unknown audience, and the struggle and desire to connect with members of my family and friends who live in different places and speak a different language than me. I will film the play being performed line by line by individuals (including myself) in four different cities: Baltimore, Allentown, Milwaukee, and Athens, Greece. My immediate family lives in Allentown, much of my extended family lives in Greece, and many close friends live in Milwaukee, where I lived for 10 years. During the editing process I will juxtapose my film footage of these different persons and locations. At times the lines will correspond to each other, at times they will become odd poetic continuations of each other, and at times there will be an awkward disjunction between them. The absurdist nature of disjointed dialogue will reference and evoke the influence of early surrealist film on my artwork. When showing the video I intend to perform in person along with the video, drawing attention to the connection happening in the room. In my desire to connect friends and family members from my past and present in one piece of art, I seek to make the personal universal. I will point out how emotional connections throughout our lives inform the present moment, and can be vast and expandable.

Colleen Courtney, Chemical Engineering
"Developing an Assay for Screening Mutants of *Aspergillus Nidulans*"
Faculty Mentor: Dr. Mark Marten
Expected Graduation Date: Spring 2012

In the Marten Lab, many different strains of the filamentous fungi *Aspergillus Nidulans* are being studied. There is a need for a quick and effective identification of what a specific deleted gene affects. The development of this assay will allow for a clear declaration of the mutational effect of specific gene deletions. This is done using the parent strain, the *Δatg8* mutant, and the *Δatg13* mutant of *A. Nidulans* along with the chemicals Calcofluor White and Congro Red. These chemicals are cell-wall inhibitors and the genes that are deleted are expected to be involved in cell-wall formation. The inhibition chemicals are incorporated in the agar plates and the strains and plated in varying spore concentrations. The mutants should show decreased growth compared to the parent strain when grown on Calcofluor White and Congro Red. This decreased growth will show that the genes are involved in cell-wall formation. The assay is semi-quantitative in that it will be able to determine which strains are more or less affected by inhibition drugs. This assay will then be able to be applied to an unlimited number of mutant strain and inhibiting chemical combinations.

Thomas Dakermanji, Biochemistry and Molecular Biology
"Investigation of the Affinity of Heparin and Snake Venom Protein Crotamine Utilizing Dye Assay"
Faculty Mentor: Dr. Richard Karpel
Expected Graduation Date: Spring 2011

The protein crotamine is a toxin from the venom of the South American rattlesnake (*Crotalus durissus terrificus*). It is a nucleic acid binding protein with a number of functions, including promoting necrosis of muscle cells. It has the ability to deliver DNA into cells, a unique cell-penetrating property that causes it to localize in the nucleus, and a preference for actively proliferating cells. These properties give it the intriguing potential to be utilized as a drug delivery device. Cell penetration is believed to follow interaction of crotamine with cell surface heparan sulphate proteoglycans. Our experiments focus on the binding of crotamine with heparin, a highly-sulphated carbohydrate chain. In order to determine the affinity of crotamine for heparin, a substance which has minimal spectroscopic properties, we have utilized the dye azure A, a probe for free heparin concentration. A value for the association constant for fractioned heparin and crotamine was determined in a previous experiment. This provides an excellent starting point for further investigation. This experiment will investigate heparin-crotamine interaction properties with the aim of determining the effects of factors such as salt concentration, the length of the heparin oligosaccharide, and the degree of sulphation, as well as investigating the effect of DNA being included in trials.

Payal Daya, Biological Sciences
"Creating and Implementing a New Method to Measure Feeding Rate in Drosophila: Implications for Effect of Energy Acquisition on Life Span"
Faculty Mentor: Dr. Jeff Leips
Expected Graduation Date: Spring 2012

Dietary restriction, a decrease in nutrient intake without malnutrition, has been shown to increase life span nearly universally among many species, including humans. Dietary restriction is highly linked to feeding behavior. Previous dietary restriction experiments show that spiders and other insects regulate and compensate for the lack of protein in restricted diets by increasing food intake, and may store this excess energy as fat, often leading to obesity. Several feeding rate methods have been used in *Drosophila melanogaster*; however, they all have methodological limitations that make the results from experiments that use them subject to alternative interpretations. This project has two major aims. First, I will develop a new method to effectively measure feeding rate in *Drosophila* and compare its efficiency to existing methods. Second, I will use that method on two diets to determine if the increase in life span seen when flies are reared on a restricted diet is caused by a difference in feeding rate or if it is truly a result of the difference in diet. Because this work will be done using a set of lines designed for genetic mapping tests, I will potentially identify candidate genes responsible for producing natural variation in feeding rate in *D. melanogaster*. In addition, the results can be used to understand the genes that regulate feeding rates and the physiological responses to dietary restriction not only in *Drosophila*, but in many other organisms as well.

Krisztina Dér, Music Performance and Musicology
"Arranging for Unconventional Ensembles"
Faculty Mentors: Dr. Linda Dusman, Dr. Joseph Morin
Expected Graduation Date: Spring 2012

Given that unconventional ensembles represent a substantial performance mode in today's world of classical musicianship, knowledge and practical application of orchestral reduction and arrangement are extremely valuable for the aspiring professional musician. To this end, this research project seeks to study musical arrangements created for unconventional ensembles for the insights they provide into this artistic craft, and to put these techniques into practice by arranging Hungarian composer Zoltán Kodály's opera *Háry János* for a specific 'unconventional' ensemble of UMBC music majors. This study will include Stravinsky's reduction of his own work *Histoire du soldat*, the King's Singers' reduction and transcription of Rossini's *Il barbiere di Siviglia*, and Truman Harris' reduction and transcription of Verdi's *La forza del destino*. Additionally, by arranging Kodály's little-known opera, this project aims to fulfil the historical purpose of arrangements (or transcriptions) as one of the chief means to make known the music of notable composers where a literal performance cannot take place

Meredith Donaho, Music and English
""*Music For All*:" After-School Private Music Education in Carroll County, Maryland"
Faculty Mentor: Dr. Joseph Morin
Expected Graduation Date: Summer 2011

Music is traditionally underfunded within the Carroll County, Maryland, school system and as a county-sponsored after-school activity. The recent economic downturn has only exacerbated this situation. In addition, many students, especially those living in the most rural and impoverished areas of Carroll County, lack the finances and access to private music instruction needed to reach their fullest potential and achieve life-long enrichment. This research project seeks to explore the creation and development of a volunteer program dedicated to providing individual music lessons to high school and middle school age youth in the Carroll County, Maryland region who cannot afford music lessons but who express a desire to learn an instrument. This research project will lay the groundwork for the development of this program and is divided into three related endeavors: (1) to carry out a needs assessment survey to convey the necessity for such a program, (2) to research similar programs dedicated to music instruction to gain insights and knowledge on how to operate an arts education program, and (3) to conduct research centered on the acquisition of non-profit status for this program, which will be vital for fund raising.

Emily Doughty, Bioinformatics and Computational Biology
"Improvement on Automatic Method for Mutation Extraction and Disease-Relationship Annotation for Mutations for the Biomedical Community"
Faculty Mentor: Dr. Maricel Kann
Expected Graduation Date: Spring 2011

Associating mutations with disease phenotypes is fundamental for developing novel tools for diagnosis and prognosis of cancer. Most of the mutation-phenotype relationships are buried in large biomedical literature databases such as PubMed. This research has two focuses. One is to improve the specificity of the automatic text-mining method Extractor of MUtations (EMU) which was created in Dr. Maricel Kann's lab to find disease-associated mutations. The second part is to use EMU for a semi-automatic evaluation of five diseases and categorize mutations that are not yet in the manual databases OMIM and SWISS-PROT. I will be working to increase EMU's precision of finding the correct gene per mutation (currently .75 precision) by associating genes to mutations based on proximity. For the second part of this work, I will be manually curating five diseases for mutational information and disease-association. The information gained from curation will be used to evaluate EMU's gene finding methods and will be made available online for visualization for use for the biomedical community.

Ashley Dyjack, Mathematics, Computer Science and History (minor in Ancient Studies)
"A Comparative Study: Courtesans and Prostitutes in Europe and Asia During the Early Modern Period (1400 to1800)"
Faculty Mentor: Dr. Amy Froide
Expected Graduation Date: Fall 2010

This research grant will be a comparative study of prostitutes and courtesans in Europe and Asia during the Early Modern Period (1400 - 1800). The goal for this project is to compare the societal attitudes and views these two cultures had about courtesans and prostitutes. Additionally, I want to investigate the reasons why women became courtesans and prostitutes as well as the experiences these women had in daily life. Lastly, I plan to research how these two cultures represented and recorded these women, and the places they lived and worked, through the arts and visual images. In order to complete this project, I will be using historical research methods, which include reading secondary literature on the topic and using primary sources from the cultures and time periods I am studying. This project will incorporate both textual and visual primary sources, including but not limited to poetry, art, costumes, and maps. The findings will provide a cross-cultural comparative approach to a subject that historians have studied only one culture at a time. Additionally, in order to incorporate my computer science major into this project, I will be adding a website component to display my findings. This will allow my project and research findings to have a much wider reach.

John Ellis, Mechanical Engineering
"Passive Evaporative Cooling Food Safe Containers"
Faculty Mentor: Dr. Uri Tasch
Expected Graduation Date: Spring 2011

In regions with inadequate critical electrical infrastructure to supply heating and cooling systems, the storage of heat-sensitive items is difficult. The Zeer-Pot, developed as early as 2000 B.C. used evaporative cooling as a means of keeping perishables fresh. The traditional Zeer-Pot is constructed from clay pots with an interstitial medium of wet sand. Throughout the day, the wet sand dries, driving convection and cooling the inner pot. The goal of my research is to modernize the materials used in the design of the Zeer-Pot and develop alternate storage utensils in accordance with NSF (formerly National Safety Foundation) food safety requirements. The primary product of this research will be a countertop device that relies on evaporative cooling to chill an interior storage zone. The experiment will be conducted through a range of humidity and temperatures in order to find the optimal operating conditions for such a device. The results may be used to determine what items, potentially including medical specimens, may be safely stored.

Casey Gray, English and Secondary Education
"Americanized Pedagogy: Journey to El Salvador"
Faculty Mentor: Dr. Jean Fernandez
Expected Graduation Date: May 2011

English as a Second Language and Bilingualism are relatively virgin fields of study to applied linguists, language acquisitionists, and educators alike. Due to the growing emphasis on multicultural education in primary and secondary classrooms in North America, it has become my goal to teach and attain from first-hand experience, contemporary techniques for English language and literacy development in multicultural settings with an emphasis on social justice and solidarity. I am interested in uncovering how and in what ways my teaching pedagogy has become Americanized and the positive and or negative implications that cultural background could have on the language learning of students from the El Salvadoran cultural background. It will then be my task to take what I have learned and apply it at home. It is my belief that some of the best works of informative literature as related to teaching are not merely scholastic and technical in form, but are also uniquely written in a free and creative style. Therefore, I will weave together my experience and research with daily El Salvadoran life into a travel narrative as I take on the role of volunteer teacher of English at *The Melida Anaya Montes Language School* of the *Centro de Intercambio y Solidaridad* (Center for Exchange and Solidarity) for nine weeks. I will also participate in Spanish language classes which will allow me to experience and evaluate the role-reversal that will take place when I become the American student in a Hispanic cultural setting instead of the teacher. This will serve as a great balance of perspectives. In my study and experience, I will take a social constructionist perspective with an emphasis on transformation pedagogies and education as a practice of freedom.

Krystyna Horn, Biological Sciences
"Sexual Signaling With Colored Pigments: Are Eastern Meadowlarks Hiding Costly Carotenoids?"
Faculty Mentor: Dr. Kevin Omland
Expected Graduation Date: Spring 2011

My goal is to examine the evolution of coloration with a specific interest in sexual signals. Eastern Meadowlarks express yellow pigments in the feathers of the breast, but a small area - in the shape of a V - is black. Two possible hypotheses explain this: (1) Carotenoid expression has been lost from an ancestral state or (2) Carotenoid expression has been retained "under" black pigments. If carotenoid expression has been lost, then this would suggest that depositing carotenoids in feathers is costly. Birds and animals are unable to synthesize carotenoids *de novo*, so they must be obtained from a dietary source. As previous studies have indicated that the expression of carotenoids is a costly sexual signal (McGraw 2006), then it would also be costly to deposit carotenoids that are masked in certain areas of the body. In a related species, the Bullock's Oriole, black feathers from the nape were found to have underlying orange coloration when bleached (Butcher & Rohwer 1989). This suggests that the Eastern Meadowlark may be masking carotenoids with its black breast feathers. This research will determine the presence or absence

of carotenoids in the black breast feathers to better understand the evolution of sexual signals and the costliness of expressing them. This might help explain the variety of colors and patterns we see in birds.

Megha Jacob, Music Education/Pre-Physical Therapy
"The Incroporation of Music Therapy into Physical Therapy Sessions for Physically Disabled Children"
Faculty Mentor: Dr. Airi Yoshioka
Expected Graduation Date: Fall 2010

This research will assess the effects of introducing music therapy (MT) into physical therapy (PT) sessions. Physical illness due to genetic and/or environmental factors (such as Down syndrome or car accident injuries, respectively) can be traumatizing. This is especially true with children because they are expected to cope with so much at a young age. Therapy sessions can be intense and draining for patients and can take a toll on their psychological state. MT, which promotes wellness in individuals by offering therapeutic benefits to the mind through the use of musical involvements, can help offset the psychological fatigue associated with PT. I plan on researching the specific types of physical disabilities for the children at the schools/institutions, so I can better understand the limitations and hazards of each disability. I also plan on attending educational workshops based on music, education, and therapy so that I may work under licensed therapists with both clinical and work experience. I wish to create innovative therapy techniques to incorporate music into therapy sessions by utilizing kinesthetic techniques to respond to sounds, creating group exercises to heighten social skills, and encouraging patients to compose and perform songs to help relieve stress and stimulate their minds. The goal of my research is to examine whether or not the combined use of PT and MT in therapy sessions is positively correlated with the patient's mental and physical well-being.

Natée Johnson, Mechanical Engineering
"X-Ray Study of Nano-Scale Superlattice Materials"
Faculty Mentor: Dr. Fow-Sen Choa
Expected Graduation Date: Spring 2011

Nano-scale supperlattice (SL) based devices, such as quantum cascade lasers QCLs, have recently become very important due to their capability to identify toxic and explosive chemicals. In manufacturing these Mid-IR photonic devices, atomic-level scanning tunneling microscopes (STM) and transmission electron microscopes (TEM) have been used to characterize the growth quality of superlattice wafers. However, these methods yield observations that are localized and cannot view the entire structure and even now we have not been able to correlate these measured crystal lattice images with device performance. The x-ray scanning technique has greater likelihood of success given that it can observe not only the localized but also the entire superlattice structure. By extracting special features and key parameters in x-ray diffraction patterns, the epitaxial quality of QCL superlattices can be evaluated and correlated to the

performance of fabricated QCL devices. We can then differentiate and classify different grades of wafers before starting device fabrication and testing. In this work, we use X-ray diffraction techniques and Fourier analysis as tools to study and compare grown SL wafer quality. The aim is to provide immediate feedback to QCL growers in order to improve their successive growth runs without waiting 3-4 weeks for device processing and testing, given that poor wafers will be immediately eliminated, and performance for all other wafers can be anticipated prior to fabrication.

Sheriff Jolaoso, Computer Engineering
"Harmonies and their Neurological Effects in Fourier Domain"
Faculty Mentor: Dr. Fow-Sen Choa
Expected Graduation Date: Spring 2012

This research aims to develop methods to quantitatively evaluate the quality of musical instruments using Fourier analysis. We will further study the human brain wave responses at both time and Fourier domain to understand psychoacoustics interpretations toward computer and instrumentally-generated music notes and timbres. Our specific goals include studying the relationship between the harmonic content of a sound signal and human feeling as well as interpretation toward that sound and measured electroencephalogram (EEG) signals of brain wave responses to auditory stimuli from different music rhythms, tones, harmonics and their combined dynamics. Along with those goals we want to identify new and objective methods to quantitatively evaluate the quality of music instruments using Fourier techniques. At the end of the study we want to link the measured results with study results from our goal of seeing the relationship between harmonic content and human feeling through EEG readings to try to understand the brain wave expressions of music related emotion and establish the fundamental knowledge for future auditory based bio-feedback training. With this information we could find possible trends that could assist in psycho-acoustic treatments.

Achsah Joseph, INDS
"The Effectiveness of Aid Organization in Northern Uganda"
Faculty Mentor: Dr. Devin Hagerty
Expected Graduation Date: Spring 2012

The decades-long conflict in northern Uganda has negatively impacted the Acholi people. Their children have been kidnapped, their villages have been destroyed and their farms have been razed. Most of the people now live in Internally Displaced People camps. Many non-profit organizations have responded to this crisis, providing aid to the Acholi people and homes for former child soldiers. However, the effectiveness, sustainability and impact of these aid organizations have not been researched. Looking at the impact of these aid organizations will identify what strategies and aid are most helpful to the people in northern Uganda, which can improve the amount and type of aid provided. Improving the aid that the Acholi people receive,

and ensuring that it is sustainable, will help reconstruct society and structure in the war torn regions of northern Uganda.

Nathaniel Kim, Chemistry and Political Science
"Tricyclic Carbonucleosides as Medicinal Agents for HCV Polymerase"
Faculty Mentor: Dr. Katherine Seley-Radtke
Expected Graduation Date: Spring 2011

One of the major public health risks in the world today is the Hepatitis C Virus (HCV). The current standard therapy for HCV infection, co-treatment with interferon-a-2b and ribavirin, has shown low efficacy and side effects, pointing to the need for new and more efficacious treatments. In order to develop novel candidates against HCV that exhibit greater inhibition than current treatments while minimizing cytotoxicity and side effects, we have designed and synthesized a series of tricyclic nucleoside analogues that have strategically designed features that should prove highly beneficial. These tricyclic purines nucleosides feature a carbocylic ring in place of the ribose moiety. This structural modification increases both the nucleoside's stability towards cellular repair enzymes and its ability to cross membranes, both of which are problems associated with ribose analogues. A second modification has been incorporated into the tricyclic base; replacement of the N-7 nitrogen provides a 7-deaza pyrrole moiety. A number of 7-deaza compounds have been shown to be potent inhibitors of HCV while maintaining low cytoxicity. Thus, combining these two structural attributes with that of known tricyclic nucleoside HCV inhibitors should synergistically result in increased anti-HCV activity.

Emily Kimak, Interdisciplinary Studies
"Dance, Sustainability and Ecology Research at the SEEDS Festival"
Faculty Mentor: Ms. Carol Hess
Expected Graduation Date: Winter 2010

This research will include a literature review of environmental art and dance and a 10-day conference called SEEDS: Somatic Experiments in Ecology, Dance and Science, in Plainfield, Massachusetts in July 2010. Upon my return from the SEEDS festival I will draw from my research of experimental dance-making, Body-Mind Centering, improvisation, ecology, environmental sustainability, and environmental art to compose my Interdisciplinary Studies capstone project consisting of a research paper and site-specific performance. I will explore an environmental issue using choreographic and improvisational methodologies learned at the SEEDS festival, and the entire performance process will establish an environmentally sustainable model, unlike traditional modes of dance performance. I will document my creative research process and final artistic product through photography, video and a dedicated public blog.

Dora Korewa, American Studies
"Contemporary Italian American Stereotypes in the Media"
Faculty Mentor: Dr. Duncan Campbell
Expected Graduation Date: Spring 2011

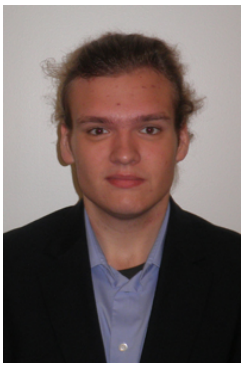
This research will examine the "guido" and "mobster" stereotypes, the prevalent representations of Italians in American media. I will first examine the stereotypes themselves – their media histories and the academic work pertaining to them. Then I will conduct a specific content analysis of these stereotypes in two cultural phenomena: *The Sopranos*, an HBO series featuring prominently the "mobster" stereotype, and *Jersey Shore*, an MTV reality show relying heavily upon the "guido" stereotype. After examining these shows from a traditional media studies lens, I will examine the response they elicit from the people whom they affect the most. I will conduct study groups with both Italian Americans in the U.S. and Italians in Italy after showing a brief series representative clips of each of the shows to the participants. These focus groups will offer a base level of understanding of the ways these stereotypes are received by the people they are associated with on an increasingly global level. I am particularly interested in the difference between the Italian and Italian American responses because these shows, which are originally American, have been released in Italy without the cultural context that makes these stereotypes recognizable. I wonder how Italians without the understanding of these stereotypes as culturally accepted respond to media representations that seem so foreign, and yet are associated, both by word and image, with a country and population from which the stereotypical individuals featured are so far removed.

Margaret Kott, Biological Sciences
"Sequencing *Gastrosaccus Spinifer* Opsins"
Faculty Mentor: Dr. Thomas Cronin
Expected Graduation Date: Spring 2011

The visual system of *Gastrosaccus spinifer*, a marine crustacean found throughout the North Sea, will be studied in order to further current understanding of arthropod and crustacean opsin protein evolution. Visual systems are based upon visual pigments, light-absorbing molecules composed of an opsin protein and a vitamin A-derived chromophore covalently bound to the opsin. Opsin protein evolution, as well as visual pigment research in general, is a topic of interest to many biological disciplines (Porter 2005), and much work has already been conducted in the area of vertebrate opsin evolution. Therefore, this study aims to expand upon research already begun on invertebrate visual systems, specifically those of crustaceans (Crandall and Cronin 1997, Porter et al. 2009). Using molecular methods, this research aims to obtain full DNA nucleotide sequences of opsin proteins from the eyes of *G. spinifer*. From a complete sequence, the primary structure of an opsin protein may be deduced and compared to opsins of closely related species, helping us to infer their evolutionary relationships.

Julianna Kuhn, Geography and Political Science
"Measles in a Modern World: Comparing the 2008 Outbreaks Austria and the United States"
Faculty Mentor: Dr. Dawn Biehler
Expected Graduation Date: Spring 2011

n developed countries, like Austria and the United States, measles is often regarded as a disease of the past since vaccinations have been available for almost 50 years. However, in 2008 measles outbreaks occurred in both countries affecting several hundred individuals, securing measles a place as a modern day problem even in the developed world. My research examines each country's outbreak by first evaluating the mechanics of the disease spread. The second portion of my research asks for a more complex analysis of the episode: How have the media and popular discourse represented a) the measles outbreaks, b) the people who were infected, and c) the responsibility of the individuals and the state for controlling disease? National health outbreaks provide a unique opportunity for nations like Austria and United States, who value personal freedoms, to demonstrate the best way to balance the personal beliefs of individual citizens with the public safety and the well-being of the community as a whole. A comparative qualitative discourse analysis of popular media documents and government reports illuminates better ways to handle disease outbreaks in the future and the ways media representation of disease shape popular understanding of public health.



Colin Leach, History
"The Eleventh Hour: Armand de Caulaincourt and French Diplomacy at the Congress of Châtillon, 1814"
Faculty Mentor: Dr. Daniel Ritschel
Expected Graduation Date: Spring 2012

In the first months of 1814, the end of the Napoleonic Wars appeared in sight. Austrian, Russian, Prussian, and British diplomats discussed amongst themselves whether or not they could achieve peace with the so-called "Corsican ogre." These attempts at a negotiated peace culminated in the Congress of Châtillon in February and March 1814. However, this meeting failed in its task and the war continued for several more months. Historians have traditionally dismissed this congress as a stalling measure on Napoleon's part and have assigned it little significance. However, no significant research has been done to examine French aims and goals at this congress. My research will therefore examine French intentions and construct an interpretation of their diplomatic policy during the last months of the war.

Chinhui Lin, Biochemistry and Molecular Biology
" Association between Parenting Goals and Parenting Practices among Chinese Immigrants"
Faculty Mentor: Dr. Charissa Cheah
Expected Graduation Date: Spring 2011

Culture plays a significant role in shaping parental values regarding desirable and undesirable long-term socialization goals and child behaviors, as well as optimal parenting practices. However, there is limited research on Chinese American parents' long-term parenting goals for their children's development and their parenting practices. Thus, the present study aims to examine: (1) the major themes and the content of the long-term parenting goals for their preschool children reported by immigrant Chinese mothers, (2) mothers' endorsement of Chinese indigenous parenting practices, (3) and the associations between the parenting goals and parenting practices of these mothers. Seventy immigrant Chinese mothers will be interviewed regarding their long-term socialization goals and asked to complete questionnaires about their parenting practices. The findings from this study will enhance our understanding of how these mothers achieve their long-term socialization goals for their children in the U.S. and contribute to our promotion of the successful development of these families.

Elizabeth Lynch, Russian
"Investigation into the Acceptability of Non-US English in the Academic Classroom"
Faculty Mentor: Dr. Thomas Field
Expected Graduation Date: Spring 2011

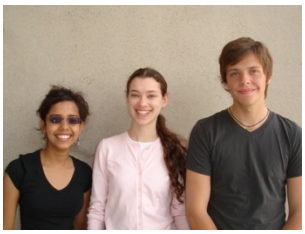
While the needs and challenges of students with limited English proficiency who come to countries like the United States are well documented, the difficulties faced by students who grew up speaking a standard, but non-United States form of English as their native language in their home country are rarely considered despite their growing presence in the US educational system. I plan to conduct a pilot study examining the ideological norms of "standard" English as applied in the English and History departments of UMBC by interviewing speakers of some of these "World Englishes" and compiling a questionnaire to discover how faculty in the History and English departments judge non-US English norms in written work. Some of these faculty members will then be interviewed to further elaborate on their responses. This will reveal how the norms of "standard" English may affect students and provide a foundation for further studies.

Richard Maduka, Chemistry
"The Affinity of CU^{1+} for the Amyloid-β Peptide of Alzheimer's Disease"
Faculty Mentor: Dr. Veronica Szalai
Expected Graduation Date: Spring 2012

Alzheimer's disease is a fatal neurodegenerative disorder. Extracellular plaques hypothesized to be the cause of dementia, develop in the brains of Alzheimer patients. These plaques are mainly made of the amyloid-β (Ab) peptide. The Ab plaques contain redox-active metal cations, including copper, which generate oxidative stress that kills neurons. In order for copper ions to participate in oxidative stress, both the low (Cu^{1+}) and high (Cu^{2+}) oxidation forms must bind to Ab with high affinity. The goal of my research is to determine the affinity and coordination environment of Cu^{1+} when it is bound to the Ab peptide. We hypothesized that the two histidines that bind Cu^{+1} in a linear bis-histidine coordination environment (as demonstrated by previous work in the Szalai lab) are positions 13 and 14 in the Ab peptide sequence. To test this idea, Competitive chelation experiments of Cu^{+1} will be performed between Aβ16 (wild-type, H6A, H13A, and H14A) and disodium bathocuproine disulfonic acid. This data increases the knowledge of the copper-Ab complex and could ultimately influence drug design and targeting.

Stefanie Mavronis, Political Science and MCS
"Indigenous Media in Bolivia: Audiovisual Democracy in a Globalized World"
Faculty Mentor: Mr. Jason Loviglio
Expected Graduation Date: Spring 2012

This research will explore the ways that indigenous populations in Bolivia utilize new media technology to foster a *de facto* form of democracy and to build community, especially in the midst of the hyper-mediated world of the twenty-first century. Scholars have written extensively about the effects of globalization on less-developed nations, focusing largely on the benefits of the spread of information and the detriments of exploitative and unequal power relations. However, few have focused on the ability of nations like Bolivia to create alternate political spheres, especially through the production of audiovisual media. Two-thirds of the country's population is classified as indigenous, a subset of the population that is highly illiterate. Furthermore, the state and Catholic Church largely control mainstream media, failing to meet the needs of these indigenous populations. Through conducting interviews and analyzing the media culture of indigenous populations in Bolivia, I hope to better understand this audiovisual resistance to globalization at large and connect its media production with the larger political question of democracy.



Eliana NessAiver, Soutry De, and Ryan Valenza
Engineering and Physics
"Wind Energy Viability Near the Mid-Atlantic"
Faculty Mentor: Dr. Lynn Sparling
Expected Graduation Date: Spring 2013

It is becoming widely recognized that traditional forms of energy such as fossil fuels are not sustainable and are leading to climate change; therefore research into alternative sources of energy is an important endeavor. Currently, we do not have much detailed knowledge about winds near the coast. The goal of this research is to establish the feasibility of wind turbines off the mid-Atlantic shoreline. To begin, our team will gather wind measurements

from multiple sources, including buoys, weather balloons, anemometers on high towers and satellites, and then develop IDL programs, using previous programs written by our mentor as a template, to perform a statistical analysis of the data and interpret the results in terms of wind energy potential. We will also analyze the winds from a weather forecast model. Our goal here will be to compare the simulations to actual wind data in order to note patterns in the winds, isolate unusual areas that should be subject for further research, and determine current predictability of winds along the mid-Atlantic coast and offshore.

Christine Osazuwa, INDS
"Film Exploration of the Influence of Popular Rock Music on Youth"
Faculty Mentor: Mr. Fred Worden
Expected Graduation Date: Spring 2011

Since its inception, rock 'n roll in all of its forms has had a tremendous impact on society and youth culture. With artists such as The Beatles from the 1960s to as recently as The Backstreet Boys in the early 2000s, the media has focused on the pandemonium these artists create when put in the presence of their fans, often young adolescent girls. However, with the dwindling sales of albums, the days of the platinum selling artist are nearly over. While albums no longer achieve Gold status in mere minutes, the crazed nature of fans' attitudes continues today, directed towards smaller more accessible pop bands. These artists and their record labels are using social networking and blurring the lines of public versus private lives in order to build an artist brand and incite fanatic behavior among adolescents similar to what has been seen in the past. I will make a documentary film showing the behavior of the fans of specific genres of music. This will show society and the music industry that millions of record sales or radio play are not the factors that incite fanatic behavior. Rather the obsession can be attributed to creating a brand and a sense of community and identity among the listeners.

Asmara Qamar, Biological Sciences
"Isolation and Characterization of Mutations in Ribosomal Proteins L4 and L22 That Confer Ketolide Resistance"
Faculty Mentor: Dr. Janice Zengel
Expected Graduation Date: Summer 2010

Protruding domains of ribosomal proteins L4 and L22 contribute to the narrowest region of the peptide exit tunnel. Several types of antibiotics, including macrolides and ketolides, are presently thought to interact with the tunnel, and mutations in L4 and L22 have been shown to confer antibiotic resistance. The novel ketolide antibiotic Cethromycin is currently undergoing development for the treatment of community acquired pneumonia and biodefense pathogens, and is considered more potent than macrolides possibly because it makes more contact points: in addition to 23S rRNA domain V, it also makes contacts with domains II and IV. This study aims to isolate and characterize *E. coli* strains with mutations in L4 and L22 by selecting on Cethromycin. Currently, eight mutants have been isolated, six of which are novel; three of the latter display out-of-frame deletions that are

predicted to eliminate a majority of the L22 protein. Additional mutants are also being generated through quickchange mutagenesis. The growth rate and degree of antibiotic resistance of these mutants will be assayed, as well as the mutant ribosome's binding affinity to Cethromycin. By characterizing antibiotic resistant mutants, this project hopes to shed additional light on mechanisms of ribosomal protein mediated antibiotic resistance.

Hannah Rider, Music Education
"Ornamentation in the Hitorical Context"
Faculty Mentor: Dr. Lisa Cella
Expected Graduation Date: Spring 2012

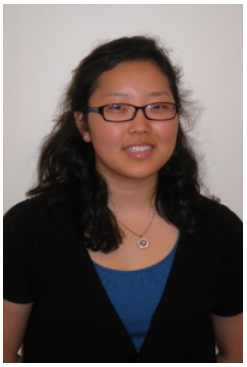
When playing music from the Baroque period (circa 1600-1750), a performer is faced with unique challenges. The contemporary performers of the period embellished, or ornamented, the notes that the composers wrote with innovations of their own. Many contemporary classical musicians are not familiar with the stylistically appropriate methods of adding ornamentation. I hope to increase my knowledge of the style period and also improve upon my ability to share this beautiful music in the creative, improvisational style for which it was intended. I will focus my research on the composer Georg Telemann, particularly his *12 Fantasias for Solo Flute*. I will read and study major treatises on music performance from the era, study recordings of a variety of interpretations of the pieces, and take lessons with experts in Baroque performance. I will then use the knowledge that I gain to create my own ornamented versions of the Fantasias. The product of my research should be a creative, musically satisfying interpretation which I can say with some degree of confidence is stylistically correct for the period; I will perform a lecture recital for the benefit of the rest of the studio.

Christina Ross, Ancience Studies/MLL
"Who Does It Belong To?: The Impact of the Repartition of Artwork from the White-Levy Collection to Italy on International Museum Policies"
Faculty Mentor: Mr. Richard Mason
Expected Graduation Date: Spring 2012

Over the past two decades, Italy has been taking a firmer stand against museums and private collectors whose holdings have objects of questionable origin. One of the most successful repatriation efforts entailed artifacts from the Shelby White and Leon Levy collection which has previously been on display at New York's Metropolitan Museum of Art. Ten objects were returned to Italy in 2008 after 18 months of negotiations. Italy, however, has said that these pieces would still be on display in museums internationally. Essentially, they have adjusted their national policy to be one of "lend and borrow," in which works of art are borrowed by museums internationally for a predetermined length of time directly from the Italian government.

Italy's unrelenting pursuit of illicit artifacts, its success in the repatriation of the White-Levy Collection, and the adoption of a new lending policy are factors in a critical turning point in

museum policy on an international scale. A change like this will completely reconstruct the international web of countries, museums, and collectors. Museums have operated in the same manner of borrowing directly from private collectors since becoming popular in the late 18th century. This would be one of the first major revolutions in the way museums function. It is my intention to explore the methods pursued by Italy in its role as the most progressive country in combating the illicit trade and ownership of art and antiquities, investigate the history of ownership and controversy surrounding the artifacts in the White-Levy Collection that were repatriated, and ultimately evaluate Italy's success as well as its impact on the illegal antiquities trade and its potential for radically changing the manner in which other American museums operate on an international level.



Annah Seo, Biological Sciences and Psychology
"Examining Parenting Behaviors, Socialization Goals, and the Development of Korean Immigrant Children"
Faculty Mentor: Dr. Charissa Cheah
Expected Graduation Date: Spring 2012

Culture influences many aspects of parenting including parents' expectations of their child and their parenting behavior. My previous URA-funded study found that Korean immigrant mother's long-term socialization goals predicted their children's conduct and peer relationship problems, and prosocial behaviors. However, the specific mechanism through which parenting goals are related to child outcomes is not well understood, and little is known about parenting behaviors among Korean immigrant mothers. This project will extend my previous research and assess the mediating role of observed parenting behaviors in the association between mothers' socialization goals and their children's outcomes. Mothers' socialization goals are predicted to be associated with their observed parenting behaviors, which will in turn be associated with their children's social and behavioral outcomes in school. Fifty Korean immigrant mothers were interviewed regarding their socialization goals. Their parenting behaviors with their children will be observed and coded (e.g., warmth, control, sensitivity/responsivity), and their children's teachers will rate their behaviors in the classroom. These findings will examine intra-cultural variation in parenting, parenting belief-behavior relations, and the importance of parent-reported versus observational assessments of parenting. Needed information on factors that predict effective parenting and the healthy behavioral adaptation of Korean immigrant young children will be addressed.

Sarah Sexton, Antrhropology
"Aimar Plantation Letters, 1871to 1898"
Faculty Mentor: Dr. Anne Rubin
Expected Graduation Date: Spring 2013

This project seeks to use the "White House plantation letters" in the South Carolina Historical Society's archives to understand plantation management in

Reconstruction and post-Reconstruction era South Carolina. The letters were written between 1871 and 1898 by the plantation's managers to inform the absent owner, Charles Pons Aimar, of the plantation's affairs. Topics addressed in the letters include planning how many acres of which crops to plant, labor contracts and plantation maintenance. These letters give a great deal of insight into the business aspects of a post-war plantation and are a valuable resource in furthering understanding of plantation management. The information gained from this project will be presented to the public through use of a website and a paper.

Shiva Sharma, Information Systems
"Authentication for the Blind Community"
Faculty Mentor: Dr. Ravi Kuber
Expected Graduation Date: Fall 2010

A tactile authentication system has been developed to address the challenges faced by blind users when entering passwords to access personal information stored in electronic format. Issues commonly encountered include inaccessible feedback presented by systems, and the risk of third parties viewing passwords whilst being entered thereby compromising security. Users will enter a 'tactile password', comprised of four pin patterns presented via cells on a tactile mouse. As the pin patterns are presented beneath the fingertips, they are accessible by a wide range of users, and hidden from 'shoulder surfers'. A study will be undertaken to identify whether the tactile stimuli are memorable, and examine usability of the interface.

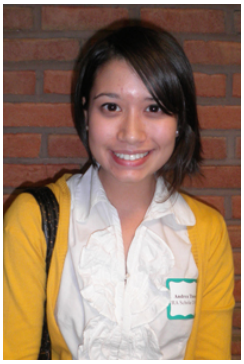
David Shyu, Computer Engineering
"Array-Beam-Forming Processing of Brain Waves"
Faculty Mentor: Dr. Fow-Sen Choa
Expected Graduation Date: Spring 2011

Electroencephalography (EEG) is a method directly recording electrical activity produced by the firing neurons within the brain. Compared to functional magnetic resonance imaging (fMRI), another technique used for non-invasive brain diagnosis, EEG is much smaller in size, less expensive, and more portable. The EEG method can also achieve much better time resolution, enabling doctors to monitor brain activities in real time. On the other hand, EEG has poor spatial resolution. Electrical signals are smeared or dispersed when they travel through the cerebrospinal fluid, skull, and scalp. This research will first process EEG data, applying Fourier analysis to extract distinctive brain activities in the frequency domain as time progresses. The research will also use beam-forming techniques to combine multi-electrode signals and achieve position locating of specific brain signals. By using Fourier analysis and beam-forming techniques, the research will improve the utility of EEG, improving the poor spatial resolution disadvantage. Additionally, the proposed work will identify differences between the brain

function of healthy and diseased brains and help identify or locate trouble sources of epileptic seizures noninvasively.

Gary Thompson, Bioinformatics and Computational Biology
"Scalability of Mutation Extraction from Biomedical Literature"
Faculty Mentor: Dr. Maricel Kann
Expected Graduation Date: Spring 2011

A major goal of biomedical research towards personalized medicine is to find relationships between mutations in the human genome and their corresponding disease phenotypes. Currently, there is no fully comprehensive database which records all of these mutations, requiring researchers to search the current literature each time a mutation is identified. We have established a new method called the Extractor of Mutations (EMU), which has been compared to other existing programs, including Mutation Finder, on data from prostate cancer and breast cancer. We will continue to expand our results on EMU towards other diseases, including diabetes, Alzheimer's, and lung cancer, among others. Based on previous work, we expect to approximately double the amount of documented mutations present in the primary databases of OMIM and Swiss-Prot. For diabetes, this would be approximately 100 new mutations, for Alzheimer's 50, and for lung cancer 50. Furthermore, EMU will be improved to allow higher accuracy of gene recognition. As with any text mining, correctly identifying the gene is a difficulty we have encountered in the past. We will illustrate a method by which we anticipate approximately 80 percent success in identifying the single gene associated with an identified mutation.



Andrea Thomson, Political Science and Economics
"An Evaluation of State Economic Development Subsidies - Results and Transparency"
Faculty Mentor: Dr. Roy Meyers
Expected Graduation Date: Spring 2011

This research investigates the transparency of economic development initiatives including subsidies, tax credits and private contracts by examining the availability of clear public records which state the costs and results of state economic development programs. If such records are not available, I will explain why, and then develop a plan of action to increase transparency. Existing information regarding Maryland's economic development initiatives suggests that only a few documents report the outcomes of these investments. This potential information asymmetry between taxpayers and government officials would allow for the misuse of public dollars and undermines any attempt at performance budgeting. Much of this research will be devoted to the construction of case studies comparing Maryland's public record of economic development initiatives to those of Pennsylvania and Virginia. These case studies will be used to determine Maryland's relative level of "transparency." Pennsylvania and Virginia may also serve as potential models of transparency for our home state. My research focuses upon the gathering of

data from: the economic development budgets of several states, national newspapers, Fifty-state data sources, academic publications and primary sources in state governments. Much of my research will take place while interning at Maryland's Department of Business and Economic Development.

Franki Trout, Dance
"Investigating the Technique and Legacy of José Limón"
Faculty Mentor: Mr. Doug Hamby
Expected Graduation Date: Spring 2012

José Limón was a leading founder of American modern dance and a major influence in the dance world during his lifetime. Even after his death in 1972, his legacy continues in the bodies of the dancers in the José Limón Dance Company who perform his choreography and continue to teach his technique. The only way to learn this technique is to go to the source and learn from the people who practice and live it every day. The ideas and principles of Limón technique are passed down from generation to generation and would be lost without dancers willing to learn and share this knowledge. My research involves learning this specific technique and the principles of fall and recovery, breath, suspension and musicality that are very characteristic of it. I plan to apply these ideas to my own artistic vision and create a dance performance work that uses the principles of Limón technique in a new and exciting way. Through the creation of this work I will share my new knowledge of Limón's choreographic and technical methods with my UMBC dance peers. My new dance will demonstrate that the blending of dance ideas and practices from artists of the past is valuable to a dance world that is constantly evolving and changing.

Amond Uwadineke, Political Science
"Nigeria's Resource Curse - Conflict in the Niger Delta"
Faculty Mentor: Dr. Carolyn Forestiere
Expected Graduation Date: Spring 2011

How has oil influenced ethnic conflict and how does ethnic conflict then influences Nigeria's democracy? Three important themes will be addressed in this research: 1) the "resource curse" in Nigeria, 2) ethnic representation in the domestic politics of Nigeria, and 3) ethnic identity in the Niger Delta. Nigeria is an example of a country that suffers from the "resource curse". It has an abundance of a natural resource while at the same time, it has an internal conflict that stems from factions fighting for their share of the wealth. Focusing on the resource curse, I aim to explore how the abundance of oil has fostered or hindered the development of ethnic representation in domestic political institutions. In Nigeria, ethnic identity is very important. Nigeria has more than 250 ethnic groups with different cultures, histories and antagonisms. Most of Nigeria's oil is found in the Niger Delta, which is home to Ijaw, Urhobo, Itsekiri, Ogoni and other minorities. However, the region has been polluted by the oil industry and the region remains impoverished even though the nation's wealth is located in the region. Now after many

years of neglect, many of the ethnic groups that inhabit this region have been making their voices heard with peaceful protest and armed resistance in support of their demand for a greater share of Nigeria's oil revenue.

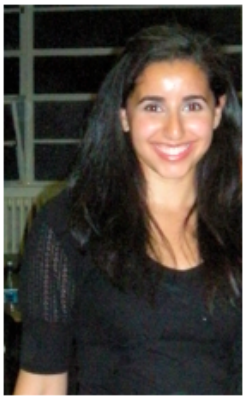
Shaun Vain, Theatre
"Incorporating the Fundamentals of the Sukuki and Viewpoints Methods into Performance"
Faculty Mentor: Dr. Alan Kreizenbeck
Expected Graduation Date: Spring 2011

Saratoga International (SITI Company) was founded by Anne Bogart and Tadashi Suzuki. SITI Company strives to create ensemble-based, collaborative, original productions. The methods they implement an awareness and kinesthetic connection to oneself, the space and whoever else occupies the space. The Viewpoints training offered at SITI Company allows actors to become aware of their body, the shape one takes in space and the integration of the surrounding environment. Suzuki method creates an atmosphere for the actor to concentrate on grounding himself in space and opening to an audience under extreme pressure. In addition to these training methods, I will also be taking a new Master Series class offered by SITI Company, entitled Consciousness of Movement. This course is designed to help actors remain aware of their bodies in space, incorporating non-traditional dance and improvisation. Through attending these workshops and understanding valuable methods and practices, I will organize and conduct my own workshop for the UMBC Community. After completion of said workshop, we, as a group will perform a collaborative movement piece based off a piece of text.

Shelby Vargo, Chemical Engineering
"Signaling Transduction of DRG Neurons in 2D and 3D Microenvironments"
Faculty Mentor: Dr. Jennie Leach
Expected Graduation Date: Spring 2011

Spinal cord injury is a complex biological problem for which there is currently no solution. Although great strides have been made in developing new therapies for nerve repair, tissue engineering efforts have been limited by the lack of knowledge and understanding of how neurons interact with their 3D environment. Previous studies with non-neuronal cells have shown that three-dimensional (3D) microenvironments better mimic *in vivo* systems than traditional two-dimensional (2D) culture. Some of our previous work dealing with neurite outgrowth and growth cone morphology analysis has proven this to be the case with neuronal cells as well. My work will focus on establishing differences between signaling mechanisms regulating neurite outgrowth and branching in 2D and 3D culture. We hypothesize that 3D environments impose changes in matrix-ligand organization and alter neuronal behavior by modulating β1-integrin cytoskeleton signaling. To test our hypothesis we will culture mouse dorsal root ganglion (DRG)

neurons in 2D and 3D collagen materials and use immunocytochemistry techniques combined with confocal microscopy to analyze the presence and location of six key signaling molecules whose regulation directly controls neuronal activity such as survival, neurite extension and growth cone motility: β1-integrin, Focal Adhesion Kinase (FAK), phosphorylated forms of FAK at tyrosine sites 861 and 397, and downstream molecules, RhoA, and Rac1. Immunoblotting will be used to quantify the expression levels of each molecule. The results from my study will provide a foundation to design optimal biomaterials towards the development of therapeutics of nerve repair and neurodegenerative disorders.



Salma Warshanna, English, Communication and Technology track
"*Project Juxtapose*: Memoir Writing and its Role in Cultural Awareness"
Faculty Mentor: Dr. Robin Farabaugh
Expected Graduation Date: Spring 2011

I plan to write a series of creative nonfiction essays, wherein I relate my parents' emigration from Egypt and their experiences in America over the past 20 years. Combing through a range of human emotions, I will illustrate real life experiences in narrative form. I will explore how my being raised between two cultures has shaped who I am. I will also explore my relationship with my parents by aligning the parallels between my mother's life and my own, and mapping out the intersections between me and my father. The familial archeology will take me to Alexandria, Egypt, where my parents grew up and the majority of my relatives still reside. I will follow their journey across the United States, from Milwaukee, where I was born, to Buffalo, Pittsburgh, and the cities that witnessed my growth around Maryland. A semester studying abroad has played a crucial role in how I relate to and understand my parents and their experiences. My explorations in the United Kingdom will be woven into the bigger story about culture fusion, strength, struggle, love, and family. Writing a memoir will lead to a study of memoir itself. For a separate analytical essay, I will research and gather critical materials on the craftsmanship of writing life stories and the memoir's role in cultural awareness. I will also read memoirs by other individuals who have had to balance two separate worlds and harmonize them into one life.

John Winder, Computer Science
"A Digital Skeleton Key to Art: Symbolism of Light and Dark in European Oil Painting from 1500 to1900"
Faculty Mentor: Dr. Preminda Jacob
Expected Graduation Date: Spring 2013

Painters of the High Renaissance through Romanticism periods (1500-1900) used chiaroscuro (contrast of light and dark) not only as a stylistic, compositional tool but also to impart symbolic meaning to aspects of their work. I will devise an algorithm that will allow me to abstract the varying values of light and dark in a digital copy of a painting, providing an analysis based on both quantitative and qualitative methods. The purpose of such an analysis is to reveal facets of a

painting, primarily focusing on composition and content, so as to illuminate the artist's intentions, to compare different artists' use of chiaroscuro when portraying the same subject, and perhaps confirm or refute conventional assumptions about a work. For each painting I will provide a contextual "vignette" to explain the artist use of chiaroscuro, its significance and symbolism to the work and compare this to other paintings of the same theme. Such a vignette would address thematic questions covered in numerous paintings. Example vignettes would include: Is Christ portrayed as the lightest figure in a scene? Do artists convey the sublime in dark or light landscapes? What we *think* to be the case might or might not be.

Jojo Yeoba, Biochemistry and Molecular Biology
"Increasing *Aspergillus nidulans* Chronological Life Span via Induced Autophagy"
Faculty Mentor: Dr. Mark Marten
Expected Graduation Date: Spring 2012

Filamentous fungi represent an extremely important class of organisms. As human and plant pathogens, they are responsible for excessive morbidity and mortality as well as billions of dollars in crop losses annually. In contrast, other species of fungi are beneficial and have been used to produce billions of dollars of products in the biotechnology industry. Recently, augmentation of autophagy (via rapamycin or spermidine) has been implicated in extending the chronological life span (CLS) of several organisms (Eisenberg et al., 2009). Autophagy's effect on CLS has yet to be studied in filamentous fungi, even though manipulation of CLS could prove advantageous. For example, increasing the CLS of a fungus during secondary metabolite production could be used to increase product yield in industry, while decreasing CLS could be used to decrease the pathogenicity of harmful fungi in medical fields. Therefore, we will determine if the induction of autophagy by rapamycin exposure increases CLS of *A. nidulans* as it does in several non-fungal species. This research will provide data for publication in a peer reviewed scientific journal, thus laying the ground work for future research in both the Marten Lab and the greater scientific community.