MONTCLAIR STATE UNIVERSITY

Fourth Annual Student Symposium

April 23, 2010

University Hall, 4:00-7:00 p.m.

Presented by

College of Science and Mathematics

College of Humanities and Social Sciences

MSU Chapter of Sigma Xi

Message from the Deans

Original scholarship as part of an educational program is among the most essential components of academia. Studies have shown that students who seek new knowledge through active research attain a deeper level of understanding of their subject. To that end, the College of Science and Mathematics and the College of Humanities and Social Sciences at Montclair State University are proud to present the original work of their students at this, our Fourth Annual Student Research Symposium, an event that showcases the diligence, excitement, importance and excellence of our student scholarship.

Students pursuing research, mentored by our outstanding faculty, forms the foundation of this event. We would be remiss if we didn't congratulate the many students who have chosen to pursue this extra effort along the sometimes unpredictable path of original research. Research cannot be conducted in a vacuum and more and more it is teams of scholars from different disciplines who seek answers to questions that have not before been asked. Our faculty act as mentors and guides and bring their enthusiasm, knowledge, insight and energy to our students. The "discovery" component of education can be a hallmark moment in the years spent in college. We know the research efforts of our students stand as an outstanding source of pride for our faculty. Today we will see posters and hear presentations that represent our students' scholarly work to date. We offer sincere congratulations to all student participants and faculty sponsors for a job very well done.

Many faculty, staff and students in both colleges have contributed to the success of this impressive event but special notes of appreciation go to Diana Thomas Jinan Jaber, Barbara Feldman, and Milos Topic. Thank you also to all of the faculty members who acted as mentors to our students and to all those not mentioned here but who worked tirelessly behind the scenes to make this occasion one of the year's most important events.

Marietta Morrissey, Dean
College of Humanities and Social Sciences
Robert Prezant, Dean
College of Science and Mathematics

Organizing Committee

CHSS: Elizabeth Emery, Marilyn Tayler, Luis Montesinos, Milos Topic, AJ Kelton
CSAM: Jinan Jaber, Diana Thomas, Mary Lou West

Schedule

4:00 PM-4:15 PM **CSAM and CHSS Opening Remarks , UN-1060**
Provost Willard Gingerich, Dean Marietta Morrissey and Dean Robert Prezant

CHSS

4:15 PM-5:00 PM **CHSS Poster Session, Seventh Floor of University Hall**
5:00 PM-7:00 PM **CHSS Oral Presentations (See room assignments below)**

CSAM

4:15 PM-6:30 PM **CSAM Oral Presentations (See room assignments below)**
5:30 PM-6:30 PM **CSAM Poster Session, Seventh Floor of University Hall**
6:30 PM-7:00 PM **CSAM Closing Remarks and Award Recognition, UN-1060**

ORAL PRESENTATIONS
Session I: 5:00 PM-7:00 PM UN–2040

Moderator: Dr. Dorothy Rogers
A. Critical Pedagogy on Democracy in Education

5:00-5:15 **Presenter:** Nataly Chesky **Advisor:** Dr. Helenrose Fives
Title: The Political Dimension of Mathematics: The Misunderstood Subject and what it can Contribute to Society Today

5:15-5:30 **Presenter:** Olivier Michaud **Advisor:** Dr. Tyson Lewis
Title: Unveiling the Disciplinary Role of Testing: A Foucauldian Interpretation

5:30-5:45 **Presenter:** Nicole Amato **Advisor:** Dr. Michele Knobel
Title: The Crisis of the Inclusion Classroom

5:45-6:00 **Presenter:** Janet Mammen **Advisor:** Dr. Chris Herrera
Title: Why Moral Perfection is Overrated

Moderator: Dr. Tyson Lewis
B. Critical Insurgencies

6:00-6:15 **Presenter:** Drew Berkowitz **Advisor:** Dr. David Lee Keiser
Title: The Zapatista Effect: Revolution through New Media Literacy

6:15 -6:30 **Presenter:** Joseph Todd **Advisor:** Dr. Jeremy Price
Title: Critical Masses: Media Literacy for the Multitude

6:30-6:45 **Presenter:** Sabrina D. Misir Hiralall **Advisor:** Dr. Dorothy Rogers
Title: An Interpretation of the Universal Lessons from 19th-Century Woman Philosopher: Eliza Sunderland

6:45-7:00 **Respondent Comments**

Session II: 5:00 PM-7:00 PM UN–2032
HUMANITIES AND SOCIAL SCIENCES
Moderator: Dr. Antoinette Pole

5:00-5:15 **Presenter:** Catherine Winters **Advisor:** Dr. Tom Benediktsson
Title: Pictorial Journey through Recovery

5:30-5:45 **Presenter:** Molly Wilkerson **Advisor:** Dr. Elizabeth Emery
Title: Practicing Dietary Laws in Judaism: Israel and the United States

5:45-6:00 **Presenter:** Brian Magill **Advisor:** Dr. Antoinette Pole
Title: Harry Truman and the Atomic Bombs

6:00-6:15 **Break**

6:15-6:30 **Presenter:** Katherine Sosa **Advisor:** Dr. Antoinette Pole
Title: Behind the Scenes of the National School Lunch Program

6:30-6:45 **Presenters:** Rachel Silverstein and Priscilla Pereira **Advisor:** Dr. Anna Feldman
Title: Annotating Corpora for Idiomatic Expressions
Co-authors include: Laura Street, Nathan Michalov, Rachel Silverstein, Michael Reynolds, Lurdes Ruela, Felicia Flowers, Angela Talucci, Priscilla Pereira, Gabriella Morgon, Samantha Siegel, Marci Barousse, Antequa Anderson, and Tashom Carroll

Session III: 5:00 PM-7:00 PM UN–2031
HUMANITIES AND SOCIAL SCIENCES

A. Moderator: Dr. Jean Alvares

5:00-5:15 **Presenter:** Brian Bloom **Advisor:** Dr. Jean Alvares
Title: The Conflict of Justice in Aeschylus' *Oresteia*

5:15-5:30 **Presenter:** Naomi Watanabe **Advisor:** Dr. Jean Alvares
Title: The Meaning of Sacrifice and its Place in Literature

5:30-5:45 **Presenter:** Nicole Papaioannou **Advisor:** Dr. Lee Behlman
Title: 'But they would not teach her to play': Child Heroines, Fantasy, and the Debate on Victorian Female Education

5:45-6:00 **Presenter:** Maj Kristina Kristensen **Advisor:** Dr. Jean Alvares
Title: Choose Responsibility

6:00-6:15 **Break**

B. Moderator: Dr. Elizabeth Emery

6:15-6:30 **Presenters**: Monica Odom and Katelyn Dilley **Advisor:** Dr. Ron Hollander
Title: The *Christian Century*'s Case of Bipolarism during the Holocaust

6:30-6:45 **Presenter:** Maureen Grimaldi **Advisor:** Prof. Ron Hollander
Title: The *Nation* Calls a *Times*-Out
Co-author: Keri Nagurka

6:45 -7:00 **Presenter:** Christina Jen **Advisor:** Dr. Naomi Liebler
Title: War, Rumor, and the Common People: The Role of the Tribunes in Shakespeare's Roman Plays

Session IV: 5:00 PM-7:00 PM UN–1060
JURISPRUDENCE
Moderator: Professor Avram B. Segall

5:00-5:15 **Presenter:** Emily Marie Bisnauth **Advisor:** Dr. Marilyn Tayler
Title: An Interdisciplinary Discourse on *Parens Patriae* v. Personal Liberty: The Dispute Between the State's Duty to Assert an Injury in "Quasi-Sovereign" Interests and the Right Held by Legal Guardians of Minors to Freely Exercise Religion.

5:15-5:30 **Presenter:** Lynnett Brooks **Advisor:** Dr. Marilyn Tayler
Title: Constitutional Protections Left "At the Schoolhouse Gate!"

5:30-5:45 **Presenter:** Andrea Castro **Advisor:** Dr. Marilyn Tayler
Title: Legalizing Prostitution: Should the United States follow in the Netherlands' and Nevada's footsteps?

5:45-6:00 **Presenter:** Peter LaGreca **Advisors:** Dr. Marilyn Tayler & Prof. Avram Segall
Title: Urban Sprawl: The American Dream Unfulfilled?

6:00-6:15 **Presenter:** Isabella Pitt **Advisor:** Dr. Marilyn Tayler
Title: The Legal and Social Ramifications of Sex Offender Registries on Sex Offenders

6:15-6:30 **Presenter:** Danielle Koch **Advisors:** Prof. Avram Segall and Dr. Marilyn Tayler
Title: The Legal and Social Implications of Genetic Engineering

6:30-6:45 **Presenter:** Brian Klein **Advisors: Prof.** Avram Segall and Dr. Marilyn Tayler
Title: Understanding the Gender-based Wage Gap

6:45-7:00 **Presenter:** Ryan Galler **Advisor:** Dr. Marilyn Tayler
Title: Dick and Jane Can Vote But They Can't Smoke: The Age of Majority -- A Double Standard?

Session V: 4:15 PM-6:30 PM UN–2026
MATHEMATICS

A. Moderator: Professor David Trubatch

4:15-4:30 **Presenter:** Ashley Ciesla **Advisor:** Dr. Bogdan Nita
Title: Numerical tests of an algorithm for seismic imaging and inversion

4:30-4:45 **Presenter:** Michael Wilson **Advisor:** Dr. Aihua Li
Title: Discrete Sturm-Liouville Problems with Nonlinear Parameter in the Boundary Conditions

4:45-5:00 **Presenter:** Douglas Platt **Advisor:** Dr. Ashwin Vaidya
Title: Mechanics of the human tear film during a blink

5:00-5:15 **Presenter:** Gina-Louise Santamaria **Advisor:** Dr. William Parzynski
Title: On the Numerical Range and Spectrum of the Weighted Shift Operator in l_2

B. Moderator: Professor Aihua Li

5:15-5:30 **Presenter:** Matthew Cavanaugh **Advisors:** Drs. Aihua Li, David Trubatch
Title: Analyzing a Spring Mass Lattice with a Discrete Time-Series Model

5:30-5:45 **Presenter:** Leslie Cheteyan **Advisor: Dr. Jonathan Cutler**
Title: Chutes and Ladders for the Impatient

5:45-6:00 **Presenter:** Rexford Acheampong **Advisor:** Dr. Aihua Li
Title: Analyzing a Spring Mass Lattice with a Discrete Time-Series Model

6:00-6:15 **Presenter:** Matthew Vieira **Advisor:** Dr. David Trubatch
Title: Magnetically induced viscosity increase in a ferrofluid

6:15-6:30 **Title:** Dynamics of Disease Spread in Linked Populations
Presenter: Jackson Burton **Advisor:** Dr. Lora Billings

Session VI: 4:15 PM-6:30 PM UN–2048
MATHEMATICS AND BIOLOGY

A. MATHEMATICS
Moderator: Professor Baojun Song

4:15-4:30 **Presenter:** Jonathan Ballone **Advisor:** Dr. Lora Billings
Title: Early die out events in SIR epidemic models

4:30-4:45 **Presenter:** Vladimir Mishcherkin **Advisor:** Dr. Baojun Song
Title: How thin is too thin? Anorexia as an epidemic

4:45-5:00 **Presenter:** Alexander Cali **Advisor:** Dr. Mary Lou West
Title: The Trojan Asteroids

B. BIOLOGY

Moderator: Professor Lee Lee

5:15-5:30 **Presenter:** Ritvik Dubey **Advisor:** Dr. Ashley Stuart
Title: Insite-Plasmodium Falciparum proteome interface

5:30-5:45 **Presenter:** Ananya Sengupta **Advisor:** Dr. Quinn Vega
Title: Regulation of RET splicing

5:45-6:00 **Presenter:** Dozie Okafor **Advisor:** Dr. Lee Lee
Title: Identification and determination of expression levels of Mercuric resistance genes in Synechococcus sp. IU 625

6:00-6:15 **Presenter:** Jose Perez **Advisor:** Dr. Lee Lee
Title: Heavy Metals Zinc and Cadmium Resistance within Cyanobacterium, Synechococcus sp. IU 625

6:15-6:30 **Presenter:** Ben Ondimu **Advisor:** Dr. Lee Lee
Title: Development of molecular probes for identification of blooming Cyanobacteria

Session VII: 4:15 PM-6:30 PM UN–2046
GEOSCIENCE
Moderator: Professor Matt Gorring

4:15-4:30 **Presenter:** Cailyn Nichol **Advisor:** Dr. Matt Gorring
Title: Petrology of Pyroxene Gneiss in the NJ Highlands

4:30-4:45 **Presenter:** Matthew Croker **Advisor:** Dr. Matt Gorring
Title: The Slab Window Hypothesis for Condor Cliff Volcanics, Southern Patagonian Andes

4:45-5:00 **Presenter:** Carl Natter **Advisor:** Dr. Matt Gorring
Title: In-Depth Geochemical Analysis of Theills Quad and Sterling Forest Granitic Gneisses, New York

5:00-5:15 **Presenter:** Dave Cuomo **Advisor:** Dr. Stefanie Brachfeld
Title: Properties of Dropstones Along the East Antarctic Margin: Towards a Better Understanding of the Carriers of Antarctic Crustal Magnetic Anomalies

5:15-5:30 **Presenter:** Linda Martin **Advisor:** Dr. Matt Gorring
Title: Source rock type and U-Pb dating of late-Proterozoic Sterling Forest Granites of the Hudson Highlands, New York

5:30-5:45 **Presenter:** Aimann Sadik **Advisor:** Dr. Robert Taylor
Title: Responsible Gold Mining? Who is Who

5:45-6:00 **Presenter**: Seth Xeflide **Advisor:** Dr. Duke Ophori
Title: Assessing Drought Performance of New Jersey Streams Using a New Overall Performance Indicator

6:00-6:15 **Presenter:** Justin Kulick **Advisor:** Dr. Matt Gorring
Title: Geochemistry of the Hudson Highlands Migmatites and Relation to Post-Ottawan Deformation

6:15-6:30 **Presenter:** Scott Buchanan **Advisor:** Dr. Lisa Hazard
Title: Movement Ecology and Habitat Utilization of the Eastern Hognose Snake at Cape Cod National Seashore

Session VIII: 4:15 PM-6:30 PM UN–2044
CHEMISTRY and BIOCHEMISTRY
Moderator: Professor David Konas

4:15-4:30 **Presenter:** Safa Tamimi **Advisor:** Dr. David Konas
Title: Efficient synthesis of (L)-4-fluorotryptophan I

4:30-4:45 **Presenter:** Drilona Seci **Advisor:** Dr. David Konas
Title: Efficient synthesis of (L)-4-fluorotryptophan II

4:45-5:00 **Presenter:** Pinal Ramani **Advisor:** Dr. Shifeng Hou
Title: A new type of nanoparticle as sorbent for removing heavy metal ions from waste water samples.

5:00-5:15 **Presenter:** Akruti Patel **Advisor:** Dr. John Siekierka
Title: Expression, characterization and inhibitor identification for a lymphatic filarial parasite, Brugia malayi, mitogen-activated protein kinase. A potential anti-parasitic drug target.

5:15-5:30 **Presenter:** Julianne Harraka **Advisor:** Dr. Shifeng Hou
Title: The Nanotechnology for Drug Delivery

5:30-5:45 **Presenter:** MarzenaWietecha **Advisor:** Dr. Shifeng Hou
Title: Pt catalysts on functionalized graphene for electrocatalytic methanol oxidation oxygen

5:45-6:00 **Presenter:** Erik Dickerson **Advisor:** Dr. Carlos Molina
Title: ICER Phosphorylation by Cdc2 during Mitosis Promotes its Monoubiquitination

ORAL PRESENTATION ABSTRACTS
CHSS and CEHS (Alphabetically by Presenter)

Title: ***The Crisis of the Inclusion Classroom***
Presenter: Nicole Amato
Advisor: Dr. Michele Knobel
Abstract: The public school system is divided into two primary programs: general and special education. In the inclusion classroom, both programs work alongside each other to collectively instruct all students. Due to a range of ability levels, special education students are not expected to perform at the same rate, in the same ways, or with the same material as the general education student. These expectations are obvious to all members of the school community through the tools for modification, differentiation, and classification. Through the differentiation of instruction, the perception of existence and self- identity of special education students is altered and their values towards the education community transforms. With the loss of standards and values within the inclusion classroom, students face a challenge in overcoming and determining their identity as learners. Additionally, the constant changes and modifications to the curriculum becomes a factor in preventing students from participating and finding value in school community. The damaging effect of inclusive education policy towards the identity of students can be seen as analogous to the progression of nihilism within society. This challenge can be considered nihilistic in its drastic affect on the student's identity, the sense of authority, and the system of educational values within public schools. Through a comparison of the relationship between current inclusive educational policy and the philosophical doctrine of nihilism, future possibilities can be established for improving the student's perception of values and identity as a citizen. Future possibilities for this crisis can be found within the paradox of natality presented within the thought of feminist theorist Hanna Arendt. According to Arendt, natality relates to the individual's newness in the world and the possibility that something new might be brought to it. In this sense, natality can be seen as a means for special education students to find a set of values, identity, and a sense of authority within the divided structure of public schools.

Title: ***The Zapatista Effect: Revolution through New Media Literacy***
Presenter: Drew Berkowitz
Advisor: Dr. David Lee Keiser
Abstract: In February 1995, the Zapatista Army of National Liberation uncovered a report by Chase Emerging Markets representative Riordan Roett calling for the Mexican government to "eliminate" the nonviolent Zapatista revolutionaries in order to protect American business interests in Mexico. Utilizing emerging communications technologies, the Zapatistas disseminated the report throughout the internet, causing international uproar, and ultimately causing the Mexican government to cancel its planned assault on the movement. The central tenet of Zapatista ideology is the tactical use of new media technology to generate spectacle, communicate ideals, and promote international solidarity for localized political movements. To this end, Zapatistas have employed social networking, flash mobs, inter-cause communication, and popular culture exposure through a partnership with Grammy-winners Rage Against the Machine. The Zapatistas' goal is to accomplish through education that which previous revolutionaries attained through violence. The goal of this paper is to examine the effects of new media on emerging counter-cultural political groups, in order to determine the efficacy of communication and exposure as an alternative to violent political action.

Title: ***An Interdisciplinary Discourse on Parens Patriae v. Personal Liberty: The Dispute Between the State's Duty to Assert an Injury in "Quasi-Sovereign" Interests and the Right Held by Legal Guardians of Minors to Freely Exercise Religion.***
Presenter: Emily Marie Bisnauth
Advisor: Dr. Marilyn Tayler
Abstract: Individual states have a sovereign interest, under the doctrine of *parens patriae*, to protect children from religious actions that place them in harm. The purpose of this study is to analyze the state's ability to override the religious protections afforded by the Free Exercise Clause of the First Amendment to protect child welfare. An interdisciplinary approach is essential to the study of the child welfare because no single disciplinary perspective can adequately address the doctrine of *parens patriae*. From the legal perspective, the state has a duty, through the doctrine of *parens patriae*, to protect children, as they lack the capacity to protect themselves. From the Political Science perspective, the state must balance actions made under the doctrine of the *parens patriae* with the best interests of children. From the philosophical perspective, because humans are

hedonistic in nature, social contracts such as the United States Constitution are needed to ensure order. Citizens are bound by U.S. Constitution, and must therefore accept its protections, as well as its limitations. The technique of theory expansion aids in creating common ground from these perspectives by expanding on the conflicts that arise between the state's duty of *parens patriae* and parental rights. Integration will extrapolate on the roles of parents within the state of nature, the need to protect constitutional religious rights, and the desire to preserve the "best interest standard" in child welfare adjudication. An interdisciplinary understanding of this phenomenon results in the cognitive advancement that uniform standards for "religious" treatments will help to ensure that child welfare is protected, as well as parental rights.

Title: ***The Conflict of Justice in Aeschylus'*** **Oresteia**
Presenter: Brian Bloom
Advisor: Dr. Jean Alvares
Abstract: In the *Oresteia* of Aeschylus, there are many conflicting ideas of justice, which reflect conflicts of opinion in the Athens of Aeschylus' era. This conflict occurs on both the level of humankind and of the gods. At the beginning of the *Agamemnon*, as the Chorus indicates, there is little clear idea of what true justice consists of. We hear of different punishments for different crimes, but we are not sure why particular crimes deserve their punishment. For example, it is unclear whether some characters are punished for crimes that were committed by them, or by their ancestors, or by their tribe. Is King Agamemnon punished for his excessive actions at Troy (although Zeus approved the Trojan expedition), or for the crimes of his father Atreus? Clytemnestra kills Agamemnon, but receives no real punishment for it until Orestes is willed by Apollo to commit matricide. Orestes himself is punished for following the command of a god – until he is acquitted through a trial at Athens. With all of these different and conflicting views of justice advocated by Apollo, Athena, and the Furies, we have no clear answer of what justice is, either on a human or godly level. Aeschylus suggests that Zeus is able, out of these conflicts, to bring out his own sense of what justice should be, by letting both Apollo and the Furies seek their revenge. Eventually, in the court in Athens presided over by Athena, a true justice is established, which is justice established by consensus in a jury trial, which is practical for our human world. Persuasion plays an important role. Further, by transforming the Furies into the Eumenides, Zeus demonstrates that a political harmony, where both new and old can contribute, is necessary for the proper functioning of justice on the divine level. In the end, the plan of Zeus has brought some reconciliation between old gods and new, and given humanity a new institution, the jury trial and the court of the Areopagus, all manifestations of a notion of true justice.

Title: ***Constitutional Protections Left "At the Schoolhouse Gate!"***
Presenter: Lynnett Brooks
Advisor: Dr. Marilyn Tayler
Abstract: School shootings and the events of 9/11 have garnered national attention in recent years and the increase of zero tolerance policies has only intensified questions raised about what rights children have in public schools. The purpose of this research is to investigate whether children enrolled in public schools are increasingly leaving their "search and seizure" and "due process" protections at the schoolhouse gate, contrary to their best interests. An interdisciplinary approach is necessary because one disciplinary lens does not adequately explore this issue. From the perspective of Constitutional and Education Law the research considers the court's reasoning and methods for deciding cases dealing with "search and seizure" and "due process" rights of public schools students using the landmark case *N.J. v. T.LO*. as well as more recent case law. The perspective of political sociology is used to examine how various schools of thoughts about children's rights, the political climate and the influences of various social groups including parents, communities affects "search and seizure" and "due process" in public schools. The redefinition technique establishes common ground by relating the legally defined parameters of children's rights with the various political sociological perspectives and meanings of those rights. A more comprehensive understanding of the issue is accomplished through the integration of the various insights and theories regarding children's rights, autonomy and development. The result of an interdisciplinary approach to "search and seizure" and "due process" of children in public schools is a recognition of the need to accommodate and transform the conflicting definitions of the disciplinary perspectives vocabulary and concepts.

Title: ***Legalizing Prostitution: Should the United States follow in the Netherlands' and Nevada's footsteps?***
Presenter: Andrea Castro
Advisor: Dr. Marilyn Tayler
Abstract: The purpose of this study is to analyze the general prohibition on prostitution in the United States and to discern whether adopting a policy modeled after the current policies in the Netherlands and Nevada would be more productive. An interdisciplinary approach is essential because no single discipline can fully explore this topic. The legal perspective has offered that prostitution goes against the states' interest in protecting the public from the spread of venereal diseases and violent crimes.

Sociology has offered the perspective that prostitution is plagued with social ills, its experts remain divided into two groups, the Radical Feminists and the Liberal Feminists, based on their opinion on the prohibition of prostitution. Radical Feminists stand against institutionalizing prostitution because of its association with the dehumanization and denigration of women while Liberal Feminists have offered that prostitution is actually an empowering profession that grants women financial independence. Both Sociology and Law have demonstrated that prostitution is a multi-faceted problem and through theory expansion, common ground can be achieved by focusing upon the social concerns of prostitution. The integration of all relevant disciplinary insights leads to the conclusion that the social concerns of victimization and harm to public welfare are based on a preconceived idea of prostitution as inherently evil. This interdisciplinary study results in the consideration of other policy approaches to prostitution that will better address the shortcomings of its prohibition as well as provide an all around more satisfactory atmosphere for voluntary sex workers and the community alike.

Title: ***The Political Dimension of Mathematics: The Misunderstood Subject and what it can Contribute to Society Today***
Presenter: Nataly Chesky
Advisor: Dr. Helenrose Fives
Abstract: This paper begins with the premise that mathematics is implicitly tied to western civilization's social, political and cultural history. Given this relationship, the ability and responsibility for mathematicians and math educators for transformative action in society today is limitless and ought to be explored. Many important mathematical projects are occurring currently. Within these emerging discourses, ways of understanding the world around us, not to mention our conception of our place within such a world, are being challenged and reconstructed in new imaginative ways. These projects are not modern occurrences, but in fact mathematicians have always been at the center of humanity's historical transformations. Unfortunately the public is very rarely made aware of such work, due to the misconception of what mathematics really is, stemming in part from how it has been traditional taught in mass public education institutions. Perhaps our public school system is to blame for these disconnects, but I will explore deeper western ideological routes, that have incorrectly situated mathematics outside socio-political frameworks. By analyzing Western mathematical history and comparing it to other modes of mathematical understanding I will show how mathematics is not only a way of "reading the world" but a way of "transforming the world" (Atweh, 2007).

Title: ***Dick and Jane Can Vote But They Can't Smoke: The Age of Majority -- A Double Standard?***
Presenter: Ryan Galler
Advisor: Dr. Marilyn Tayler
Abstract: In the 1970s, the drinking age was reduced to eighteen due to social pressures. Eighteen soon became the minimum age for most privileges, including tobacco purchase and contract affirmation. Beginning in 1984, a nationwide drinking age passed which returned the drinking age to twenty-one, while leaving eighteen as the minimum age for nearly everything but alcohol and tobacco. The purpose of this study is to determine whether state governments are violating the Equal Protection clause of the Constitution by prohibiting adults over the generally accepted age of majority from purchasing or using alcohol and tobacco. An interdisciplinary approach is necessary because no discipline alone can fully address this question. The legal perspective looks into courts' views on the issue, including who is protected by the Equal Protection Clause. The political science perspective explores the reasoning behind the change in the age of majority and how the legislature enacted the changes. The technique of redefinition will aid in the creation of common ground, and integration will build on the need to address the minimum age conflict toward a more equitable solution. The findings of the research conclude that, while not a violation of the Equal Protection clause, the prohibition of alcohol and tobacco purchase and use by those above the age of eighteen is inconsistent with our society's use of this age as the dividing line between childhood and adulthood. In order to solve this conflict, legislatures should set an all-encompassing age of majority.

Title: **The Nation *Calls a* Times-*Out***
Presenter: Maureen Grimaldi
Advisor: Prof. Ron Hollander
Abstract: In our presentation, *The Nation* Calls a *Times*-Out: A Look at the Dramatic Differences Between Magazines' and Newspapers' Coverage of the Holocaust, my partner and I sought out to prove how, during the Holocaust, reporting in newspapers and magazines was not as clear, precise, or extensive as it could have been. By taking a deeper look into specific newspapers such as the *New York Times*, *The Denver Post*, *St. Louis Post Dispatch*, and magazines including *The Nation* and *Commonweal*, among others, analyzing the placement, usage of words, pictures used or lack thereof, we concluded that, although the amount of

reporting in magazines wasn't near the amount of articles that had been printed in newspapers, they did however touch upon topics and events that the newspapers were hesitant or altogether afraid of going near. Along with the difference in newspaper and magazine journalism as a whole during the Holocaust, various newspapers as well would report news that wasn't controversial or "pro-Jews". An intense look into the world of newspapers, magazines, and even cartoons during Hitler's reign tells a lot more with what isn't told today then it did when the news was first happening. Co-author: Keri Nagurka.

Title: ***An Interpretation of the Universal Lessons from 19th Century Woman Philosopher: Eliza Sunderland***
Presenter: Sabrina D. Misir Hiralall
Advisor: Dr. Dorothy Rogers
Abstract: Eliza Sunderland, a scholar of Kant and Hegel, was a revolutionary woman whose ideas contributed to the nineteenth century. However, the revolution begun by Sunderland in the nineteenth century has not ended. Currently, the revolution continues. Just as Sunderland fought for the suffrage of women, people of today, such as people from the gay community, are fighting for equal rights. Eliza Sunderland, a past American womn philosopher, helped to shape the future of women of America. This paper will comprehend Sunderland's religious/philosophical thought. This includes background information on Eliza Sunderland as well as the influence of the male philosophers Kant and Hegel on Sunderland. In addition, thought will be given to Sunderland's philosophy of idealism, view of World religions, and her perspective on pessimism and atheism. I shall discuss women's issues from Sunderland's perspective, life within the domestic sphere, education, employment, and the suffrage of women. I will share my insight regarding the application of Sunderland's thought today. Overall, the goal of this paper is to examine the universal applications of Sunderland's thought in both past and present. An analysis of Sunderland's thought provides a chance to apply them.

Title: ***War, Rumor, and the Common People: The Role of the Tribunes in Shakespeare's Roman Plays***
Presenter: Christina Jen
Advisor: Dr. Naomi Liebler
Abstract: In his Roman tragedies, Shakespeare asks questions that continue to haunt American society today: What is the relationship between the represented and the representative? Why does republicanism fail to achieve political harmony? The office of the tribune supposedly serves to prevent oppression by the aristocracy (patricians) on the one hand and mob rule by the working class (plebs) on the other. This paper, however, uncovers the problematic nature of this office. At first, the tribunes work as manipulative teachers of the people, but as the Roman Republic disintegrates, the tribunes learn to silence rather than give voices to their plebs. Their failure in representation, according to Shakespeare's use of Plutarch, can be explained by the uncertainty surrounding the origins of their office. Their legitimacy is founded on a misleading rumor, and they perpetuate acts of misinterpretation that cast doubt on whether republicanism can ever lead the community to truth. Thus, the tribunes present not only political implications applicable to republicanism today, but also the broader issue of the human limits of knowledge. This research uses *Titus Andronicus*, *Julius Caesar*, and *Coriolanus* as primary sources and responds to scholars such as Paul Cantor, Oliver Arnold, and Naomi Liebler.

Title: ***Understanding the Gender-based Wage Gap***
Presenter: Brian Klein
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: Gender-based wage imbalance is a multifaceted, compound problem, requiring a comprehensive analysis of an interdisciplinary nature. In building a foundation for a better understanding of its inherent complexities, theories, concepts, and assumptions from multiple disciplinary perspectives must be incorporated. Through an in-depth analysis of each relevant disciplinary perspective, an interdisciplinary researcher is able to reach area-specific adequacy, paving the way for critical, thought-provoking insights. Addressing the underlying sources for the continuance of unlawful employment practices, extensive analytical research supports the hypothesis that the United States government's most recent fair pay legislation is still not effective enough. Moving toward the interdisciplinary goal of an integrative and groundbreaking advance in knowledge, parallel and conflicting insights from the fields of Sociology, Economics, and Law are integrated systematically. The interdisciplinary integration process justifies the hypothetical connections between each previously noted discipline and issues of gender, disparate treatment and the resulting wage disparity. The intense contrast and scrutiny essential to the integrative process give rise to new knowledge, conclusively supporting the hypothesis that current fair pay legislation is fundamentally inadequate in addressing the root causes of gender-based wage imbalance. Through completion of the interdisciplinary research process and achieving full interdisciplinary integration, the subjective analysis evolves through research and insight-based conclusions into an

objective course for future legislation. The presentation will address the law's inherent shortcomings and propose a common-ground-based integrative solution.

Title: ***The Legal and Social Implications of Genetic Engineering***
Presenter: Danielle Koch
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: Since the discovery of DNA by Watson and Crick, genetic technology has grown to be a phenomenon that cannot be treated in isolation. The purpose of this research project is to demonstrate that Mary Shelley's novel, *Frankenstein*, prefigures the legal and social implications of genetic engineering. An interdisciplinary approach based on law, literature, and philosophy is necessary to my research due to the complexity of human genetic engineering. The novel *Frankenstein* will be used to analyze the growing concern about the relationship between science and society. Shelley conveys the public and legislatures' concerns of not exercising prudent control over biomedical technology. Through the use of theory expansion, common ground is created between these perspectives. The literary and philosophical perspectives illustrate governmental agencies' ethical concerns regarding the safety of genetic engineering as well its effects on procreation, the family structure, and attitudes towards children. While there are no explicit laws that forbid genetic engineering, litigation has arisen as a means to pressure the government to set strict regulations on this practice. This research concludes that the scientific and moral dilemmas put forth by Mary Shelley's *Frankenstein* do reflect society's fear of science as the public and the law's ethical concerns depict the necessity of closely regulating the growing field of genetic engineering.

Title: ***Choose Responsibility***
Presenter: Maj Kristina Kristensen
Advisor: Dr. Jean Alvares
Abstract: The current federally mandated drinking age of twenty-one years has been hotly debated for years. Some want this age to be raised, while many others wish to lower the legal drinking age. There is no doubt evidence for the maintenance of age as it currently is – particularly the decrease in alcohol-related car accidents – but there is also increasing evidence that current laws which mandate a drinking age are flawed – they are widely disregarded by underaged drinkers and are otherwise unenforceable. Indeed, some evidence shows that a decrease in the legal drinking age (especially when coupled with other measures) may help to solve the problem of underaged drinking, indeed, other countries do well without such an age limit. The principle objective of this paper is to critically compare the benefits and consequences of a lower drinking age while exploring the possibility of a compromise – a lowered legal drinking age, but with the implementation of alcohol education classes and the creation of a "drinking license," thus promoting the safe consumption of alcohol in not only young adults but of consumers of all ages.

Title: ***Urban Sprawl: The American Dream Unfulfilled?***
Presenter: Peter LaGreca
Advisor: Dr. Marilyn Tayler and Prof. Avram Segall
Abstract: This study argues that contemporary practices of exclusionary zoning- and the associated urban decline that follows -- are best analyzed in light of the U.S. Supreme Court's 1926 precedent-setting decision in, *Village of Euclid v. Ambler Realty Co*. The study seeks to answer the question of whether *Euclid* establishes standards of legal validity, and of moral permissibility, necessary to justify the enforcement of zoning laws that effectively segregate society according to race and socio-economic status. The disciplines of law and of philosophy offer important insights into the problem of exclusionary zoning. From a legal perspective, *Euclid* provides a mechanism whereby certain classes of people can be effectively barred from living in a neighborhood, or even an entire municipality, without that exclusion violating any recognized constitutional right. From a philosophical perspective, what are traditionally thought to be legal questions of substantive due process and of equal protection, are epistemically reducible to philosophical questions of justice and of ethics. An interdisciplinary approach is necessary because each discipline is, on its own, unable to provide a comprehensive understanding of this complex problem. A consensus among disciplines is developed as the foundation from which to integrate. Integration builds upon conflicting disciplinary insights, as the police power of the state must be balanced with the need to ensure the civil liberties of all citizens. The solution of a mixed-use system of land development is proposed, and the New Urbanism and Smart Growth movements are introduced as suggestions for further study.

Title: ***Harry Truman and the Atomic Bombs***
Presenter: Brian Magill

Advisor: Dr. Antoinette Pole

Abstract: The purpose of my study of President Harry Truman was to show how difficult of a decision it was to use atomic weapons in order to end World War II. This research shows the many different influences that go into making important presidential decisions, such as the opinions of the Cabinet, experts in the field, and public opinion. It was necessary to show the various opinions that those involved had and how much they weighed on the mind of President Truman. While the final decision to enter the nuclear age was his alone, I show through primary sources such as letters from Einstein, statements from J. Robert Oppenheimer, and even journal entries and official Presidential memos from Truman the strain all involved were going through. I also prove how this was the most important decision ever made by an American president. Millions of lives, both American and Japanese were at risk, and a new age of warfare would be entered if atomic bombs were dropped. Once the decision to use the bombs was made, I address the decision of where to drop the bombs, whether to warn the Japanese or not, and what the general public opinion was after the destruction was witnessed.

Title: ***Why Moral Perfection is Overrated***

Presenter: Janet Mammen

Advisor: Dr. Chris Herrera

Abstract: Aristotle believes that one of the ways to become a flourishing individual is to achieve moral excellence. His theory of virtue ethics focuses on the character of the agent performing the action. In my view, however, Virtue Theory may place responsibility on the agent to be unrealistically virtuous. Aristotle may have been correct in believing that moral and intellectual excellence can in some cases lead to flourishing, which would then lead to happiness. But the attempt to achieve moral excellence may also lead to resentment and unhappiness, rather than individual happiness, mainly due to the constant pressure to be virtuous. This is not to say that moral excellence is unimportant, but, rather, that it is more important for the benefit of society than it is for the benefit of the individual.

While Aristotle may have been correct that moral excellence is needed for an individual to flourish, in this paper I will argue that making moral excellence a “habit” is not the only way for an individual to achieve this standard. If an ethical dilemma is serious enough that one is being strongly tempted to act immorally, then it is not right for her to simply perform the virtuous action because it is the right thing to do and ignore her inclinations to do otherwise. Instead, she must identify and reflect on what her impulses in that given situation are and why she thinks they may differ from the right thing to do. If the individual goes through this process, then there is more of a chance of flourishing because moral excellence is now informed by personal desire and reflection rather than simply habituation.

Title: ***Unveiling the Disciplinary Role of Testing: A Foucauldian Interpretation***

Presenter: Olivier Michaud

Advisor: Dr. Tyson Lewis

Abstract: My generation has been educated through and by testing. Testing was, and in fact still, one of the core elements of our experience in school. We are therefore not pushed to question testing, because testing is like schooling; they appear to us as being good and necessary. We tend to accept as natural what we consider as normal and not question it. What is the use to question the obvious? Foucault helps us think about testing, because he puts it in a historical and critical perspective. For him, testing is one of the fundamental elements of the liberal society and its institutions that have developed since the 18th century. More precisely, testing is part of the appearance of a new kind of power that aims to create a specific kind of individual: what Foucault calls the disciplinary power. This questioning of the role of testing in our schools and our lives appears to be more urgent as testing is becoming more and more present in our educational system, and, at the same time, becoming more and more obvious and necessary to educate our children.

Title: ***'But they would not teach her to play': Child Heroines, Fantasy, and the Debate on Victorian Female Education***

Presenter: Nicole Papaioannou

Advisor: Dr. Lee Behlman

Abstract: Lewis Carroll's *Alice's Adventures in Wonderland* and *Through the Looking-Glass and What Alice Found There* have long been heralded as masterpieces of children's literature and as such, have met with hundreds of different critical interpretations. Some believe that the Alice stories are about Carroll's child-friend, Alice Liddell. Some insist that Carroll's books are actually drug-induced hallucinations put into words. Some say the stories are a treatise against logic. Less often, however, have the "Alices" been considered a critique of Victorian female education. While this paper does not debate the accuracy of any of the former claims, it concludes that the "Alice" stories go beyond Carroll's personal life and significantly challenge the performance-based education system that prepared girls solely to be contenders in the marriage market, instead advocating

experiential education. The discussion of Carroll's "Alice" stories is part of a larger research project which includes two other works of Victorian fantasy inspired by Carroll's writing, Christina Rossetti's *Speaking Likenesses* and Augusta Webster's *Daffodil and the Croaxaxicans: A Romance of History*.

Title: ***The Legal and Social Ramifications of Sex Offender Registries on Sex Offenders***
Presenter: Isabella Pitt
Advisor: Dr. Marilyn Tayler
Abstract: Sex offender registries are post-conviction restraints placed on offenders both to keep track of their whereabouts and minimize the risk of a re-offense. The research in this paper examines the influence of sex offender registries on the reintegration of sex offenders into society. An interdisciplinary approach is necessary in order to fully explore the implications of the registry legislation. This study weighs the impact of the registries and legislation such as Megan's law and the Adam Walsh Act and their intended benefits. The legal perspective of sex offender registries is that they are necessary in order to reduce recidivism and any negative impact that may incur is drastically offset by the crimes they prevent. From the sociological perspective, sex offender registries have a negative impact on all social levels and hinder the offenders' re-integration by causing a divide in society. The technique of theory expansion aids in creating common ground by allowing sociological factors such as reintegration to be viewed in terms of the legal implications. By viewing sociological factors in terms of the alternate disciplinary perspective of law, conflicts are resolved to make way for an integration of the disciplines. Integration grows from the idea that obstacles that hinder an offender's re-entry into society can cause sociological problems that manifest as legal issues. The research performed for this paper concludes that these sex offender registries have a negative sociological effect, which then hinders the reintegration of the offender and makes the laws ineffective.

Title: ***The* Christian Century*'s Case of Bipolarism during the Holocaust***
Presenters: Monica Odom and Katelyn Dilley
Advisor: Prof. Ron Hollander
Abstract: Our project is centered around the Holocaust and the coverage (or lack thereof) of the period by American news publications. We used the magazine *The Christian Century* to explore whether fair and unbiased coverage was given to the plight of the Jews. Through our research, we sought to prove that the magazine in fact was at times very sympathetic to the situation of the Jews in Europe, but that it also had a tendency to exhibit anti-Semitism and lack of support for the victims of the Holocaust. To begin, we read through secondary sources including Deborah Lipstadt's *Beyond Belief* and Robert Ross's *So It Was True*. We chose important historical dates and events, and then poured through *The Christian Century* archives at the New York Public Library. We researched years 1933-1945, looking for any mention of the Jews or the happenings of Nazi Germany and Europe, and began to draw patterns between the events, the time period, and the coverage. We concluded that the magazine wavered throughout the entire period, sometimes reporting extensively on events such as Kristallnacht and even encouraging calls to action, especially during the 1936 Olympic games. However, the publication also included editorials that showed hints of anti-Semitism, constantly referring to the Jews as a race and blaming them for their own problems. The most logical explanation for the wavering we found is that the coverage seems to change based on the extent of the U.S.'s involvement in the war. But even so, *The Christian Century* continuously fluctuated between support and disregard, ultimately providing inconsistent coverage of the Holocaust.

Title: ***Behind the Scenes of the National School Lunch Program***
Presenter: Katherine Sosa
Advisor: Dr. Antoinette Pole
Abstract: The purpose of this research was to have a better understanding of the National School Lunch Program (NSLP). The NSLP is a federally-assisted meal program functioning in over 100,000 public and private schools, which feeds students breakfast and lunch. My paper will discuss the history of the NSLP, those who are eligible to participate within it, problems within this program, and the solutions to these problems. The NSLP started in 1946 under the National School Lunch Act, which was signed by President Truman. Under the National School Lunch Act, the United States Department of Agriculture (USDA) oversees the program. The National School Lunch Act also explains how numerous families, whether these families are completely wealthy or even poor, can participate in the NSLP. Over the years, nutrition became a problem and parents questioned whether or not their children were getting the right nutrition in their respective schools. Solutions regarding whether or not children are receiving the proper nutrition can vary between taking home-made lunches to schools and cooking healthier recipes for school lunches. Though cooking healthier recipes may be expensive, it will benefit children in numerous American schools, both in public and private schools.

Title: ***Annotating Corpora for Idiomatic Expressions***
Presenter: Rachel Silverstein and Priscilla Pereira
Advisor: Dr. Anna Feldman
Abstract: Despite the work that has been done on idiomatic expressions, idioms are still a rather poorly understood aspect of human communication. Idioms such as "let the cat out of the bag" and "bought the farm" have an emergent layer of meaning that is wholly separate from the individual definitions of their words. Oftentimes, the literal interpretations of idioms have little or nothing to do with the actual messages they are intended to convey. Furthermore, there is a degree of ambiguity when identifying idioms, some phrases such as "kick the bucket" could be idiomatic in one context and literal in another. As such, recognizing idioms automatically presents a tremendous challenge for natural language processing systems. In our study, we annotate a portion of the American National Corpus for idioms consisting of verb-noun constructions, prepositional phrases, and subordinate clauses. In addition, we calculate the rate of inter-annotator agreement for this highly subjective task using Krippendorff's Alpha. The goal of our project is to produce an annotated corpus of idioms that can serve as the foundation for a more focused inquiry into the subject matter. We believe our corpus will be a useful resource for theoreticians and practitioners in the fields of linguistics, language technology, and language teaching. Additional student authors include: Co-authors are: Laura Street, Nathan Michalov, Rachel Silverstein, Michael Reynolds, Lurdes Ruela, Felicia Flowers, Angela Talucci, Priscilla Pereira, Gabriella Morgon, Samantha Siegel, Marci Barousse, Antequa Anderson, and Tashom Carroll.

Title: ***Critical Masses: Media Literacy for the Multitude***
Presenter: Joseph Todd
Advisor: Dr. Jeremy Price
Abstract: Exploring fundamental dimensions of democracy in light of alternative social and political movements reveals that institutionalized democracy has become stagnant and is in need of recovery. Without models of active/critical/political participation, society in general becomes complacent with the current state of things as fixed. Hardt and Negri's response to this state of affairs in the books *Empire* (2001) and *Multitude* (2005), discuss innovating our uses of technology that creatively express dissent in the struggle to realize new models of democracy. They provide many examples of critical and creative collectives effecting action and informing insurgencies. Critical media literacy provides skills that can extend beyond classroom walls and allow students to glean from the media models of the multitude that can be understood and operationalized. Advancing technologies ,i.e. social networking sites and mass texting coupled with globalization, provide an immediate space where the social collectives can be defined by those using the technologies, not isolated to ivory tower musings of intellectuals or circumscribed by capitalistic tendencies. To conclude, an exercise in identifying the contents of the *Multitude* in media can help to elucidate the features we struggle to enact. Greene, Maxine. (1978). *Landscapes of Learning*. New York: Teachers College Press. Hardt, Michael & Negri, Antonio. (2004). *Multitude*: *War and Democracy in the Age of Empire*.

Title: ***The Meaning of Sacrifice and its Place in Literature***
Presenter: Naomi Watanabe
Advisor: Dr. Jean Alvares
Abstract: This paper will give a general background of sacrificial ritual and its importance in ancient religion and life in general, as well as its contribution to the literary works of ancient Greece and Mesopotamia. First, its suggested origin in prehistoric hunting rituals will be considered From there, the different functions of sacrificial rituals will be discussed – why they were performed and what results were intended. There are a few different theories for explaining participation in the sacrificial rituals, and I shall, in particular, concentrate on how sacrificial rituals managed the sense that the life of the world can only be continued through the shedding of innocent blood. Next I shall give a description of a generally-accepted process for undertaking a sacrificial ritual and its significance, taken from literary and archaeological evidence, any prerequisites in terms of the object or person being sacrificed, the significance of the different steps as well as of the instruments and places used. Finally, I shall briefly show how a deeper understanding of sacrificial ritual can help illuminate four works: the Atrahasis epic, the Gilgamesh epic, *Descent of Ishtar*, and The Oresteian Trilogy of Aeschylus. By examining the use of sacrificial ritual, we gain a clearer understanding of the motivations of certain characters of these works – why they chose to sacrifice and what results were intended. We can also compare the sacrifices found in these works to actual ritual practices.

Title: ***Practicing Dietary Laws in Judaism: Israel and the United States***
Presenter: Molly Wilkerson
Advisor: Dr. Elizabeth Emery

Abstract: Globally, the two countries with the highest percentage of Jewish residents are the United States and Israel. With 40% of these nations' populations practicing Judaism, the United States has more in common with Israel than the average person might suppose. This religious commonality impacts the diets of these religious followers because of the strict adherence of a kosher diet. These laws not only dictate which foods are to be consumed but also instruct how the food should be prepared and used to serve God. Those who practice Judaism are expected to comply with kosher dietary standards, yet the specific role of food and health in the United States and Israel has varied effects on this diet.

Title: ***Pictorial Journey through Recovery***
Presenter: Catherine Winters
Advisor: Dr. Tom Benediktsson
Abstract: The purpose of this paper was to analyze the illustrations in *Extremely Loud & Incredibly Close* as significant elements of the novel. In preliminary research, no critical analysis of the illustrations could be found; the material appears to have been disregarded as unrelated or a gimmick. However the author, Jonathan Safran Foer, stated in interviews that he has an interest in sampling, such began the idea that the illustrations were more than a gimmick. Furthermore *Extremely Loud & Incredibly Close* follows in the tradition of other Brooklyn authors writing "mystery" novels (Auster, Lethem) in which the mystery revolves around the character's predicament rather than the situation the character is investigating. To prove there was a relationship between the illustrations and the text, close reading, research in literary criticism, and research in other fields, namely psychology, was used. The conclusion the paper draws is that the illustrations are Foer's clues towards the main character's Post Traumatic Stress Disorder and a type of therapy for the character to facilitate development.

POSTER PRESENTATION ABSTRACTS
CHSS (Alphabetical by Presenter)

Title: **CHSS-P1:** ***The Use of Uncorroborated Eyewitness Testimony to Secure Convictions***
Presenter: Xiomara Alvarez
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: The use of uncorroborated eyewitness testimony to secure convictions is a widely employed tool of the State. The purpose of this study is to analyze how the use of eyewitness testimony, without corroborating direct evidence, can lead to wrongful convictions. Interdisciplinary research in law and psychology is necessary for this study, as no single discipline can provide a thorough understanding of this complex subject. From the legal perspective, the State reserves the right to use any evidence permitted by law to secure identifications. From the perspective of experts in psychology, eyewitness testimony lacks credibility for use as sole evidence in criminal proceedings. The Due Process clause of the Fourteenth Amendment can be used to create common ground between the conflicting positions of law enforcement and experts in psychology. Integration can be achieved by mutual acknowledgement that the State's primary obligation is to protect its citizens pursuant to the Constitution. Some states have adopted legislation and/or guidelines to eliminate suggestive procedures to ensure reliable eyewitness testimony that does not violate Fourteenth Amendment protections. The poster highlights the relevant case law, variables influencing memory, and remedies to suggestive procedures.

Title: **CHSS-P*2: The Rights of Property Owners in Landmark Preservation***
Presenter: Lorraine Arnold
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: This research tests the hypothesis that landmark preservation legislation supersedes the rights of property owners and does not constitute a "taking" of property within the meaning of the Fifth Amendment of the U.S. Constitution. The research requires examining the Fifth Amendment in conjunction with American culture within the realm of archaeology and by extension, architecture. An interdisciplinary examination of law and archaeology is essential to resolve questions that are imbedded in the research hypothesis because no single disciplinary perspective can adequately address this issue. Judicial opinions and documented preservation cases are researched to develop an understanding of specifics of the "taking" of private property for public use and how it relates to the Fifth Amendment in landmark preservation. The research integrates archaeology with a focus on American culture and is used to interpret which cases are relevant as it relates to the Fifth Amendment and to the hypothesis. The research concludes that subsequent to the U.S. Supreme Court decision in Penn Central Trans. Co. v. New York City, landmark preservation has been strengthened and supersedes the rights of property owners within the parameters set by the Fifth Amendment. Common ground will be created applying integration to insights of government regulation, public interest

and economic impact. This poster presentation will depict the process through which a case is brought to reach the supported conclusion of the hypothesis.

Title: **CHSS-P3:** ***The Philosophy of Love and the Search for the Truth: Sufism and Hindu Yogis***
Presenter: Brittany Butler
Advisor: Dr. Aditya Adarkar
Abstract: In the never-ending quest of seeking spiritual divinity, many cultures and religions take different paths. Sufism and the Yogi Hindus have many overlapping similarities in the search for personal enlightenment. Hinduism is a religion that has a lot of acceptance and tolerance of other religions because they believe that every path leads to god. The early era of Hinduism includes the Sanskrit Epics and the Upanishads which are the dialogues of the Yogi Gurus and their students. The Yogis were part of a Hindu movement that strayed away from the traditional Vedic rituals and practices. Their beliefs were , in order to reach full enlightenment and the Atman, one must shed their ego and meditate to get rid of all karma and reach their full potential within. The Sufis also believed that to reach true enlightenment they must annihilate the ego and surpass the human condition. Both practices involve going into the wilderness and giving up your identity and human ego in order to attain the ultimate truth.

Title: **CHSS-P4:** ***Hedonic Contrast Requires Stimuli Not Too Different in Hedonic Value***
Presenter: Elizabeth Cogan
Advisor: Dr. Debra Zellner
Abstract: Hedonic contrast (good things make bad things seem worse and vice versa) does not occur if the hedonic difference between the good and bad things is too great. We show this in two studies. When the difference is great, contrast fails. When we reduce the difference, contrast occurs.

Title: **CHSS-P5:** ***When It Comes to Taste, Neatness Counts***
Presenter: Rebecca Conroy
Advisor: Dr. Debra Zellner
Abstract: Color influences liking for the taste of a food (e.g., Zellner, Bartoli, & Eckard, 1991). Another visual cue that might influence liking is the neatness of the presentation. Neatness indicates the amount of care taken with preparing the food and might increase attractiveness of the food. The question this research addresses is whether the neatness of the presentation of food on a plate affects the attractiveness of the food, the willingness of a subject to taste the food and the liking of the taste of the food presented.

Participants received chicken salad in either a neat or messy plate presentation. They rated presentation attractiveness, willingness to try the food, and liking for its taste. Although the two arrangements did not differ significantly in rated attractiveness, the chicken salad was rated as tasting better in the neat presentation.

Title: **CHSS-P6:** ***The Sexually Violent Predator Act: Sex Offenders in Our Society***
Presenter: Jillian Crane
Advisor: Dr. Marilyn Tayler
Abstract: The Sexually Violent Predator Act (SVP) allows for the indefinite civil commitment of sex offenders after their release from prison. This paper examines whether the SVP Act violates the civil liberties of sex offenders. The interdisciplinary research process is necessary because no one discipline can answer this complex question. Through the perspective of constitutional law, the cases of *Kansas v. Hendricks* and *Kansas v. Crane* highlight the issues of constitutionality, the definition of mental abnormality and prediction of future dangerousness. Through the political science perspective, the paper emphasizes the effects of the SVP Act and past law on public policy for sex offenders and society. Common ground in the disciplines emphasizes a need to reform the mental abnormality component of civil commitment. It will show how the each perspective needs to ensure the safety of the offender and the public. The integration chapter highlights the commonalities between perspectives with emphasis on the dual mental abnormality and risk of dangerousness requirement,as well as the relationship between public policy and society in passing sex offender laws. Integration will show differences between disciplines evaluating mental abnormality and the purpose of the SVP Act. Research suggests and The Supreme Court rules that the SVP Act is not a violation of civil liberties and, therefore,emphasizes the need for policy reform for sex offender crimes and the SVP Act. The poster highlights the SVP Act with focus on cases and contrasting it with repealed law and studies on public perception.

Title: **CHSS-P7:** ***The Phrase "under God" in the Pledge of Allegiance: Constitutionally Permissible as an Expression of Religious and Patriotic Values***

Presenter: Natalie Gordon
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: The purpose of this study is to show that the phrase "under God" in the Pledge of Allegiance is constitutionally permissible as an expression of religious and patriotic values and does not violate the Separation Clause of the U.S. Constitution. An interdisciplinary research approach is required because no single discipline can provide a comprehensive understanding of this complex subject. From the legal perspective the Constitution was written to ensure that government could not force religious beliefs on any person. Using the case of *Congress of the United States v. Newdow*, this study traces the controversy surrounding the pledge from its inception to the present day. From the political science perspective the phrase has had a major impact on debates and decisions that political leaders make on issues regarding religion. From the religious vantage point the phrase has caused frustration for many, especially atheists who believe the phrase is a violation of First Amendment rights. By analyzing each of these disciplines, common ground is formed providing a better understanding of the relationship between legal and political systems. Integration is developed from the idea that the phrase "under God" is protected by the First Amendment. An interdisciplinary understanding of this issue results in the proposition that the First Amendment protects both the phrase as well as atheists, who fought against it and continue to fight for the exclusion of the phrase since 1954. Through the examination of the integrated disciplines illustrated in the poster presentation, it is revealed that the phrase "under God" in the Pledge of Allegiance is constitutionally permissible as an expression of religious and patriotic values in a democratic society.

Title: **CHSS-P8:** ***Improper Use of Race in the Jury Selection Process***
Presenter: Marvin Hammerman
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: The 1986 US Supreme Court case *Batson v. Kentucky* examined racial discrimination during jury selection, after every African American juror was excused, and set out a framework for its elimination. The purpose of this research is to demonstrate that this framework is inadequate. The interdisciplinary process is essential because while the law dictates that juries be impartial, it is necessary to use psychological research and techniques to explain and illuminate these lurking biases. This research will integrate each discipline's perspective on the use of race in jury selection, the means of combating its improper use, and the limitations of studying this phenomenon from only one discipline. Psychological research has demonstrated that all human beings form biases stemming from their experiences and interactions which permeate the courtroom, affecting not only jurors, but attorneys and judges alike. Thus it is impossible to have a truly impartial jury, despite its Constitutional requirement. By relying on psychological experts to assess jurors, attorneys can get a better idea of what types of biases each juror has, whether they have the potential to affect the case, and gain a better understanding on which to support whether a peremptory challenge is necessary, though this still will not eliminate bias from the courtroom. This poster presentation will highlight the psychological studies of jurors and juries, and why it can be argued that the 200 year long tradition of peremptory challenges must come to an end.

Title: **CHSS-P9:** ***Qualified Immunity: Diminishing the Constitutional Rights of the Ordinary Person***
Presenter: Kristin Hayes
Advisor: Dr. Marilyn Tayler
Abstract: The purpose of this study is to analyze the application of the qualified immunity defense as it relates to public officials in civil rights cases concerning statutory claims. An interdisciplinary approach is necessary because no single discipline can provide a comprehensive understanding of this complex subject. From the legal perspective, qualified immunity is a defense provided to protect public officials from claims interfering with their duties. From the psychological perspective, disciplinary action and the perception of punishment are needed in order to further reduce future unlawful interactions. The technique of theory expansion is used to create common ground by examining civil rights violations and accountability. The integration process combines insights of psychological behavioral theories of public officials and judicial reasoning within the mandated process of qualified immunity. The solution of revoking the protection of qualified immunity in excessive force cases is proposed. The process of an interdisciplinary understanding results in a cognitive advancement on the knowledge of qualified immunity's conflict with the perception of punishment between that of a public official and of an ordinary citizen. This poster presentation will highlight the perceived accountability mechanism which carries through to an actual unlawful act as it relates to qualified immunity in excessive force cases.

Title: **CHSS-P10:** ***"Don't Ask, Don't Tell": A Solution or a Problem?***
Presenter: Ariana Hryckowian
Advisor: Dr. Marilyn Tayler

Abstract: "Don't Ask, Don't Tell" is a federal law passed in 1993 that states that if an individual serving in the military publicly admits that he or she is homosexual, engages in, or has the intent to engage in homosexual activity, that individual will be removed from the armed forces. The purpose of this study is to analyze whether the 1993 law "Don't Ask, Don't Tell" violates Civil Rights with regard to gay men and women serving in the United States Military. An interdisciplinary approach is essential to examine this issue because no single disciplinary perspective can adequately address this topic. The legal perspective is that the law is not required to treat all soldiers equally in terms of their sexual orientation. The political perspective is that the law was created to satisfy the majority of soldiers who are heterosexual, while disregarding its effects on homosexual troops. From the perspective of psychology, the law causes an increased acceptance of homophobia within the military. Common ground is created through examination of the different theories of each discipline that compare the rules of the legal system, the various political arguments, and the psychological effects of the law on soldiers. Integration is found through the idea that constitutional rights are not only in the legal system but also in political and psychological construct for all citizens. The research concludes that "Don't Ask, Don't Tell" violates civil rights of selected individuals within the armed forces. These three perspectives will be presented in a poster that highlights the differences among the disciplines and how integration leads to a more comprehensive understanding of the issue.

Title: **CHSS-P11:** ***Twice Exceptional Children***
Presenter: Jennifer Karasik
Advisor: Dr. Marilyn Tayler
Abstract: The purpose of this research is to investigate whether or not students who are twice exceptional, those who are both gifted while at the same time disadvantaged with having a learning disability, should be eligible for special education services provided under the Individuals with Disabilities Education Act (IDEA). An interdisciplinary approach is essential because no single disciplinary perspective can effectively provide an understanding of this complex issue. From the legal perspective, IDEA has an obligation to offer children who are disabled the services that are necessary for them to reach their maximum potential in a classroom. The psychological perspective allows us to understand that a twice exceptional child is otherwise known as Other Health Impaired and falls into the category of disabled, and should therefore be acknowledged by this Act. The theories and assumptions gathered from the perspectives of both disciplines result in the creation of common ground, which links the law and the mental conditions of twice exceptional children with their individual needs. Integration will further elucidate that all children, including twice exceptional children, are entitled to a free and proper education that will satisfy their own individual needs. A cognitive advancement is attained with the result being that the IDEA can address a child's issues, help the child to cope, and provide an appropriate education that encourages the child to reach his or her potential in a classroom setting. The poster presentation emphasizes the particular disorders that the twice exceptional child may suffer from, and examines how the IDEA will help deal with these deficiencies.

Title: **CHSS-P12:** ***Placement of Objects in a Frame: Effect of Direction & Portrayed Motion***
Presenter: Afshan Ladha
Advisor: Dr. Debra Zellner
Abstract: The aesthetic judgment of an object displayed within a frame, such as an object in a painting, varies with the placement of the object. Compositions where the placement of an object is at the perceptual center of a frame have been found to be the most pleasant (Palmer, 1991). However, the objects which were placed in the frame in the Palmer (1991) study were simple circles. More recent (Palmer, Gardner, & Wickens, 2008) studies investigated the most aesthetically positive placement of more complex objects (e.g., people, cars, teapots, and flowers) within a rectangular frame. In these studies, the objects were either facing forward or to the right or to the left. When the objects were facing forward, subjects indicated that the most aesthetically pleasant placement was at or near the center of the rectangular frame. However, when the object was facing right, subjects indicated that the most aesthetically attractive placement was to the left of center and when the object was facing left, subjects indicated that the most aesthetically attractive placement was to the right of center (this is called "inward bias"). It is therefore more aesthetically pleasing to view an object that has more space in front of it than behind it. None of the objects used in Palmer et al. (2008) were portrayed as being in motion. If an object is shown to be moving in a particular direction, rather than simply facing that direction, it might be important to allow more space in front of the object because of the anticipated movement that will occur in that direction. This study investigates whether "inward bias" is enhanced with objects in apparent motion.

Title: **CHSS-P13:** ***The Protection of Lawful Commerce in Arms Act and the Second Amendment Right to Bear Arms***
Presenter: John Manzo
Advisor: Dr. Marilyn Tayler

Abstract: The purpose of this study is to analyze how the Protection of Lawful Commerce in Arms Act impacts the rights of citizens under the Second Amendment to the United States Constitution. An interdisciplinary approach is necessary, because no single discipline can provide a complete and in-depth understanding of this complex subject. The legal perspective on the Act is that the law is crafted in such away that it reflects the best interest for all members of society and operates in accordance with the Constitution. From the perspective of political science, the Act provides protection to legal gun sources for gun rights organizations in the political battle between guns rights and gun control. Through examining each disciplines' theories and expanding those theories there is a creation of common ground that unites the structure of the legal system and the different political beliefs on the gun debate. Integration grows from the idea that the Constitution is not only the foundation of the legal system but also a political contract between all citizens. The Protection of Lawful Commerce in Arms Act not only operates within the Constitution, but by protecting sources of firearms for legal use, it also preserves the Second Amendment from becoming an antiquity. Through an interdisciplinary understanding of the Act from law and political science there is a cognitive advancement in understanding the gun debate and the need to balance individual rights with the public safety. This poster presentation highlights the need for the Protection of Lawful Commerce in Arms Act by showing how the gun industry is essential to the Second Amendment and how lawsuits threaten to make the gun industry inoperable without proper regulation by the legal system.

Title: **CHSS-P14: *Children and Adults' Descriptions of Causal Events***
Presenter: Ivonne Mejia
Advisor: Dr. Laura Lakusta
Abstract: Does infant thought reflect how both children and adults talk about the world around them? In order to explore this, we studied how children and adults describe events. More specifically, we focused on causal events, in which one object causes the motion of another object. Previous research found that infants show a goal bias, that is to say, in an event in which "the toy duck moves from the red block into the green bowl," infants prefer to encode the goal (into the green bowl) over the source (from the red block) (Lakusta, et al. 2007). However, there is no goal bias in regard to events involving inanimate objects (e.g. balloon) (Lakusta and Carey, under revision). Recently, Reardon, Lakusta, Muentener, & Carey (2009) demonstrated that infants still show a preference for encoding endpoints (goal bias), despite being presented with causal sources or starting points (the cannon shot the beanbag onto the bowl). We explored how young children and adults describe events with causal sources. Do they show a bias to encode the goal over the causal source or vice versa? We presented 3½ year to 4-year old children and adults with short video animations of causal events and asked them to describe what they saw. Results indicated that children (n=9) displayed a goal bias despite being presented with the causal sources, whereas adults (n=14) did not show a goal bias.

Title: **CHSS-P15: *Social Security: Friend or Foe***
Presenter: Kader Mondoumba
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: This research focuses on the different elements contributing to push Social Security to a point where it will become an unsustainable program by the year 2041. It is hypothesized that, by the year 2041, Social Security will be unable to provide benefits for retirees. An interdisciplinary study is necessary to fully understand the different contributing elements that are plaguing the program. This research draws upon the discipline of Law in analyzing the Social Security legislation, in order to identify the contributing elements found within the framework of the program itselft. The research also draws upon the discipline of Political Science, in order to understand the sociopolitical elements contributing to the fiscal instability of the program. It was found that the Pay-As-You-Go plan found in the legislation creates an environment where generational population and standard of living stabitlity is necessary for Social Security to operate indefinatly. This research also offers a number of reforms to the program can adress this problem ranging from privatization to simple distributive reforms. The information will provide an avenue from which further studies can identify the best possible reform needed, to return Social Security's financial stability.

Title: **CHSS-P16: *DNA -- It's a Life Saver***
Presenter: Tajah Muhammad
Advisor: Dr. Marilyn Tayler
Abstract: Advancement in the use of DNA in criminal cases has focused attention on the topic of wrongful convictions in the United States. The purpose of this study is to investigate the possible implementation of new policies regarding civil compensation is needed for these vindicated victims. An interdisciplinary approach is necessary because no single discipline can provide a complete and in-depth understanding of such a complex issue. The legal perspective on wrongful conviction is that the Constitution provides the legal protections regarding rights and liberties of the accused. From the perspective of political science, the power lies with the control of government officials to develop appropriate procedural guidelines. The technique of theory

expansion creates common ground from the insights of these perspectives by expanding on the conflicts that exist between the Constitution and the guidelines used by government officials who enforce them. Integration will reveal the importance of the protections of rights and liberties set forth by the Constitution and the need for government to limit its misuse of power and procedural errors in criminal cases. Through an interdisciplinary understanding of wrongful conviction from the perspectives of law and political science there is a cognitive advancement in understanding the need for implementation of new policies regarding civil compensation and the need for equilibrium between guidelines set forth by the Constitution and those who enforce them. This poster presentation will reflect the need for civil compensation reforms for vindicated victims by showing the number of overturned cases that soon result into either civil suits or individuals left without skills to reintegrate into society.

Title: **CHSS-P17:** ***Media Attention on Criminal Cases that Highlight Post-Partum Depression Exposes Instability in the Legal System and Has Led to New Developments in Law and Public Policy***
Presenter: Hasina Mungin-Bey
Advisor: Prof. Avram Segall and Dr. Marilyn Tayler
Abstract: Post-partum depression is not commonly thought to be a legal concern nor an issue that should be incorporated in the law. The purpose of this study is to analyze factors that led post-partum depression to be both a legal and public health concern. Interdisciplinary research is essential to understand these factors. No one discipline can illustrate how this issue triggered new developments in both law and public policy. It is necessary to study it from the perspective of law, public policy and mass communication. In the past post-partum depression has not been a major concern in the legal system, until the case of *Yates v. Texas*. From a public policy perspective, post-partum depression is a public health issue, because it affects society as a whole. Mass communication has a profound effect in both public policy and public opinion, it is also therefore necessary to study post-partum depression though mass communication reporting on the subject. Integration is built on redefining the concepts and assumptions, then creating a common meaning. The disciplines of law and public policy agree that post-partum depression is a mental illness that affects many women and needs further research. Interdisciplinary research will illustrate how case law spurred legislatures to enact laws that address the issue. The research will also illustrate how media has exposed the severity of post-partum depression and gained support for new policies. This study and the accompanying poster will illustrate how post-partum depression must be examined through an integrated interdisciplinary approach focusing on criminal cases.

Title: **CHSS-P18:** ***Supreme Court v. Bush Administration: A Test of Plenary Power***
Presenter: Sandra Osmanovic
Advisor: Dr. Marilyn Tayler
Abstract: After the attacks of September 11, 2001, the Bush Administration actively pursued expanded presidential powers. Through rulings in the Guantanamo Bay detention cases, the Supreme Court has made the Executive Branch accountable for its treatment of non-citizens during times of war. The purpose of this study is to investigate the extent to which the Supreme Court's decisions in the area of Unitary Executive "war powers" following the events of September 11, 2001 represent an unprecedented power struggle between the Executive and Judicial Branches. An interdisciplinary approach is essential to this study because no single disciplinary perspective can adequately address this issue. From the legal perspective, this hypothesis will examine the extent to which the Supreme Court and Bush Administration have applied their explicit, constitutionally-based powers. Through the lens of political science, the problem will investigate the power struggle between the Judicial and Executive Branches post-September 11. The relevant insights and theories drawn from each discipline will be expanded in order to create common ground between an administration's duty to simultaneously maintain both national security and civil liberties. These insights will then be integrated to gain a deeper understanding of the unprecedented power struggle surrounding the Guantanamo detention cases. These two perspectives will be visually presented in a poster which will show the difference in the underlying assumptions of each discipline. The outcome of the research will present an idea for further inquiry highlighting the need for future policies regarding issues of the balance between national security and civil liberties.

Title: **CHSS-P19:** ***Postpartum Depression and the Insanity Defense***
Presenter: Manish Patel
Advisor: Dr. Marilyn Tayler
Abstract: The insanity defense has provided a platform for women who commit infanticide while suffering from postpartum depression. The purpose of this study is to investigate how postpartum depression driven infanticide has affected the insanity defense in homicide cases. There are many inconsistencies within the justice system when postpartum is raised as a defense. Currently, postpartum depression is not categorized independently within the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), thus creating inconsistencies with diagnosis. An interdisciplinary approach is essential for a clearer

understanding of this disorder faced by women and its affect on the insanity defense because no single disciplinary perspective can adequately address this issue. This study looks at the perspectives of criminal law, forensic psychology, and abnormal psychology. The different perspectives required the creation of common ground through the technique of redefinition. By redefining concepts, assumptions and terminology it is then possible to integrate insights from both disciplinary perspectives. The findings of this study demonstrate the many inconsistencies within the justice system as well as the poor diagnosis and research by medical professionals which has lead to the disparate treatment of women who raise postpartum depression as a defense. In conclusion, further research is necessary to better understand the nature of postpartum depression and the need for the law to recognize it as a viable defense in infanticide cases. The poster will depict the inconsistencies in the treatment of women who raise postpartum depression as a defense to infanticide.

Title: **CHSS-P20:** ***Medical Marijuana and California's States' Rights***
Presenter: Kyle Perez
Advisor: Dr. Marilyn Tayler
Abstract: This paper explores the conflict between California's medical marijuana laws and the United States government's prohibition of marijuana. It is necessary to approach this issue using interdisciplinary process to develop a full understanding, because the issue cannot be adequately examined through one disciplinary lens. Therefore, three perspectives are used: Law, specifically Criminal, Health and Constitutional, Political Science, namely American Public Policy, and Pharmacology, specifically clinical pharmacology, toxicology and Pharmacognosy. From a legal perspective marijuana laws are governed by the laws of the states and federal government, but this creates conflict in the case of California's laws. From the view of political science, marijuana's place as a medicine is dictated by the people and politicians who create the laws. From pharmacological perspective marijuana's status as a medicine is determined by the outcome of medical studies which have shown promising results. The technique of theory expansion is used to find common ground among these three disciplines by looking into how the laws can be changed and adapted through the political system based on the newest researched developed by the pharmacologists. This approach will safeguard the rights of the ill people of California by creating a new understanding and solution to the problem of laws regarding medical marijuana. The current administration's ending of federal raids and use of the elected branch of the federal government by the populous, to augment marijuana laws by proving its medical use by the standards set in the Controlled Substances Act can result in greater liberty for California's patients. The conflicts and resolutions in marijuana laws will be visually represented through a poster.

Title: **CHSS-P21:** ***Hubris in a Selection of Prominent Myths***
Presenter: Christopher Preciado
Advisor: Dr. Jean Alvares
Abstract: In this poster session I shall analyze the characteristics of pride and hubris, an arrogant, excessive action, as they appear in a number of prominent Mesopotamian and Hebrew myths. I wish to demonstrate how hubris, divine envy, and its consequences are a recurring theme in these mythologies, as well as connect and expand upon the traditional notion about pride being dangerous and the gods being jealous. I will connect this topic with the notion that pride, of not understanding your proper place in the cosmos, is a fundamental cause of evils in the divine and human realm. Indeed, pride is not just a shortcoming for humanity, but it affects the gods as well. Among other famous episodes, I will consider how the hybris of Enkidu in the *Epic of Gilgamesh* brought about his death, the act of pride represented by the eating of the apple in the Garden of Eden which caused expulsion from the Garden of Eden, the later excess represented by the building of the tower of Babel, the offences of humanity which brought about the floods in the Atrahasis epic and in Genesis and the destruction of Sodom. I will also consider how this theme is connected to the explicitly low status of humankind, as seen in the Enuma Elish's account of the creation of humanity from the blood of a rebel god, which also occurs in the Atrahasis epic, and the story of Adapa's failure to gain immortality, which can also connected to his excessive actions against the South Wind. As we shall see, the motifs of pride, which leads to hybris, and divine jealousy are fundamental motifs shaping these myths.

Title: **CHSS-P22:** ***Immigration Law: Friend or Enemy for Long-Time Undocumented Aliens and the United States***
Presenter: Saurabh Puri
Advisor: Dr. Marilyn Tayler
Abstract: The purpose of this research paper is to analyze the question of whether there should be another amnesty similar to the one in 1986, in order to provide a path to permanent residence for undocumented aliens who are long-time residents of the United States. It is necessary to approach this issue using the interdisciplinary process to develop a full understanding, because this issue cannot be adequately examined through one disciplinary perspective. The method of research

employed is to examine the issue of immigration through two perspectives: Law and Political Science with Public Policy as a sub-discipline. The legal perspective on the immigration is that an undocumented alien's intent to remain in a state can qualify him or her as a resident for some purposes and under some circumstances. From the Public Policy perspective, by not changing the status of illegal immigrants to permanent residence, it affects the legal immigrant's and citizens' rights too. These perspectives are compared and contrasted to create common ground through theory expansion. Integration of disciplinary insights will help in establishing the benefits for legalizing illegal immigrants. Through an interdisciplinary understanding of amnesty from Law and Public Policy, there is a cognitive advancement in understanding the need to balance US security with undocumented aliens who are living in the US. By legalizing undocumented immigrants, not only undocumented aliens will benefit but it will also generate an annual increase in the U.S. GDP of at least $1.5 trillion during the next 10 years. By comparing and contrasting different aspects of law and public policy, this research concludes that there should be another amnesty like 1986 to provide a path of permanent residence for undocumented aliens who are long-time residents of the United States. The poster will include the different aspects of Law and Public Policy which will highlight the major arguments and conclusions about providing a path to permanent residence for undocumented aliens who are long-time residents of the United States.

Title: **CHSS-P23: *Same-Sex Marriage***
Presenter: Isha Ramadan
Advisor: Dr. Marilyn Tayler
Abstract: The topic of same-sex marriage has been a heated debate for over forty years, this issue is approaching a final Nationwide decision. States such as Massachusetts and Connecticut, and our Nation's Capital have passed initiatives allowing same sex couples to marry. The purpose of this study is to put in perspective the issues that the Defense of Marriage Act (a federal act which defines marriage between man and woman only) imposes on the Nation's States. Currently the fifty states are undecided, and the Defense of Marriage Act still stands. Many cases have been to trial, majority of those struck down by the U.S Supreme Court. Many milestone cases have set standards for the court to follow, some cases in favor of same-sex marriage, and others against. The case of *Baker v. Nelson*, an important same-sex marriage denial case, had the effect of striking down trials regarding same-sex marriage. This case suggests that the Act and State Amendments are not in violation of the couple's civil liberties. For the purpose of this research, the issue of same-sex marriage will be viewed through the disciplinary lenses of Law and Political Science. An interdisciplinary approach is necessary, because no single discipline can provide a complete and in-depth understanding of this complex subject. The legal perspective on the Act is that the law is crafted in such a way that it reflects the best interest for all citizens, and is in accordance with the Constitution. From the perspective of Political Science, the Act provides for the protection of the same- sex marriage couples. These two perspectives will be visually presented in a poster which will show the difference in the underlying issues of each discipline with regards to same-sex marriage.

Title: **CHSS-P24: *Insurance Companies and Eating Disorders: A Matter of Equal Protection***
Presenter: Christine VanBavel
Advisor: Dr. Marilyn Tayler
Abstract: The purpose of this study is to analyze whether or not the lack of recognition of eating disorders as biologically-based mental illnesses by some insurance companies violates the Equal Protection clause of the 14th Amendment of the Constitution. An interdisciplinary approach is essential to the study because no single disciplinary perspective can adequately address this matter. The legal perspective illustrates that the law does not mandate the inclusion or exclusion of eating disorders, however, courts determine coverage according to specific case facts as well as reviewing the terms and type of coverage offered in one's specific policy. The psychological perspective views eating disorders as both a behavioral and a cognitive problem. Finally the biological basis offers new research that shows a genetic linkage between eating disorders and family history which brings awareness to prescription medication that could treat eating disorders. By examining the root cause of eating disorders from each discipline's perspective, common ground among all disciplines is created. Integration offers advancement in the understanding that eating disorders do not have one root cause and therefore a comprehensive treatment plan is needed for a successful recovery. As a cognitive advancement, it can be concluded that, because eating disorders do have a biological basis, coverage should be offered. This poster presentation highlights the need for a complete understanding of the complexity of eating disorders and brings awareness to a comprehensive treatment plan.

Title: **CHSS-P25: *Foundations of Language: Infants' Discrimination of Goal Events***
Presenters: Kathryn Yuschak and Jessica Batinjane
Advisor: Dr. Laura Lakusta

Abstract: Does infant thought reflect the language of older children and adults? Recent research has explored this question by focusing on endpoints (also referred to as goals) in events (e.g., the duck flew onto the box) (Lakusta, Wagner, O'Hearn, and Landau, 2007, Lakusta and Carey, 2008). Linguistic theory suggests that in language there is a broad category for goal that encompasses different types of endpoints (e.g., into a bowl, onto a block, to a tree). Do infants also have a broad goal category? We explored this question by testing whether infants discriminate between events with different endpoints (to the box, into the box, onto the box), since the basis for categorization is discrimination (Quinn, 1994). We repeatedly presented 14-month-old infants one type of goal event (onto the box) and then showed them pairs of events: the same goal event (onto the box) vs. a novel goal event (into the box). Results revealed that infants looked longer at the novel event, providing evidence that they do discriminate between the different goal events. This evidence provides further support that infant's pre-linguistic thought is related to children and adult's language, thereby possibly aiding them in language acquisition.

Title: **CHSS-P26:** ***Effects of Noise and Reverberation on BCI users' Localization Ability***
Presenter: Yunfang Zheng
Advisor: Dr. Janet Koehnke
Abstract: This study investigated (1) the feasibility of using a virtual localization test to evaluate listeners with bilateral cochlear implants (BCIs) and (2) the effects of speech-spectrum noise and reverberation on localization for BCI users. Seven adults with normal hearing (NH) and two adults with BCIs participated. All subjects completed the virtual localization test in quiet, and at 0, -4, -8 dB SNRs in simulated anechoic and reverberant environments. The noise source was at 0º. BCI users were also tested at +4 dB SNR. A three-word phrase was presented at 70 dBSPL from nine simulated locations in the frontal-horizontal plane (+/-90º). Root-mean-square localization error in degrees was calculated. Results revealed that BCI users had significantly poorer localization accuracy than listeners with NH in both environments. For NH subjects localization performance started to decrease at -8 dB SNR in both environments. BCI users had a similar accuracy pattern to NH subjects in the anechoic environment. However, in the reverberant environment localization of BCI users started to decrease at +4 dB SNR. These preliminary results indicate that this virtual localization test is useful for measuring binaural performance in BCI users and is sensitive to differences in localization ability in these two groups.

CSAM ORAL PRESENTATIONS
(Alphabetically by Presenter)

Title: ***Analyzing a Spring Mass Lattice with a Discrete Time-Series Model***
Presenter: Rexford Acheampong
Advisor: Dr. Aihua Li
Abstract: A lattice of three masses, joined by nonlinear springs and anchored with fixed ends, displays complex dynamics. The three-mass lattice is a simplification of the Fermi, Pasta, Ulam model for investigating thermalization of nonlinear systems. We develop a method to model nonlinear systems with a discrete time series in order to gain insight into the dynamics and apply it to our nonlinear spring model. The method is an adaptation of a scheme to derive linear models from time-series data. Conservation laws of the nonlinear system guide the selection of an appropriate nonlinear model. The model is tested by varying the initial condition.

Title: ***Early die out events in SIR epidemic models***
Presenter: Jonathan Ballone
Advisor: Dr. Lora Billings
Abstract: What prevents a disease from spreading through a population? We study the early die out of a disease, the case in which a large outbreak is avoided. We compare three models for disease spread. Specifically we consider an SIR epidemic model, in which an individual in the population can be Susceptible, Infectious or Recovered. Ordinary differential equations are commonly used to model SIR systems. However, this approach fails to describe the spontaneous die out event. We develop a Markov SIR model from which the probability of early die out can be captured. Additional simulations reveal that this model agrees closely with the ODE solutions when these low-probability events are ignored.

Title: ***Movement Ecology and Habitat Utilization of the Eastern Hognose Snake at Cape Cod National Seashore***

Presenter: Scott Buchanan
Advisor: Dr. Lisa Hazard

Abstract: The eastern hognose snake (*Heterodon platirhinos*) is a species of increasing conservation concern in the northeastern United States. Once common in certain geographic areas, populations of this species have declined in recent decades. Investigations of movement ecology and habitat utilization of *H. platirhinos* in the northeastern U.S. will contribute to the effort to conserve this species. A radiotelemetry research project was initiated in 2009 to track adult H. platirhinos at Cape Cod National Seashore (CACO). A total of ten adults (7 females, 3 males) were surgically implanted with Holohil SI-2T (9g and 11 g) and SB-2T (5g) radio transmitters. Individuals were relocated approximately every four days, on average (less frequently September-November). At each unique location data was collected on body temperature, behavior, geographic location, and microclimate. Body temperature was determined by measuring the pulse frequency of the transmitters. Body mass and length measurements were taken in the field approximately every two weeks. In an effort to characterize habitat utilization and assess habitat preferences of *H. platirhinos* at CACO, data were collected at two spatial scales (1m2 quadrat and 15m radius) on a suite of a priori selected physical and vegetative characteristics deemed potentially meaningful. Data collection was carried out using identical methods at an equal number of paired "random" points. Five snakes were successfully tracked to hibernacula. Radiotelemetry will continue on these individuals and on other opportunistic captures in the 2010 active season.

Title: ***Dynamics of Disease Spread in Linked Populations***
Presenter: Jackson Burton
Advisor: Dr. Lora Billings
Abstract: In populations, there is a familiar pattern often associated with certain diseases. The pattern is recognized as an oscillation between the presence and absence of the disease separated by some time period. The question arises, 'What factors influence the reintroduction of the disease into the population.' The current standard approach to studying a disease mathematically almost exclusively involves the analysis of a single population that is affected by a particular disease. However, simply from an intuitive point of view, we realize that populations are not isolated from others. In fact, migration is a very common event that takes place between populations. This research project focuses on the analysis of disease spread through two populations linked by migration. This is done through the use of stochastic methods to capture certain levels of unpredictability. The model I have developed thus far has produced what is informally described as a ping pong effect. We see the disease alternate between the two populations causing periodic outbreaks. Interestingly enough, we also see the disease completely die out in one of the populations only to be later re-introduced with an outbreak occurring. The primary focus of analyzing this model is to examine the conditions under which reintroduction is possible and to discover possible preventative measures.

Title: ***The Trojan Asteroids***
Presenter: Alexander Cali
Advisor: Dr. Mary Lou West
Abstract: The two groups of Trojan Asteroids are located at the triangular Lagrangian points of the Sun-Jupiter system. They have the same orbital period around the sun as Jupiter, and therefore nearly the same orbit. However, they trail behind Jupiter by 60 degrees, or they lead Jupiter by 60 degrees in the orbit. These two separate groups are called the L4 or the L5 group. Data from NASA includes orbital eccentricity, perihelion distance, aphelion distance, semi-major axis, brightness, and many other properties for 4000 asteroids. Excel and JMP have been used to create histograms and scatter plots to determine statistical values of the studied properties and to plot correlations between them. These real data will be compared to the values predicted by theoretical and numerical solutions to the restricted three body problem.

Title: ***Analyzing a Spring Mass Lattice with a Discrete Time-Series Model***
Presenter: Matthew Cavanaugh
Advisor: Drs. Aihua Li, David Trubatch
Abstract: A lattice of three masses, joined by nonlinear springs and anchored with fixed ends, displays complex dynamics. The three-mass lattice is a simplification of the Fermi, Pasta, Ulam model for investigating thermalization of nonlinear systems. We develop a method to model nonlinear systems with a discrete time series in order to gain insight into the dynamics and apply it to our nonlinear spring model. The method is an adaptation of a scheme to derive linear models from time-series data. Conservation laws of the nonlinear system guide the selection of an appropriate nonlinear model. The model is tested by varying the initial condition.

Title: ***Chutes and Ladders for the Impatient***
Presenter: Leslie Cheteyan
Advisor: Dr. Jonathan Cutler

Abstract: I will review the rules and game board for Chutes and Ladders, define a Markov chain to model the game with any spinner size, and describe how properties of Markov chains are used to determine that the optimal spinner size of 15 minimizes the expected number of turns for a player to complete the game. Because the Markov chain consists of 101 states, we demonstrate the analysis with a 10-state variation with a single chute and a single ladder. The resulting 10 x 10 transition matrix is easier to display and the manipulations are comparable.

Title: ***Numerical tests of an algorithm for seismic imaging and inversion***
Presenter: Ashley Ciesla
Advisor: Dr. Bogdan Nita
Abstract: We present numerical tests for an acoustic inverse scattering algorithm for simultaneous geophysical imaging and amplitude correction from measured data. No knowledge about the medium under investigation is assumed. We model the data from several one-dimensional earth configurations and show how the algorithm can find the precise location and a good estimate of the layers' parameters from data only. Our tests will include different number of layers, high/low contrasts, velocity inversions and noisy data.

Title: ***The Slab Window Hypothesis for Condor Cliff Volcanics, Southern Patagonian Andes***
Presenter: Matthew Croker
Advisor: Dr. Matt Gorring
Abstract: This research focuses on the Pliocene (2-5 Ma) and Middle to Late Miocene (5-14 Ma) basaltic magmas that formed plateau regions in the southern Patagonian Andes. The ridge collision at the Chile Triple Junction caused pre-, syn- and post-collisonal basaltic flows to occur in the region and have been previously mapped. My samples were collected from the Condor Cliffs which is a ~1,000 m high plateau in the southern Patagonian Andes just north of the Rio Santa Cruz. Using geochemical analysis on recently collected and radiometrically age-dated samples, I hope to prove that the basaltic flows in the Condor Cliff area are due to a slab window. The slab window would be an opening between the faster moving Nazca Plate and slower moving Antarctic Plate, leaving a gap between them. This would allow sub-slab asthenospheric mantle to rise through the slab window and would cause decompression melting and basaltic magmas to flow out onto the surface. Supporting geochemical and age data for the slab window hypothesis would consist of Condor Cliff flows that have alkaline, OIB-like (Ocean Island Basalt) chemical signature and Pliocene ages. If however, Condor Cliff flows turn out to be tholeiitic and have strong arc-like geochemistry, then some other process(es) of formation maybe involved.

Title: ***Magnetic Properties of Dropstones Along the East Antarctic Margin: Towards a Better Understanding of the Carriers of Antarctic Crustal Magnetic Anomalies***
Presenter: Dave Cuomo
Advisor: Dr. Stefanie Brachfeld

Abstract: We present results of a magnetic analysis of dropstones collected along the East Antarctic Margin including the George V Coast, Terre Adélie coast, Prydz Bay, and Mac.Robertson Land for the purpose of gaining insight into the subglacial geology of East Antarctica. Dropstones, relative to sediment, provide an ideal representation of magnetic carriers still within their crystalline matrix, which can be used as reference material for interpreting satellite and aeromagnetic anomaly maps and environmental magnetic paleo-reconstructions. Here we report on the dropstones' magnetic mineralogy, natural remanent magnetization, susceptibility, and coercivity spectrum as well as their chemistry and Curie temperature. 28 samples along the East Antarctic Margin display a variety of plutonic igneous rocks as well as low and high grade metamorphics. The Koenigsburger Ratio, Q, is used to decipher between rocks that would create an induced or remanence dominated magnetic anomaly. Rocks from the Terre Adelie region contain metapelitic slates and phyllites (Q=0.006-0.7), which carry small magnetic grains (20 μ) situated within the fabric. Also present are metamorphic rocks that contain a single magnetic phase of iron sulfide (Q=0.01-0.7) and those that contain (pseudo) single domain (PSD/SD) elongated titanomagnetite grains. Samples from the Prydz Bay area are dominantly of granitic composition and commonly contain 2 magnetic phases, located within cracks in biotite crystals (Q=0.04-0.2) and as equant titanomagnetite grains enclosed within silicates (Q= 1-2.4). Plagioclase dominated plutonic rocks are also found in this area that display SD/PSD titanomagnetite +/- iron sulfides and have a wide range of Q values from 0.6 to 48. Mac.Robertson Land is dominated by meta-igneous rocks that contain titano-magnetite and minor iron sulfides (Q=0.06-0.7).

Title: ***ICER Phosphorylation by Cdc2 during Mitosis Promotes its Monoubiquitination***
Presenter: Erik Dickerson

Advisor: Dr. Carlos Molina

Abstract: The transcriptional repressor and functional tumor suppressor ICER is undetected in the nuclei of prostate cancer cells. Until now, the molecular mechanisms for ICER deregulation remained largely unknown. In this paper, we discovered that ICER is post-translationaly modified by phosphorylation and monoubiquitination. Western-blot analysis show that the expression of modified ICER was inversely correlated with the expression of ICER per se during the cell cycle. In vitro and in vivo experiments lead to the conclusion that ICER is a target for the cyclin dependent kinase Cdc2. As seen by mutational experiments and mass spectrometry, Cdc2 phosphorylates ICER on serine 35 or 41 during mitosis and ICER phosphorylation on serine 35 is a prerequisite for its monoubiquitination therefore leading to a decrease of ICER per se.

Title: ***Insite-Plasmodium Falciparum proteome interface***

Presenter: Ritvik Dubey

Advisor: Dr. Ashley Stuart

Abstract: Malaria is a deadly infectious disease spread by the bite of a female anopheles mosquito. Each year, Malaria claims around a million lives mostly in sub-saharan Africa and South Asia. The disease is caused by a eukaryotic protist of the genus Plasmodium, there are around ten major species that infect humans. Recently, there has been a growing trend of resistance to conventional treatments. This research focuses on identifying potential target sites for further drug development in Plasmodium Falciparum, the most infectious of all plasmodium species. In this research project, the proteome of Plasmodium is analyzed and organized into a database containing pertinent information such as relevant structural information, human analogs to the proteins, protein 'motifs' and sequence alignments from members of different species so as to identify proteins that could be targets for further drug development. The project was completed in two parts, i.e. building the database and building a user friendly interface which would permit the user to search for proteins using human analogs, binding sites, ligand information, protein products, protein sequence or all the above, thus allowing the user to perform highly selective searches. The user can access the results to obtain relevant information about the protein from the database as mentioned above and even cross reference the information from several other databases such as RefSeq and UniProt. The web interface was built using CGI-PM and Bioperl .

Title: ***The Nanotechnology for Drug Delivery***

Presenter: Julianne Harraka

Advisor: Dr. Shifeng Hou

Abstract: While chemotherapy is successful in destroying tumors and slowing cancer progress, the treatment is also very toxic to the body. We report here a new approach to deliver drug molecules to breast cancer cells by utilizing nanomaterials as drug carrier. The aminoethylethanolamine dendrimer, a nanomaterials with a 1,12-diaminododecane core, will encapsulate a non-water-soluble drug molecules, triptolide, into its hydrophobic core and enable triptolide to solubilize into water. This approach can overcome the problem of the poor solubility of triptolide in water, which will significantly decrease the treatment dosage, minimize the side effects and increase the delivery capacities. Dendrimer can potentially carry the drug, triptolide through the body causing less damage and better targeting cancer cells. A mixture solution with 1mmol triptolide and 1mmol dendrimer was used to encapsulate the triptolide into dendrimer cores and the high-performance liquid chromatography (HPLC) and UV spectroscopy were used to monitor the encapsulation process. Acknowledgment: Sokol-Fellowship & Sokol faculty-student research.

Title: ***Expression and Purification Of Protein Tyrosine Kinases***

Presenter: Chitra Hindnavis

Advisor: Dr. Quinn Vega

Abstract: The purpose of this research was to express and purify the protein tyrosine kinase. The kinases play a role in cellular signaling and regulate many multicellular processes such as cell-to cell signals occurring in growth, differentiation, adhesion, motility and death. The kinases are enzymes that are active participants in tyrosine phosphorylation of a target protein, which leads to activation of signal transduction pathways. The unicellular organism, Monosiga Brevicollis is closely related to the metazoans having machinery for signal transduction. Of the non-receptor tyrosine kinases the Src family participate in signaling processes such as mitogenesis, T and B cell activation and are critical components in the regulation of the immune system. Several expression systems such as E.coli, yeast, insect suspension cultures (Hi5 and SF9 cells) and mammalian cells (293cells) have been used for protein purification. In the bacterial system, the co-expression of tyrosine with the phosphatases achieved high yields. The YopH phosphatase specific for tyrosine was able to increase the solubility of the kinases. The methodologies used for

purification has been IPTG induction followed by fusion with GST (glutathione-s-transferase) and SDS-PAGE analysis. The purified protein can aid in crystallographic structural studies.

Title: ***Geochemistry of the Hudson Highlands Migmatites and Relation to Post-Ottawan Deformation***
Presenter: Justin Kulick
Advisor: Dr. Matt Gorring
Abstract: The Hudson Highlands, the New Jersey Highlands, and extending into eastern Pennsylvania are all collectively part of the Reading Prong. The Middle Proterozoic rocks of the Hudson Highlands consist of meta-volcanic, meta-sedimentary, and intrusive igneous rocks all metamorphosed to upper amphibolite to lower granulite facies metamorphism during the Ottawan Orogeny (1080-1030 Ma; Aleinikoff and Grauch, 1990). The Canada Hill Granite (Helenek and Mose, 1984; Ratcliffe, 1992) and associated migmatites (rocks that have been partially melted due to metamorphism), are considered to be post-Ottawan (1020 to 1000 Ma in age. Thirty-five samples were collected of the Canada Hill Granite (Helenek and Mose, 1984; Ratcliffe, 1992) and surrounding rocks from the Hudson Highlands, NY in the West Point-Bear Mountain area, new major- and trace-element data have been obtained. The Canada Hill Granite occurs in the cores of late folds comprising three small plutons which occur as lenses within migmatitic metapelitic gneisses. The REE chemistry of the granites varies widely due to an array of processes that occur during the time of melting through crystallization. Meta-pelitic sediments underwent biotite dehydration which generated sufficient melt so that segregation from the migmatites could take place; the melts pooled locally in the cores of late folds. Heterogeneous sources may have produced batch melts, leaving restitic phases on the border of the granite plutons, that when pooling in a central location did not efficiently mix. During crystallization some melt may have been squeezed away from the batch melts creating a cumulate melt. This melting event coincided with dextral transpression, orogenic collapse, and lithospheric thinning during the Himalayan style orogeny.

Title: ***Source rock type and U-Pb dating of late-Proterozoic Sterling Forest Granites of the Hudson Highlands, New York***
Presenter: Linda Martin
Advisor: Dr. Matt Gorring
Abstract: Geochemical analysis and U-Pb dating will be conducted with purpose of determining source rock type and true age of Sterling Forest granites of the Hudson Highlands, New York. Geochemical analysis will help determine amount of crustal influence and source rock type in the formation of the Sterling Forest granites. At present, rocks lie within Grenville age metavolcanics, metaplutonics, and metasedimentary rocks and show no metamorphic fabric to the naked eye. Questions arise as to its formation during the Ottawan orogeny of the late Proterozoic or as a post-collisional process. Sterling Forest granites may have formed from melt through subduction, during continental collision, or following collision as a result of crustal delamination. Amount of crustal influence can be interpreted by examining its major and trace element signature. In addition, U-Pb dating by SHRIMP II analysis will establish a true date that correlates granites to an age of during (108-113 Ma) or post-Ottawan orogeny.

Title: ***How thin is too thin? Anorexia as an epidemic.***
Presenter: Vladimir Mishcherkin
Advisor: Dr. Baojun Song
Abstract: For the last two to three decades, different eating disorders have had a profound impact on the physical and psychological health of many Americans, especially young women. According to National Disorders Association, eating disorders (such as anorexia nervosa, bulimia nervosa, and binge eating disorder) are serious emotional and physical problems that can have life-threatening consequences for females and males []. In our project, we focus on anorexia nervosa and develop a mathematical model to study this eating disorder. We also discuss the role of college-peer pressure on the dynamics of bulimia-free anorexia and take into account the impact of relapse, a very common phenomenon among anorexics. Finally, extensions and connections to bulimia nervosa are discussed.

Title: ***In-Depth Geochemical Analysis of Theills Quad and Sterling Forest Granitic Gneisses, New York***
Presenter: Carl Natter
Advisor: Dr. Matt Gorring
Abstract: The granitic gneisses located within the areas of Theills Quad and Sterling Forest, New York, have been largely ignored by recent geologic study. As part of a larger research project, these rocks - among others - will be sampled, prepared, and run through a series of major and trace element geochemical analyses. These data will be compared with the geochemical data of other local suites of granitic gneisses to see if there is in fact any correlation. On a larger scale, the geochemical data will provide

insight into the parent material of these metamorphic rocks and also will assist in determining whether the multiple suites have similar origins and are therefore related. Other suites of rocks to be considered in this study are the Byram Intrusive Suite of the northern New Jersey Highlands and the Storm King Granites of New York, both of which are being studied for age correlation. By including the Theills Quad and Sterling Forest information, accurate mapping of these suites can be performed.

Title: ***Provenance characteristics of sediment from the Weddell Sea and Larsen Ice Shelf region, Antarctica***
Presenter(s): Carl Natter
Advisor(s): Dr. Stefanie Brachfeld
Abstract: Provenance determination of geologic materials can be accomplished by using a variety of physical and chemical parameters that are diagnostic of source area. In this investigation, the geochemistry, iron oxide mineralogy, and texture of sediments collected from the Weddell Sea (WS) and Larsen Ice Shelf (LIS) region of Antarctica are analyzed to determine if distinctive properties of grains from these areas can be identified and exploited as tracers of sediment provenance. The information gained in provenance determination is useful for tracking environmental parameters such as iceberg and sea ice movement and ocean currents, all processes that are affected by or contribute to ice shelf and ice sheet stability. Analyses of individual iron-oxide (Fe-oxide) grains indicate that noteworthy differences in texture and composition do exist that can be used as source area fingerprints. Initial lithological analyses show that Fe-oxide grains are more abundant in the LIS region than in the WS region. We observed magnetite, hematite, and ilmenite with a variety of textures including mineral intergrowths, lamellae, magnetite co-occurring with apatite, and surface pitting caused by the removal of the apatite grains. Fe-oxide grains from the WS region show different textures and patterns of exsolution from those in the LIS region, which may be useful as tracers of these two source regions.

Title: ***Petrology of Pyroxene Gneiss in the NJ Highlands***
Presenter: Cailyn Nichol
Advisor: Dr. Matt Gorring
Abstract: The New Jersey Highlands are comprised of Mesoproterozoic high-grade metamorphic rocks found in the northwestern portion of the state. Metasedimentary rocks overlie the Losee Suite (basement rock of the Highlands). Little is known about the metamorphic history of these supracrustal rocks, given the inaccuracies inherent with analysis on metasedimentary rocks, as well as a structural disparity in the contact between the Losee Suite and supracrustal rocks between the eastern and western Highlands. This study utilized laboratory and analytical techniques to determine the protolith of a pyroxene gneiss sample collected from Wawayanda State Park. Data from the bulk chemistry was interpreted using well-established relative proportions of minerals in various tectonic environments. Additionally, P/T constraints were attempted using previously published chemistry data and the PX-NOM spreadsheet program. We expect the results to indicate that the sediments were deposited in a back-arc basin environment, which is consistent with the generally accepted model of the tectonic history of the NJ Highlands. This study is valuable because it provides greater resolution to the understanding of the tectonic past of the Highlands, as well as provides some new insight on techniques for using metasedimentary rocks in this analysis.

Title: ***Identification and determination of expression levels of Mercuric resistance genes in Synechococcus sp. IU 625***

Presenter: Dozie Okafor
Advisor: Dr. Lee Lee
Abstract: Due to high levels of heavy metal pollution in the environment, there has always been a high interest in organisms that have developed resistance to certain heavy metals of interest. Microorganisms such as Pseudomonas, E. coli, and Ralstonia, have been identified as being resistant to one or more heavy metals. Extensive work has been done with respect to mechanisms of resistance to heavy metals in a wide array of microorganisms. However, mechanisms of resistance are yet to be fully explored in some other microorganisms. One such example is the Cyanobacteria, Synechococcus sp. IU 625, formerly classified under Anastycis nidulans. This microorganism has been known to show levels of resistance to Cu2+, Hg2+, and Fe2+. Understanding the exact mercuric resistance mechanism in this microorganism would bring the field of bioremediation closer to developing very effective systems for toxic waste clean up. Primers for various genes encoding mercuric resistance were designed and amplification was attempted on both chromosomal and plasmid DNA from Synechococcus sp. IU 625. Expression levels of identified genes were then analyzed in relation to concentration and time of mercuric exposure on cells. Arrangement of identified mercuric resistance genes were then compared to arrangement of generic mer operons.

Title: ***Development of molecular probes for identification of blooming Cyanobacteria***

Presenter: Ben Ondimu
Advisor: Dr. Lee Lee,
Abstract: Harmful Algal Blooms of cyanobacteria have been reported in many parts of the world. They affect water quality, human and animal health. Timely intervention depends on early detection of bloom causing microorganisms. Water samples were collected from 15 Northern New Jersey lakes and each passed through coarse (3.0µm) and fine (0.15µm) pore filters that were dried then frozen at -20 0c. 5 discs were cut from the filters and resuspended in 500µL water for microscopic observation. Many microorganisms were detected (cyanobacteria, microeukaryotes etc) whose separation and identification based on morphology was not conclusive. A gene of interest was selected for analysis by the polymerase chain reaction (PCR) using degenerate primers. A quick DNA extraction protocol was developed and used for DNA extraction from filters with 5% chelex-100, followed by PCR with primers specific for synechoccocus sp. IU 625 (AN) .PCR with degenerate primers and DNA extracted from known laboratory microorganisms was successful but failed to work with the environmental samples, likely due to primer overdilution (0.5 µM/L), the protocol has been revised and the experiment will be repeated. Although more studies are underway, it is evident these primers can be used to separate and identify cyanobacteria from microeukaryotes in lakes.

Title: ***Expression, characterization and inhibitor identification for a lymphatic filarial parasite, Brugia malayi, mitogen-activated protein kinase. A potential anti-parasitic drug target.***
Presenter: Akruti Patel
Co-author(s): Katie Gaskill, Agnieszka Chojnowski, Ally Bress, Anna Tomaszewska, Sailaja Sankabathula, Ronald Goldberg
Advisor: Dr. John Siekierka
Abstract: Lymphatic filariasis (or elephantasis) is a major neglected disease with an estimated 120 million individuals infected and approximately 1.5 billion at risk in endemic regions. It is a highly disfiguring and debilitating disease and one of the major causes of global morbidity. We are studying the parasitic nematode, Brugia malayi, which is the main cause of lymphatic filariasis in South and Southeast Asia. We are particularly interested in the biochemical anti-stress responses that this parasite uses to protect itself from envirormental stress and host anti-parasite immunological responses. We have identified an enzyme expressed in B. malayi which is closely related to the human stress-activated protein kinase called p38 mitogen-activated protein kinase (p38). This enzyme is known to play an important role in human responses to stress such as caused by toxins, infection, oxidative and UV-induced stress and inflammation. A similar enzyme is also expressed in the non-parasitic nematode C. elegans, which is distantly related to B. malayi, and has been shown using genetic means to be involved in protecting the worm from a variety of environmental and other stresses. Based on these observations we hypothesized that the B. malayi enzyme is important in protecting the parasite from stress and that inhibiting it's activity may be deleterious to the parasite. We have successfully expressed and characterized the B. malayi p38 ortholog, BmMPK1. We have assayed BmMPK1 using a flourscence polarization kinase assay and screened a panel of known p38 inhibitors for activity. All p38 inhibitors evaluated showed potent activity against BmMPK1. Our results pave the way for assessing the activity of these inhibitors against the parasite.

Title: ***Heavy Metals Zinc and Cadmium Resistance within Cyanobacterium, Synechococcus sp. IU 625***
Presenter: Jose Perez
Advisor: Dr. Lee Lee,
Abstract: Cyanobacterium, *Synechococcus sp.* IU 625, is an oxygenic photosynthetic bacterium that approximately dates 2.8 – 3.9 Ga. Its abilities as an oxygen producer through ancient mechanisms generally support the observation that plant chloroplasts were derived from a cyanobacterial ancestor. Heavy metal toxicity is dependent on the heavy metal's ability to interact with or out-compete other essential metals. The valence d-orbital reactivity of cadmium confers an ability to supplant Zinc, Calcium, and Copper. Cadmium is considered one of the most toxic heavy metals. Zinc's toxicity may be observed at higher concentrations because it is found as a natural component within many enzymes and DNA-binding proteins. The effects of different concentrations of CdCl2 and ZnCl2 on the growth of *Synechococcus sp.* IU 625 have been studied. Zinc tolerant *Synechococcus sp.* IU 625 cells have been isolated and the Zinc resistant genes have been identified and sequenced. Moreover, heavy metal treated cells have been monitored to study the metal effect on these macromolecules.

Title: ***Mechanics of the human tear film during a blink***
Presenter: Douglas Platt
Advisor: Dr. Ashwin Vaidya
Abstract: The human eye is protected, and nourished by a multilayer tear film. During a blink this tear film is exposed to a large number of forces and motions, causing part of the tear volume to be drained through the drainage system, and replenishing the eye surface as the eyelids reopens. A second set of forces present under the eyelid during the blink cycle causes debris and

dead cells to be removed from the eye. We propose a mathematical model to study the fluid mechanics of the tear film under the eyelid and interactions with any imbedded particle in the system.

Title: ***Truth About Reversing Aging?***
Presenter: Trista Powell
Advisor: Dr. Ann Marie Dilorenzo
Abstract: For years, cosmetic companies have promised never-ending youthfulness. For example, cosmetic companies marketing their new pentapeptide complexes claim that their products stimulate cell proliferation. An important goal of cosmetic companies in the European Union is to gain a better understanding of the mechanisms at work within in vitro tissue studies. In March 2009, the European Commission banned animal testing in the cosmetic industry. Thus, companies have been trying to develop new techniques that may elucidate whether toxic effects on cells are seen. Tissue culture experiments are used to detect and identify mutations from chemical compounds affecting the skin. Our research team has already obtained results in a chick embryo biopsy/ proliferation test, which tested Vitamin C, Allantoin, Palmitoyl Pentapeptide-3(pp-3), and their combinations. Vitamin C appeared to indicate that it did not increase cell proliferation. Cell proliferation increases observed with Allantoin were significantly less than those observed with pp-3. When pp-3 was used at a moderate level of 25 ppm with the other two substances, the data showed a doubling effect on the number of cells. This suggested synergistic effects. Eventually, these three compounds will be evaluated at a molecular level.

Title: ***A new type of nanoparticle as sorbent for removing heavy metal ions from waste water samples***
Presenter: Pinal Ramani
Advisor: Dr. Shifeng Hou
Abstract: Recent advances in nanotechnology suggests that nanomaterials can be helpful in eliminating the problems associated with heavy metal pollution. Nanomaterials have much larger surface area as compared to bulk materials and they exhibit novel properties due to smaller size. EDTA (ethylenediaminetetraacetic acid) is a chelating agent and was commonly used to remove heavy metals from the sample along with distill water. The main objective of this study is to demonstrate the possibility of EDTA modified Graphene in removing heavy metals from waste water and environmental samples. From the study we observed that EDTA-Graphene is an ideal nanomaterial for removing Pb2+ ions from waste water and other environmental samples with high adsorption capacity. Uv-vis and titration technique were applied to evaluate and find the amount of Pb2+ adsorbed by EDTA-Graphene and its kinetics; the pH effects were also investigated. EDTA-Graphene has good adsorbtion capacity for Pb2.

Title: ***Responsible Gold Mining? Who is Who***
Presenter: Aimann Sadik
Advisor: Dr. Robert Taylor
Abstract: Gold mining is associated with numerous environmental, ecological and social damages; therefore mining firms are required to be compliant with the applicable laws and regulations of local, state, regional and national governing bodies aimed at responsible mining practices and sustainable development. In addition, gold mining firms have committed themselves to a number of voluntary codes and initiatives aimed at addressing these negative impacts. However, non-governmental organizations (NGOs) through their websites and campaigns have showed the failures of such voluntary codes and initiatives throughout the world. The aim of this study is to rank the responsible mining practices of the top 10 multinational gold firms (MNGs) in the world by market capitalization. This will be illustrated by identifying the main themes of various responsible mining practices and sustainable development initiatives and codes followed by weighting of the themes by use of the frequency of related mining events as reported on the websites of selected international NGOs. The result will be integrated into a coding system to categorize the global top 10 MNGs.

Title: ***On the Numerical Range and Spectrum of the Weighted Shift Operator in l_2***
Presenter: Gina-Louise Santamaria
Advisor: Dr. William Parzynski
Abstract: We will examine both the left and right weighted shift operators in the Hilbert Space l2. These shifts are examples of hyponormal shifts, which have some nice properties, including numerical ranges which are easy to calculate. Thus, our first objective, which is to calculate the numerical range of both shifts, is simplified. Furthermore, we will discuss the spectra of both shifts, as well as each spectrum's constituent parts. There is a theorem that the spectrum of an operator is contained within the closure of the numerical range. Therefore, our final objective will be to use what we know about spectra and weighted shifts in order to identify where each constituent part lies within the closure of the numerical range.

Title: ***Efficient synthesis of (L)-4-fluorotryptophan II***
Presenter: Drilona Seci
Advisor: Dr. David Konas
Abstract: Fluorinated amino acids are important tools for medicinal and biological chemists. Fluorination at the 4-position of the indole ring in (L)-tryptophan results in a non-fluorescent analog which can be used in a variety of valuable biochemical applications. In the interest of generating a significant supply of this compound, we are developing a new efficient and enantioselective synthesis of (L)-4-fluorotryptophan. Important background information and details of this new synthesis will be presented.

Title: ***Regulation of RET splicing***
Presenter: Ananya Sengupta
Advisor: Dr. Quinn Vega
Abstract: Splicing refers to a process in which a mature functional mRNA sequence is formed by the cutting and removal of pre-mRNA sequence. In many cases, splicing can produce a variety of mRNA products by varying the sequences removed and on some occasions even including some exons. These mRNAs then undergo translation and result in the production of different isoforms with some unique amino acids. This study is to measure the different conditions of splice variation and also identify the conditions which leads to splicing of the human RET (Rearranged during Transfection) proto-oncogene. RET proto-oncogene encodes a receptor tyrosine kinase for members of the GDNF (glial cell line derived neurotrophic factor) family of extracellular signaling molecule. Human RET gene contains 21 exons and the alternative splicing of the RET gene between exons 19 and 21 results in the formation of its three isoforms - RET9, RET51, RET43. The different expression patterns shown by the RET 9 and RET51 isoforms and the work of other researchers showing that the different RET splice variants result in different phenotype when expressed independently are demonstrations of the importance of these splice variations in RET function. As a sequential step, in this study two different constructs of a specific region of RET were designed and analyzed using RT-PCR and Q-PCR to demonstrate the mechanism of splicing. These constructs are planned to be further used as a model for the study of conditions which lead to splicing of Human RET proto-oncogene.

Title: ***Efficient synthesis of (L)-4-fluorotryptophan I***
Presenter: Safa Tamimi
Advisor: Dr. David Konas
Abstract: Fluorinated amino acids are important tools for medicinal and biological chemists. Fluorination at the 4-position of the indole ring in (L)-tryptophan results in a non-fluorescent analog which can be used in a variety of valuable biochemical applications. In the interest of generating a significant supply of this compound, we are developing a new efficient and enantioselective synthesis of (L)-4-fluorotryptophan. Important background information and details of this new synthesis will be presented.

Title: ***Magnetically induced viscosity increase in a ferrofluid***
Presenter: Matthew Vieira
Advisor: Dr. David Trubatch
Abstract: Magnetic fluids (ferrofluids) are engineered suspensions of ferromagnetic particles that are ferromagnetic on a bulk, macroscopic scale. The suspended magnetic particles render the fluid opaque to visual light, thus requiring other means to observe internal phenomena in the ferrofluid. To measure the viscosity of a ferrofluid, glass spheres were dropped into a sample of ferrofluid subject to applied magnetic fields, and their trajectories were observed using x-ray phase contrast imaging at the Advanced Photon Source of the Argonne National Laboratory. The average speed of a falling sphere is observed to decrease with an increase in the applied magnetic field, manifesting a saturable, magnetically induced increase in the ferrofluid viscosity.

Title: Pt catalysts on functionalized graphene for electrocatalytic methanol oxidation oxygen
Presenter: Marzena Wietecha
Advisor: Dr. Shifeng Hou
Abstract: Pt catalysts on functionalized graphene for electrocatalytic methanol oxidation oxygen for fuel cell Marzena Wietecha, Hou Department of Chemistry & Biochemistry Montclair State University, 1 Normal Ave, Montclair, NJ 07043 This research targets the study of chemically functionalized graphene and the in-situ synthesis of metal nanoparticles on graphene surface and their activity as fuel cells and sensor catalysts. Families of silane-modified graphenes with amine, thiol and chelating

groups and the composites of graphene nanosheets decorated by Pt nano clusters have been prepared via reduction of graphite oxide and H2PtCl6. Platinum nanoparticles were made by combining reduced grapheme, ethylene glycol, tertaamine platinum (II) hydroxide solution Pt 9.3%, which was refluxed for 3 hours and then vacuumed. SEM had been used to characterize the materials and electrochemical experiments showed that graphene is a good catalyst for oxidation of methanol for fuel cells.

Title: ***Discrete Sturm-Liouville Problems with Nonlinear Parameter in the Boundary Conditions***
Presenter: Michael Wilson
Advisor: Dr. Aihua Li
Abstract: This paper deals with discrete second order Sturm-Liouville Boundary Value Problems (DSLBVP) where the parameter that as part of the Sturm-Liouville difference equation appears nonlinearly in the boundary conditions. We focus on analyzing SLBVP with cubic nonlinearity in the boundary condition. The problem is described by a matrix equation with nonlinear variables. By applying the matrix pencil techniques, we reduce an SLBVP to a generalized eigenvalue problem with respect to its coefficient matrix. Under certain conditions, such a generalized eigenvalue problems can be further reduced to a regular eigenvalue problem so that many existing computational tools can be applied to solve the problem. The main results of the paper provide the reduction procedure and identify those cubic SLBVPs which can be reduced to regular eigenvalue problems. We also investigate the structure of the coefficient matrix to a DSLBVP and its effect on the reality of the eigenvalues of the problem.

Title: ***Assessing Drought Performance of New Jersey Streams Using a New Overall Performance Indicator***
Presenter: Seth Xeflide
Advisor: Dr. Duke Ophori
Abstract: In the era of increasing exploitation of streams as a resource for public water supply, the performance characteristics of streams in a region in times of drought becomes very imperative. In the past, typical stream performances indicators that have been used to characterize streams with respect to drought do not account for drought severity and frequency. Recently, a new overall performance indicator (pD,10) which combines drought severity/magnitude and frequency has been successfully used to assess the performance of groundwater during drought (Peters et al., 2005). In this study this new overall performance indicator has been applied to streams located in the six drought regions (i.e. north east, north west, central, coastal north, south east and south west) of New Jersey. The new overall performance indicator whose values range from 0 to 1 is based on drought deficit (D) corresponding to a return period of 10 years (denoted by pD,10). Streams with relatively small pD, 10 values (poor performance) tend to be more impacted during drought. Results of the analysis revealed that values of pD,10 in the north eastern, north western and central (i.e., northern part of the state) drought regions ranged from 0.07 to 0.14, whilst streams in the coastal north, coastal south and south west have values ranging from 0.20 to 0.26. This implies that during drought, streams in the north eastern, north western and the central drought regions (northern New Jersey) appear to be the most severely impacted. Examination of the frequency distribution of monthly severe droughts indicated that streams in the northern part of the state exhibit predominantly within -year drought tendencies whilst the southern streams exhibit over year drought tendencies. The degree of responsiveness of drought as a consequence of increasing water withdrawals has been was also determined in this study by computing the performance elasticity of demand. The results indicated that the northwestern and northeastern drought regions appear to be relatively less responsive to increasing water withdrawal. This phenomenon is probably the result of the within-year drought and carry-over tendencies exhibited by streams in these regions.

CSAM POSTER ABSTRACTS
(Alphabetically by Submitting Presenter)

Title: **CSAM-P1:** ***The environmental planning for academic and administrative buildings of the Hypothetical North Jersey State University***

Presenter(s): Nicoletta Aguccioni, Jennifer Prawetz
Advisor(s): Dr. Greg Pope
Abstract: The goal of this project is to design environmentally sustainable academic buildings that are economically feasible and will provide the campus with the best possible land use for these types of buildings. This poster describes the function of the Academic and Administrative buildings of the North Jersey State University. Approximately 23,000 students attend the North Jersey International University. To understand the best possible land use, studying geologic maps and the researching of potential hazards has been done. This project has some constraining factors concerning land use, such as varying slopes and possible erosion. Another constraint is possible zoning issues due to height of buildings because of town ordinances and possible

expansion of the university due to the close proximity of the urban dwellings that surround the university site. All colleges are located in the heart of the 250 acres campus. The campus itself is a large parcel of land with a diverse morphology of terrain. The campus itself is in a very strategic location due to the vicinity of New York City, which is only fourteen miles away which provide the campus with public transportation.

Title: **CSAM-P2:** ***Construct for the generation of a transgenic zebrafish***
Presenter(s): Caitlin Ament
Advisor(s): Dr. Carlos Molina
Abstract: Inducible cAMP Early Repressor (ICER) regulates the nuclear response to gonadotropins in ovarian tissue and is thus an important regulator in folliculogenesis. It has been hypothesized that increasing the amount of ICER in granulosa cells should lead to increased production of mature follicles in the ovary thus increasing the number of ova produced. The purpose of this study was to demonstrate that expression of an ICER transgene could be induced using the 3.0 kb promoter region of the ovarian-specific alpha inhibin (INHa) gene in zebrafish, Danio rerio. The sequences for ICER and the INHa promoter in Danio rerio were identified via a BLAST search using the known sequences from mouse and chicken. The putative sequences were subsequently isolated and amplified using PCR and confirmed with DNA sequencing. ICER-Iγ was tagged with a FLAG sequence by cloning into pFLAG-CMV-2 plasmid. The expression of FLAG-ICER-Iγ protein was confirmed by Western blot after transfection into HEK 293T human kidney cells. INHa was sub-cloned into three different vectors (phrGFP, pGL3-Basic and pLuc-MCS) to test the functionality of the Danio 3000bp INHa promoter region. These constructs will be transfected into an embryonic zebrafish cell line termed PAC-2 to test promoter activity. The long-term goal of this project is to use the same vectors to determine if transgenic Danio rerio hyperovulate in response to excess ICER.

Title: **CSAM-P3:** ***Faunal Associations with the Black Sea Urchin, Diadema antillarum***
Presenter(s): Christine Barton
Advisor(s): Dr. Paul Bologna
Abstract: We conducted research into the potential relationships of organisms which are affiliated with the protection offered by the spines of the black sea urchin in three bays in St. John, USVI. Our target species included three crustaceans (Mysid shrimp, spiny lobsters, arrow crabs) and three fish (French grunts, short-nose puffers, and high hats). Additionally, we evaluated the potential that mysid shrimp use kairomone signals to assess risk of predation from fish. Our results indicate differences in the levels of species utilization among the bays, the highest of which were seen in Reef Bay. Results from the mysid behavior experiment suggest that mysids are able to detect kairomones, and have a threshold response to the concentrations of kairomones in the water, where they exhibit escape behavior.

Title: **CSAM-P4:** ***Seagrass Community Structure and Faunal Density in St. John's, USVI***
Presenter(s): Kimberly Christiansen
Advisor(s): Dr. Paul Bologna
Abstract: Seagrass community structure and faunal density was assessed in three different bays in St. John's, USVI. The three bays where research was conducted were Greater Lameshur, Little Lameshur and Hurricane Hole. Greater Lameshur and Little Lameshur are exposed embayments, which could affect the amount of plants and organisms that inhabit certain areas. Hurricane Hole is highly protected from any disturbances with fringing mangroves present. In this experiment, five cores were collected in each bay to assess the faunal density and plant community structure. Samples were then separated, identified and recorded to observe the faunal density and plant community structure within each bay. Animal density was the highest in Greater Lameshur and Little Lameshur compared to Hurricane Hole. Dominant taxa included polychaetes, mudd shrimp, pea crabs and several species of mollusks. Throughout the three sites we found similar species. Assessment of plant community showed higher turtle grass shoot density at Little Lameshur compared to Greater Lameshur and Hurricane Hole. Little Lameshur showed a lower manatee grass density compared to Greater Lameshur and Hurricane Hole. Hurricane Hole maintained the highest amount of algal species while Greater Lameshur and Little Lameshur showed the lowest amount of algal species. These results showed the differences among the bays according to animal density and plant community structure. UG, Talk

Title: **CSAM-P5:** ***Pathways of leukemic T-lymphocyte activation and inactivation: the role of acidic pH and p38 mitogen-activated protein kinase (p38 MAPK)***
Presenter(s): Marni Crow
Advisor(s): Drs. Vladislav Snitsarev,Dr. John Siekierka , Elena Petroff

Abstract: Dysfunction in regulation of T-cell proliferation is thought to be responsible for development of autoimmune diseases. According to NIH, autoimmune diseases affect up to 24 million Americans, while cancer affects up to 9 million, and heart disease up to 22 million. T-cells are among few cell types that start proliferation in response to activation by cancer or by self-cells infected by virus. We hypothesized that 1) immunogenic activation increases T-cell proliferation rate (TLPR), 2) extracellular acidification, a common process in sites of inflammation, increases TLPR, 3) inhibition of p38 MAPK with SB203580 decreases TLPR. TLPR was measured as a ratio of the cell count 48 hours after treatment relative to the seeding count using hemacytometry. Surprisingly, in response to immunogenic activation by phorbol 12-myristate 13-acetate (50 ng/ml) and leukoagglutinin (1 μg/ml), human leukemic Jurkat T-lymphocytes decreased TLPR from 3.3±0.7 to 0.88±0.06, n=4, p<0.001. However, pH change from 7.4 to 7.2 significantly increased TLPR from 3.3±0.7 to 4.0±0.1 (n=4, p<0.01). SB203580 had biphasic effect; it increased TLPR with ED50=1.1 pM (Hill=4.0), and inhibited TLPR with IC50=0.13 μM (Hill=0.8). Since the results were obtained using leukemic T-cells, we speculate that 1) immunogenic activation of malignant T-cells may reduce their malignancy, 2) an increase in TLPR in acidic pH may be related either to an increase in malignancy in sites of chronic inflammation or reflect normal physiological response of T-cells to inflammation, and will be the subject of our future studies, 3) at pM concentrations SB203580 may enhance cell proliferation through an unknown mechanism that deserves further investigation. Future studies will focus on the mechanisms of T-cell activation at acidic pH and approaches to inhibit autoimmune disease related T-cell proliferation.

Title: **CSAM-P6:** ***The mechanism of autoregulation by ICER***
Presenter(s): Mark DeMilio, Franklin Paulino
Advisor(s): Dr. Johannes Schelvis
Abstract: ICER (Inducible cAMP Early Repressor) is a known transcription and tumor repressor and is a product of the CREM (cAMP Responsive Element Modulator) gene. It is involved in the repression of certain genes that are activated by the cAMP signaling pathway. ICER binds to CRE's (cAMP Responsive Element), found in the promotor sequences of genes involved in cellular growth. ICER also binds to CRE's sites located in its own promotor to regulate its own expression. These four CRE elements on the CREM gene promotor are known as CARE-1 through CARE-4. Since ICER has multiple binding sites, the probability of cooperative binding exists, notionally similar to how oxygen is shown to bind to hemoglobin. In this work, our goal is to determine the binding constants associated with the binding of ICER to each individual CARE site as well as to examine the potential for cooperative binding between multiple CARE sites. Prior to binding analysis, the relatively common protein assay known as the BCA Assay is used to determine ICER's concentration in solution. By using fluorescence resonance energy transfer (FRET), we studied the interactions of the ICER protein as it binds to fluorescently tagged DNA strands containing either a CARE-1 or a CARE-2 site. The FRET technology allows for precise quantitative measurements that are necessary to elucidate the mechanism of autoregulation by ICER and can provide both static and dynamic information. By using the data collected from the titrations of ICER and the double-stranded DNA, the binding mode of ICER to CARE-1 and CARE-2 will be discussed.

Title: **CSAM-P7:** ***Modified green tea polyphenols as a novel approach to inhibit Herpes simplex viral infections***
Presenter(s): Aline deOliveira
Advisor(s): Dr. Lee Lee, Dr. Sandra Adams
Abstract: Herpes viruses (family *Herpesviridae*) are a diverse group of large DNA viruses, each of which is able to establish latent infections. There is no cure for the diseases caused by HSV infections. Green tea polyphenols are antioxidants known to possess antiviral properties against several viruses, including HSV (Herpes Simplex Virus). More importantly, HSV infection could be significantly reduced if effective agents for prevention are developed. HSV-1 DNA with the green fluorescent protein (GFP) introduced into the UL46 gene was used to investigate the effects of green tea polyphenols on the virus. Three different green tea extracts have been isolated and modified, EGCG and GTP are water-soluble and LTP is fat-soluble. These extracts with concentration of 12.5, 25, 50, 75 and 100 μM were used on Vero cells to determine the cytotoxicity, and wound healing effect. Cell viability was determined by the trypan blue reagent, which stains only non-viable cells. The preliminary results of this study suggested that EGCG and GTP with concentration of 25μM, and LTP with concentration of 12.5 μM provided the best results on Vero cells. There are no significant morphological and proliferation changes seen in the treated cells. The maximum non-toxic concentration of each extract was further used to study its effect on HSV by plaque forming unit (PFU) assay and GFP expression. Virus treated with the different green tea polyphenols infected cells much less when compared to control.

Title: **CSAM-P8:** ***Campus Recreational Facilities and the Environment - An Exercise in Urban Planning***
Presenter(s): Mike Donnelly, David Sudol
Advisor(s): Dr Greg Pope

Abstract: Environmental constraints are now more than ever playing a role in urbanization. The relationship between urbanization and the environment is a two-way street as planners must not only make sure to take measures to reduce the impact on the environment while adequately providing for the needs of the population, but to also protect the population from the potential dangers of earth's natural processes. Planning a university campus is a prime example of this paradigm, and these factors will be taken into consideration for campus recreational facilities for a hypothetical university that is to be designed from scratch on the current Montclair State University site. Indoor facilities such as an ice hockey arena, swimming pool, basketball courts, and exercise gym require vast amounts of energy and square footage, but building a multi-level super-complex to house all activities in one place would reduce the number of buildings (and thus the actual physical footprint) and keep energy needs in one place. It will also utilize energy-saving practices such floor-to-ceiling windows for natural light and heat as well as rooftop tennis courts for further ground space conservation. Outdoor facilities such as sports fields, a campus commons, and a 5K walk/run/bike/rollerblade path will provide green space but must also be protected from threats like erosion and slope instability.

Title: **CSAM-P9:** ***Insite-Plasmodium Falciparum proteome interface***
Presenter(s): Ritvik Dubey
Advisor(s): Dr. Ashley Stuart
Abstract: Malaria is a deadly infectious disease spread by the bite of a female anopheles mosquito. Each year, Malaria claims around a million lives mostly in sub-saharan Africa and South Asia. The disease is caused by a eukaryotic protist of the genus Plasmodium, there are around ten major species that infect humans. Recently, there has been a growing trend of resistance to conventional treatments. This research focuses on identifying potential target sites for further drug development in Plasmodium Falciparum, the most infectious of all plasmodium species. In this research project, the proteome of Plasmodium is analyzed and organized into a database containing pertinent information such as relevant structural information, human analogs to the proteins, protein 'motifs' and sequence alignments from members of different species so as to identify proteins that could be targets for further drug development. The project was completed in two parts, i.e. building the database and building a user friendly interface which would permit the user to search for proteins using human analogs, binding sites, ligand information, protein products, protein sequence or all the above, thus allowing the user to perform highly selective searches. The user can access the results to obtain relevant information about the protein from the database as mentioned above and even cross reference the information from several other databases such as RefSeq and UniProt. The web interface was built using CGI-PM and Bioperl .

Title: **CSAM-P10:** ***PCR Analysis of Batrachochytrium Fungus in Local and Lab Amphibians***
Presenter(s): Rakesh Dussa **Co-author(s):** Lisa Hazard, Kirsten Monsen
Advisor(s): Dr. Kirsten Monsen
Abstract: *Batrachochytrium dendrobatidis* (Bd) fungus has recently been attributed as a cause of massive amphibian declines and extinctions globally. There is currently no screening data available for the state of New Jersey making the threat of this pathogen to local amphibians unknown. Additionally, this pathogen's presence in commercially available animals may increase the global spread of this fungus. Wild and commercially-purchased amphibians are used frequently at MSU for faculty research and course use in both the field and classroom. In this study we tested locally caught and commercially purchased amphibians and environmental samples for the presence of Bd DNA using a non-invasive Polymerase Chain Reaction-based technique. All samples tested negative for presence of the fungus. It is possible the negative results are due to a lack of sensitivity using traditional PCR. To verify our results, we are currently re-testing these samples using a quantitative PCR analysis that is significantly more sensitive in detecting the presence of Bd DNA.

Title: **CSAM-P11:** ***Study of GCDs of Certain Solutions to Diophantine Equations***
Presenter(s): Kale Evans
Advisor(s): Dr. Aihua Li
Abstract: We investigate the Greatest Common Divisor (GCD), D(x), of g(x), h(x), and f(x) for fixed integer values x. Here g(x), h(x),and f(x) satisfy the Diophantine equation g^2 + 2h^3 = 783f^3. We show that 1, 2, 29, and 58 are the only possible values for D(x). We give a complete classification of x for which D(x) takes on the values 1, 2, 29, or 58.

Title: **CSAM-P12:** ***Hypothetical Planning for Utilities of North Jersey State University***
Presenter(s): Darryl Green **Co-author(s):** Kiryl Bychkouski
Advisor(s): Dr. Greg Pope

Abstract: The purpose of this project is to construct plans for North Jersey State University. North Jersey State University is a concept of a new university campus village using the current footprint of Montclair State University. There are six sections to this project and this section focuses on university utilities. NJSU utilities will have the priority of clean and sustainable functionality. This can be achieved through the use of solar and wind technology, rain water collection and recycling, as well as an enhanced 21st century communication systems. Because the campus has a unique microclimate due to its geographic elevation compared to the neighboring communities, an on-campus weather monitoring system is recommended to provide real-time weather information to the campus community. As with any building complex, maintenance is the key to efficiency. For instance, to enhance maintenance efficiency, Geographic Information Systems will be used to geo-code utility assets such as light fixtures, fire hydrants, and all safety related assets. North Jersey State University will still be connected to the local utility grid. However, by using green technology it is our goal to minimize waste and the use of fossil fuels thus reducing the university's carbon footprint. These, among other innovations, will be designed to promote effective real-time communication between the student body and the campus, and to set the groundwork for sustainable energy consumption for future generations of the NJSU community.

Title: **CSAM-P13:** ***Morphological Study of Cyanobacteria Synechococcus sp. IU 625 in response to Heavy Metal Stress***
Presenter(s): Bobak Haghjoo **Co-author(s):** Dr. Lee Lee
Advisor(s): Dr. Lee Lee
Abstract: Synechococcus sp. IU 625 is a unicellular photosynthetic cyanobacteria. The effect of different heavy metals on the growth of Synechococcus sp. IU 625 has been reported. Cadmium (Cd2+), Zinc (Zn2+), Copper (Cu2+), and Mercury (Hg2+) are well-studied heavy metals in its physiological interaction in many organisms. In this study, their effect on cyanobacteria Synechococcus sp. IU 625 are observed using DIC (Differential Interference Contrast) microscope and a Scanning Electron Microscope (SEM) to determine morphological changes that arise from heavy metal contamination. DAPI stain is used to study the changes in DNA. The results indicated that in most of the heavy metal stress, the elongation of cells has been observed. Some cells are curved, due to the metal effect on cytoskeleton inside the cell. Some metal such as mercury has the strongest effect on the DNA. Some fragmentation of DNA has been identified in metal treated cells. There are also significant surface changes been detected in the SEM. The observed changes in characteristics allow further understanding of the interactions of these heavy metals on the cells, DNA and cytoskeleton that alter physical traits in response to contaminated or treated environments. The metals are observed on an acute to chronic toxicity level with insight on metal bio-uptake, accumulation, detoxification, and metabolism of the species in natural systems.

Title: **CSAM-P14:** ***Galaxy Collisions***
Presenter(s): Dawn Haider, Craig Lapierre
Advisor(s): Dr. Mary Lou West
Abstract: Galaxies consist of clouds of gas interwoven with hundreds of billions of individual stars, their planets and moons. Although stars hardly ever collide, galaxies often do. During a collision of two galaxies, the moving gravitational fields result in drastic changes to the trajectories of groups of stars in both galaxies. Rings and streamers of stars are thrown out of normal spiral or elliptical galaxies. A series of computer simulations were used to investigate which input parameters to a collision could reproduce the images of several pairs of colliding galaxies seen in the real sky.

Title: **CSAM-P15:** ***Mathematical Modeling of Action Potential in Neurons: Contribution of Different Ion Channels***
Presenter(s): Dawn Haider
Advisor(s): Dr. Vladislav Snitsarev, Dr. Elena Petroff
Abstract: Action potentials (AP) are the means of transferring information along neuronal axons. AP shape and frequency are the way the information is encoded, and these parameters affect synaptic transmission from one neuron to the next. Ion currents through various ion channels define the shape of an AP. Ion channels conducting these currents can be pharmacologically targeted as treatment for neurological disorders. It is therefore important to know the contribution of each channel involved in AP. To gain an insight into ion channels' contribution to APs, we further developed and applied a previously generated mathematical model of an AP using Simulink (Mathworks), based on the Hodgkin-Huxley model of whole-cell currents and changes in conductance of ion channels known to contribute to AP. Using this model, we were able to simulate current injection into a model neuron, measure the AP outcome, generate a graph of the action potential shape, and adequately model action potentials in the presence of known ion channel blockers, including Tetrodotoxin, Lidocaine, Scorpion Toxins, and endogenous toxins. Comparing the computer-generated model with real experimental data, we determined the model's accuracy. In response to simulated depolarization with 0.04 nA current injection, 4 APs adapting within 200 msec were generated. Doubling K+ channel conductance from 6.5 to 13 nS resulted in 12 APs adapting within 600 msec, and halving BK conductance to 3.25 nS resulted in 3

APs adapting in less than 200 msec. Similar changes in AP firing were observed in the model system and in the previously obtained measurements in the nodose neurons.

Title: **CSAM-P16:** ***Database for Studying Ligand Binding Sites in Plasmodium falciparum Proteins Having the Least Similarity with Human Proteins***
Presenter(s): Waleed Haso
Advisor(s): Dr. Ashley Stuart
Abstract: Plasmodium falciparum is the infectious parasite that causes malaria, which kills millions of people, mainly children, each year. The entire genome for this parasite is published at the website PlasmoDB.org, in addition the human genome is publicly available on the web. These databases have significantly improved the process of drug discovery. Potential antimalarial drugs can be developed by identifying the ligand binding sites in Plasmodium falciparum proteins that are the least similar to human proteins. Finding targets with the low similarity to human proteins grants researchers the ability to design drugs that have low or no side reactions in patients that often cause damaging and harmful consequences. For this project, a database was created using MySQL that contains information about the malaria proteins extracted from PlasmoDB. The database attempts to correlate known functional information with available structural data and to provide tools to help analyze potential new targets against malaria. The database also contains human proteins that are similar to malaria proteins. Homologs were found using the BLAST algorithm (Basic Local Alignment Tool) to search against the Plasmodium falciparum proteome. Structural information was extracted from PDB (Protein Data Bank) and ModBase (a structural database of homology models). Other useful information was added to the database including cross references to (UniProt) and motif analysis from ProSite. The database was made searchable through a web interface and will be publicly available on the Ramapo Bioinformatics server. (proteus.ramapo.edu).

Title: **CSAM-P17:** ***Determination of disscoiation constanst for B. Stearothermophilus Dihydrofolate Reductase***
Presenter(s): Mark Haverick
Advisor(s): Nina Goodey
Abstract: Dihydrofolate reductase (DHFR) is an enzyme that is crucial for purine biosynthesis in nearly all-living organisms and purines are essential for DNA synthesis. The enzyme catalyzes the conversion of dihyrofolate to tetrahydrofolate using NADPH as a cofactor. This enzyme has become a common target to treat a variety of diseases that range from bacterial infections to cancer. The dissociation constant (Kd) quantifies the interaction between a drug and a target indicating the how tightly a drug binds to its target. Pyrimethamine is an anti-folate drug and known inhibitor of DHFR in Toxoplasma gondii (T. gondii). The Kd of the DHFR from B. stearothermophilus was determined by measuring the change in fluorescence intensity upon addition of successive amounts of the drug. The fluorescence intensity versus Pyrimethamine concentration data was fitted to the Morrison equation, which provided a value of 2.6 nM for the Kd.

Title: **CSAM-P18:** ***Location and Annotation of Dissocitation Elements in the Maize Genome***
Presenter(s): Andrew Hoffman, Ambrish Mistry, Veronica Garzon, Natali Vicente, and Gina Cordero
Advisor(s): Dr. Charles Du
Abstract: In this study, our goal was to locate and annotate all of the Dissociator(Ds) transposable elements in the maize genome. These elements were among the first transposable elements discovered, by Barbara McClintock 1948. Ds, along with the transposon Activator(Ac), form a system that allows these elements to "jump" all around the maize genome. Today, with modern sequencing technology, we are now able to identify hundreds of potential areas where Ds elements exist thanks to unique sequences they share. This began with the complete sequencing of the maize genome and continued when the maize genome had been assembled into pseudomolecules for each of Maize's 10 chromosomes. The exhaustive process involves identifying not only the element type, but its location and identity of the sequence that it had inserted into. Discovering all of these elements will lead to a better understanding of transposable elements in the maize genome, and will also aid genetic studies in maize due to locating Ds elements that have transposed into genes. Next-Generation sequencing technologies such as SOLiD will be able to use these results in aiding the identification of all Ds elements in other strains of maize as well, allowing the study of gene knockouts via the Ac/Ds system to become much easier.

Title: **CSAM-P19:** ***Determination of p38 Kinase Inhibitor Binding Constants for the Brugia malayi p38 Ortholog, BmMPK1, by Intrinsic Protein Fluorescence Quenching.***
Presenter(s): Sean Hughes, Akruti Patel, Katie Gaskill, Ruqaya Navqi, Ronald Goldberg
Advisor(s): Dr. John Siekierka & Dr. Nina Goodey

Abstract: Lymphatic filariasis (or elephantasis) is a major neglected disease with an estimated 120 million individuals infected and approximately 1.5 billion at risk in endemic regions. It is a highly disfiguring and debilitating disease and one of the major causes of global morbidity. We have identified an enzyme (BmMPK1) expressed in the filarial parasite, Brugia malayi which is closely related to the human stress-activated protein kinase, p38 mitogen-activated protein kinase (p38). This enzyme is known to play an important role in human and other organisms responses to stress such as caused by toxins, infection, oxidative and UV-induced stress and inflammation. We hypothesize that the B. malayi enzyme plays an important role in protecting the parasite from stress and that inhibiting its activity may interfere with the parasite's ability to establish infection. We have expressed recombinant BmMPK1 and successfully identified several inhibitors that inhibit its catalytic activity. To further study the interaction of these inhibitors with BmMPK1, the binding equilibrium constants (Kd) of this enzyme to protein kinase inhibitors, RWJ67657, BIRB 796 and the weakly active control compound, SOK-1, were measured by monitoring the change in intrinsic protein fluorescence. Increasing amounts of a ligand were added to a solution of BmMPK1 and the intrinsic protein fluorescence was measured after each addition. For some ligands, the ligand itself was found to have a fluorescence signal at 340 nm when excited at 290 nm, the wavelengths used to detect intrinsic protein fluorescence, and for these cases, the contribution from the ligand was determined and subtracted from the final fluorescence. The results showed that BmMPK1 binds all three ligands tested; the binding to RWJ 67657 was found to be tighter (Kd = 0.267 M) compared to weakly active control SOK-1 (Kd = 1.18 μM) and BIRB 796 (Kd = 0.75 μM).

Title: **CSAM-P20:** ***Variable Carrying Capacity and Bi-logistic Population Growth***
Presenter(s): Nicholas Kass and Raffael Strassnig
Advisor(s): Arup Mukherjee
Abstract: The idea that earth's natural resources are finite and capable of supporting only a limited population size extends back at least as far as Reverend Thomas Robert Malthus' 1798 Essay on the Principle of Population. Applied mathematically to the problem of modeling the dynamics of earth's human population growth the results have been lackluster, leading to frequent reformulations since the first formulation in 1838 in an attempt to better model and understand the forces behind earth's human population growth.Two recent formulations were provided by Cohen and Meyer, both of which introduce the notion of a variable carrying capacity. We provide a calculus based analysis of the primary features of each of these models with special attention paid to the bi-logistic growth patterns exhibited by Meyer's model. We endeavor to show that this bi-logistic growth is the result of the decoupling of time between capacity and population growth which is better accounted for by a fixed time delay in Cohen's system. We also provide an explanation for this fixed time delay rooted in the dynamics of population growth.

Title: **CSAM-P21:** ***Characterization of the catalytic mechanism and dynamic motion employed by Indole-3-glycerol phosphate synthase from Sulfolobus solfataricus***
Presenter(s): Tomasz Kurcon
Advisor(s): Dr.Nina Goodey
Abstract: Indole-3-glycerol phosphate synthase from Sulfolobus solfataricus (SsIGPS) belongs to a broad family of (βα)8-barrel enzymes. It catalyzes the fifth step in tryptophan biosynthesis, converting 1-(o-carboxylphenylamino)-1-deoxyribulose-5-phosphate (CdRP) to indole-3-glycerol phosphate (IGP). Site selective mutagenesis was used to introduce a single cysteine in two loops near the active site, generating two recombinant proteins, each containing a single cysteine handle. The two construct were labeled, each with two different thiol-reactive probes generating four labeled constructs that were used for this study. Steady-state kinetic parameters of the labeled mutants and the wild type SsIGPS were well characterized using fluorescence spectroscopy. Subsequent experiments under single turnover (STO) conditions were employed. In the STO experiments stopped-flow instrument was used to observe IGP accumulation and change in emission of the fluorophores, to identify microscopic rate constants, and the conformational motions occurring within this enzyme. Significant changes in the fluorescence emission of the probes upon binding of IGP and substrate analog rCdRP were used to determine the binding parameters of the ligands. A mechanism was proposed for the pathway employed by SsIGPS, and was subsequently used to fit STO data for each labeled construct in a global fit using the DynaFit program.

Title: **CSAM-P22:** ***Introduction of Double Mutations into Moderate Thermophilic Dihydrofolate from Bacillus Stearothermophilus***
Presenter(s): Keun Soo Kwon
Advisor(s): Dr. Nina Goodey

Abstract: Introducing mutations into enzymes is a vital component of studying the various facets of enzyme function and stability. Here the purpose of preparing amino acid substitutions is to construct reactive cysteine handles into Dihydrofolate Reductase from Bacillus Stearothermophilus (BsDHFR) for the purpose of introducing fluorophores to various regions of the enzyme. Cysteine73Alanine-Glutamic Acid 147Cysteine (C73A E147C) mutations and Cysteine73Alanine-Aspartic Acid17Cysteine (C73A D17C) mutations were prepared utilizing the QuikChange Site-Directed Mutagenesis Method from Stratagene®. First, single amino acid mutations were achieved in various sites of the enzyme. Deriving from the single amino acid mutant C73A, where the only cysteine residue has been removed from the enzyme, an additional mutation was added to restore the cysteine residue at a different location in the enzyme. The two mutations individually added, E147C and D17C, on the C73A single mutant, make up the BsDHFR double mutants that will initially be examined through monitoring their ability to express the appropriate BsDHFR enzymes within BL 21 cells. These thermostable BsDHFR have been shown to be structurally stable and viable for protein expression when transformed in BL 21 cells using published methods (Kim et al., 2005). After chromatographic purification, the purity of the double mutant enzymes will be examined through SDS-PAGE gel analysis. Subsequent kinetic analysis will eventually be carried out to determine if the mutations have any influence on activity. The secondary mutation sites will serve as attachment sites for fluorescent probes for future analysis of local motion. Kim et al. (2005) Structure and Hydride Transfer Mechanism of a Moderate Thermophilic Dihydrofolate Reductase from Bacillus stearothermophilus and Comparison to Its Mesophilic and Hyperthermophilic Homologues, Biochemistry 2005, 44. 11428-11439.

Title: **CSAM-P23:** ***Soil Composition and Transfer of Metals on Nutritional Quality of Vegetables Grown in Urban Community Gardens***
Presenter(s): Khadija Latif
Advisor(s): Dr. Charles Feldman
Abstract: Studies have found that community gardens promote better nutrition, ease of access to food and physical activity (Wakefield et al., 2007). There is a growing public health concern because many community gardens have been developed on vacant lots or abandoned areas which might have been contaminated by toxic elements such as lead-based chemicals (Goldstein, 2009; Wakefield et al., 2007; Clark, Brabander & Erdil, 2006). The objective of this research is to analyze soil in such gardens and edible portions of plants grown in the soil for toxic metals. Vitamin C levels of the vegetables, as a micronutrient marker, will also be assessed. Soil and plant samples from an established inner-city community garden, small private inner-city plots, and gardens in other outlying areas will be obtained. Two samples will be taken from each garden or plot: 1 soil sample at surface horizon and another sample from the rooting depth. Soil will be analyzed for a suite of metals in the Montclair State University (MSU) Environmental Science laboratories by inductively-couple plasma mass spectrometry. Also, vitamin C from plant samples will be analyzed in the MSU Nutrition and Food Science laboratory by using an accepted Association of Analytical Communities (AOAC) colorimetric assay. Findings will be compared to NJ Department of Environmental Protection residential soil criteria and USDA standards.

Title: **CSAM-P24:** ***Post-restoration stream evaluations in New Jersey***
Presenter(s): Jared Lopes
Advisor(s): Dr. Josh Galster
Abstract: Stream restoration is becoming increasingly common in New Jersey, where anthropogenic activity has altered and impacted streams and rivers. These impacted streams and rivers may exhibit decreased water quality, increased bank instability, and present flooding issues. To combat these problems, stream restorations and alterations have been conducted state-wide to restore the natural state of streams. While numerous streams are being restored every year, and approximately a billion dollars per year are spent nation-wide on stream restoration, there is exceedingly little post-restoration surveying conducted to evaluate how beneficial or stable these projects are over long term periods of time. This project entails locating and surveying various stream restoration sites around New Jersey for the purpose of post-restoration evaluation. The chosen sites vary in project completion age from 1 to 6 years and have shown varied levels of degradation since restoration was completed. The Rutgers University Water Resources Program's modified Stream Visual Assessment Protocol (SVAP) tool has been used to assign a numeric value to the health and conditions of streams and rivers. A Topcon total station has also been utilized to survey the post-restoration area and provide thalweg, stream bank measurements, and channel morphology. The surveying data points were used to create digital elevation models of the streams in Arc-GIS, and the stream geomorphology has been used in conjunction to the SVAP tool in evaluating overall stream health. Initial conclusions suggest that restored streams frequently suffer from degradation, aggradation, widening, and even large scale changes in planform over time which have impacted streams' health following the restoration project.

Title: **CSAM-P25:** ***Residential Buildings for Students, Faculty, and Staff of the hypothetical North Jersey State University***

Presenter(s): Amanda Lotto, Ayite Brown Burke

Advisor(s): Dr. Greg Pope

Abstract: North Jersey State University is a synthetic solution to an existing University which occupies present day Montclair State University in addition to the area that extends to Rt. 46. The residential planning committee for North Jersey University strives to provide 12,000 students and 500 faculty and staff members with housing facilities. In accordance with New Jersey State law, each building will meet L.E.E.D standards (Leadership in energy and environmental design): L.E.E.D certification is among the most prestigiously respected accreditation systems for Green building designs. Environmental factors taken into consideration include but not limited to; selection of construction sites, recycling materials used for the projects, and using innovative designs. Faculty and staff residencies will be located in close proximity to the academic buildings, and be situated at a distance where they will not feel impeded by the student living lifestyle which has been linked to noise pollution. The layout of the residential buildings includes an integration of mixed land use creating commercial space within the residential sectors. During the process of selecting construction sites for the residential buildings, environmental risks like slope gradient, exposure to air pollution, seismic activity, and flooding hazards are all carefully taken into consideration.

Title: **CSAM-P26:** ***Resonance Raman spectroscopic comparison of the flavin semiquinone cofactor in CPD photolyase and cryptochrome DASH***

Presenter(s): Carlos Lucero

Advisor(s): Dr. Johannes Schelvis

Abstract: CPD photolyase and cryptochrome DASH are DNA-repair enzymes that bind a flavin adenine dinucleotide (FAD) cofactor as its catalytic center. CPD photolyase is able to bind to and repair cyclobutane pyrimidine dimers (CPDs) on single- and double-stranded DNA. Cryptochrome DASH, on the other hand, has been shown to bind to and repair CPDs only on ssDNA. The FAD cofactor in both these enzymes can exist in three different redox states; fully oxidized, neutral radical semiquinone, and anionic fully reduced hydroquinone. In cryptochrome DASH, aerobic conditions favor the flavin cofactor in the fully oxidized redox state whereas the flavin cofactor of CPD photolyase finds stability in the neutral radical semiquinone state under aerobic conditions. Small structural differences may also be responsible for differences in the redox potential of the FAD in both enzymes. Here we provide a comparative resonance Raman study of the FAD cofactor in the neutral radical redox state as a function of pH for Escherichia coli CPD photolyase and Vibrio cholerae cryptochrome DASH. As a result we find small differences in the resonance Raman spectra of the neutral radical semiquinone in cryptochrome as compared to photolyase which suggests a different hydrogen bonding environment in the active site that may account for the differences in the redox potentials. Furthermore, we also observe perturbation of hydrogen-bonding upon binding of CPD containing DNA to either enzyme. The implications of these findings will be discussed in light of the function of the enzymes.

Title: **CSAM-P27:** ***Synthesis and study of novel fluorescent sensors for cations***

Presenter(s): James Luginsland, Karishma Patel, Sara Abouelkheir, Raymond Otchere-Adjei, Rinam Shah

Advisor(s): Saliya de Silva

Abstract: Many fluorescent sensors for cations that use photoinduced electron transfer (PET) as the signaling mechanism have been reported over the past three decades. Most of these sensors are based on a chromophore-spacer-receptor architecture. Our efforts to develop novel fluorescent PET sensors by using different chrompohores and receptors will be presented.

Title: **CSAM-P28:** ***Protein acrobatics: the relationship between motion and catalysis in dihydrofolate reductase from bacillus stearothermophilus***

Presenter(s): Andrew Mauro, Diane Powell

Advisor(s): Dr. Nina Goodey

Abstract: Most enzymes have defined three-dimensional structures but are not rigid, rather they flex to change conformation and local shape. The study of protein conformational motion is critical for the field of drug design. The motions that take place upon the binding of a compound to a protein must be considered for a realistic representation of protein structure that is a useful computational starting point in the design of biologically active pharmaceutical compounds. It is not trivial to capture these motions because enzymes are too small to be viewed via optical microscopy and consequently it is necessary to apply novel methods to determine the extent, direction, and rates of these motions. The careful correlation of the motion of dihydrofolate reductase from Bacillus stearothermophilus (BsDHFR) with catalysis will be achieved by means of fluorescent probes and stopped-

flow instrumentation. So far, the protein was obtained from transformed BL-21 cells using published methods (Kim et al., 2005). The protein’s purity was verified by SDS-PAGE electrophoresis. Preliminary kinetic studies were preformed using a stopped-flow instrument in order to determine the activity of BsDHFR at different temperatures. The purified wild type protein was then labeled with an environmentally sensitive fluorescent probe, PyMPO, via a maleimide linkage at a single naturally occurring cysteine residue. Several mutants of BsDHFR were created that have the naturally occurring cysteine removed and another cysteine residue placed at a different position in the protein structure.

Title: **CSAM-P29:** ***The Blinker***
Presenter(s): Paul McLaughlin
Advisor(s): Ashwin Vaidya
Abstract: In this presentation we discuss our experimental work on the fluid mechanics of the eye. The study aims to investigate the motion of the multiple layers of the tear film in the eye and the resulting motion of any embedded particles. It is our hypothesis that the non-Newtonian nature of the mucus layer of the tear film helps provide normal stresses that push away any trapped foreign body away from the cornea; nature therefore selects an appropriate lubricant layer that also serves to protect the eye. We have constructed an experimental device called "the blinker" which mimics the oscillatory motion of the eyelid. Our experiments are still in progress so we will discuss the design of the blinker and any results that we are able to obtain.

Title: **CSAM-P30:** ***Ion channel interaction and cell proliferation***
Presenter(s): Jude Mele
Advisor(s): Dr. Elena Petroff
Abstract: Gliomas are cancers derived from the glial cells of the brain. They are the most common and malignant type of primary brain tumor (CBTRUS, 2008) accounting for 86% of all malignant brain and central nervous system tumors, and have a 4-year survival rate of 3.9%. Gliomas carry a very poor prognosis due to their fast growth and invasive migration. Both normal glia and glioma tissue express Acid Sensing Ion Channels (ASICs) and Big K+ (BK) channels. ASICs interact with and inhibit BK channels at normal brain pH, and this interaction is disrupted at acidic pH. BK channels potentiate cell proliferation, and their blockers are used to inhibit glioma cell growth. We hypothesize that ASICs function as endogenous inhibitors of glial cell growth through inhibition of BK. Dysregulation of this interaction may lead to increased proliferation of glia and tumor growth. Moreover, lower pH as a result of injury or inflammation may lead to release of ASIC block of BK and lead to an increased glial proliferation and tumor growth. Our data show that model HEK293 cells expressing wild type ASIC1a and BK grow slower compared to cells expressing an ASIC1a mutant that does not block BK.This study establishes the role of ASIC-BK channel interaction in cell growth and proliferation and is a step towards identifying potential molecular targets for novel therapeutic approaches in our fight with gliomas.

Title: **CSAM-P31:** ***Which to use: NWI Maps or Corps of Engineers Delineation Manual***
Presenter(s): Brian Mikucki
Advisor(s): Dr. Meiyin Wu
Abstract: Two methods, National Wetlands Inventory Maps (NWI) and the Army Corps of Engineers Wetlands Delineation Manual (ACOE) are used to delineate wetlands. The U.S. Fish and Wildlife Service (USFWS) rely on remote sensing technology to create wetland maps in the NWI. This study compared the results of the two wetland delineation methods on 473 study sites. Of the 473 study sites, 252 sites (53.2%) are classified as wetlands on the NWI map; the remaining 221 sites (46.7%) were not classified as wetlands. ACOE wetland delineation manual utilizes field indicators to assess hydrology, soil, and vegetation status; an area is determined as wetlands when observed with all three indicators present. Wetland hydrology and vegetation status of the 473 study sites were observed and recorded in the summers of 2005 and 2006 using the ACOE field delineation method. Evaluation of wetland soil was determined using the Natural Resources Conservation Service soil maps and the New York State Hydric Soils List. 187 of the 473 sites, 39.5%, were observed to have all three wetland indicators present; 286 sites, 60.5%, were found to have at least one indicator missing. 52.4% (248/473) of the interpretations were consistent: 22.6% (107/473) were determined as wetlands and 29.8% (141/473) as uplands by both methods. 30.7% (145/473) are listed as wetlands on the NWI maps but as uplands by ACOE; 16.9% (80/473) are listed as non-wetlands on the NWI but as wetlands by ACOE. The high percentage discrepancy, 47.6% (225/473), exemplifies the margin of error between the two methods.

Title: **CSAM-P32:** ***Statistical Analysis of MSU's Parking Problem***
Presenters: Mirella Moawad and Kaitlyn Murphy
Advisor: Dr. Aihua Li; Dr. David Trubatch

Abstract: Montclair State University is second largest and fastest growing school in New Jersey. Students have difficulty finding a place to park. We collected data via parking services and analyzing data collected from surveying commuters. We mathematically explain the relationship between the amount of time it takes for commuters to park their vehicle at Montclair State University according to the day of the week and time of day they arrive.

Title: **CSAM-P33:** ***Burial rate and depth of of the Asian Clam: Corbicula fluminea***
Presenter(s): Alison Morel
Advisor(s): Dr. Robert Prezant
Abstract: The Asian clam *Corbicula fluminea* is typically found in habitats with sediments composed of sand or gravel and maintain either a partially buried position, with the posterior part of their shell slightly exposed above the sediment layer, or often fully buried. This variability in life position is typical in both lotic and lentic systems. Little is known, however, of the relative burial rate and depth habits of *C. fluminea*. This study examined the relative rate and vertical depth traveled by variously sized specimens of the Asian clam in environments of moving water versus stagnant water and in light and dark conditions. Data indicate that in an environment of aerated (moving) water, larger clams burrow more deeply than smaller clams. Furthermore, larger clams that were exposed to treatments of lighted and stagnant/aerated conditions burrowed slightly deeper than smaller clams. Larger clams under dark and aerated/stagnant settings burrowed deeper than smaller clams.

Title: **CSAM-P34:** ***Variations in Quasar Colors over Time***
Presenter(s): Garrett Nieddu
Advisor(s): Mary Lou West
Abstract: Quasars are active galactic nuclei located far away from the Earth and at immense times in the past (billions of years). A quasar has a moderately steady luminosity for years, then flares up and flickers irregularly for weeks or months. This is thought to be due to a supermassive black hole in the center of a galaxy suddenly consuming several stars. The augmented brightness is from a thin jet of plasma ejected as the stars fall in, but theoretical models differ on the details of the radiation production. Published observations of quasar 3C 273 from several observatories and spacecraft have been studied to identify times of outburst (1983, 1993, and 1995) as well as times of quiescent behavior. These are compared with the brightness of the quasar at various frequencies (colors from radio to gamma rays), with several values of delay time. Rani et al (2010) report that some quasars become bluer with an increase in brightness, while others show the opposite trend.

Title: **CSAM-P35:** ***Tropical Cyclone Model using Markov Chains***
Presenter(s): Thomas O'Keefe, Lisa Germain **Co-author(s):** Maria Cristina Morales
Advisor(s): Dr. Baojun Song
Abstract: Every year the Gulf of Florida is hit with many major storms with varying degrees of severity. We would like to find a model that would be able to predict behaviors of the storms and the overall conditions of the Gulf of Florida during the storm season. For this we will consider the use of a Markov Chain model to predict and simulate the storm systems.

Title: **CSAM-P36:** ***Assessment of Diadema antillarum Density and Size Frequency in St. John, USVI***
Presenter(s): Stephanie Parelli
Advisor(s): Dr. Paul Bologna
Abstract: In 1983 a mass mortality event occurred in the Caribbean killing 95-99% of Diadema antillarum. The event was the result of an unknown water borne pathogen, and was the largest marine die off ever recorded. This mass mortality event led to elevated algal cover and the smothering of some coral reefs. Over the last 25 years, D. antillarum have been recovering on Caribbean reefs, but some populations still remain depressed. We measured the density and size distribution of D. antillarum in four bays of St. John, USVI. Density differed among the bays ranging from 0.86 to 1.58 m-2. The average test size ranged from 54 to 62 mm with individuals as small as 12 mm measured. An inverse relationship between size frequency and density was found which may be attributed to the competition for resources among the urchins.

Title: **CSAM-P37:** ***Numerical Solutions for Deformations of Spherical Ferrogels***
Presenter(s): Jin Park
Advisor(s): Dr. Arup Mukherjee
Abstract: Ferrogels, or soft magnetic elastomers, are elastic gels embedded with ferromagnetic nanoparticles much like the ones found in ferrofluids. When subjected to an external magnetic field, ferrogels demonstrate magneto-elastic properties that allow them to elongate and contract depending on the strength of the field. The magnetic-field sensitive property of ferrogels

allows for a multitude of potential applications including controlled drug delivery, synthesizing artificial muscles, soft actuators, and micromanipulators. An isotropic elastic membrane possesses the same elastic response in each direction under the influence of an external field. A spherical ferrogel sample has a similar response and will deform when subjected to an external magnetic field. We model these deformations by using the partial differential equations of isotropic elasticity. Finite element methods are numerical techniques for solving partial differential equations. We use the software FreeFEM++ to solve the equations that model the deformation of a spherical ferrogel. We are currently solving problems involving regular elastic membranes in order to apply the concept to ferrogels. Isotropic membranes are described by the scalar quantities μ and λ, known as the Lamé moduli. In membrane problems, usually there is no body force but boundary forces are present. The uniform external field creates a non-uniform magnetization in the ferrogel sample. This creates boundary forces which drive the deformation.

Title: **CSAM-P38:** ***Study the Effect of Cupric Chloride and Cadmium Chloride on Exopolymer production and Growth of Cyanobacteria Synechococcus sp. IU 625.***
Presenter(s): Shyam Patel
Advisor(s): Dr. Lee Lee,
Abstract: *Synechococcus sp.* IU 625 is a unicellular, cylindrical-shapedcyanobacterium that typically inhabits freshwater locations. This microbeserves a valuable role as an indicator of environmental contamination,particularly water pollution by heavy metals (ex. lead, mercury, cadmium,copper, zinc). Previousstudy has found that *Synechococcus sp.*IU 625 cells have low permeability to $CuCl_2$ and $CdCl_2$ andpermeability may be one of the reasons that the cells are able to tolerate themetal contamination. In this experiment, the effects of different concentrationof $CuCl_2$ (0 mg/L, 5 mg/L, 10 mg/L, 15 mg/L and 30 mg/L) and $CdCl_2$(0 mg/L, 5 mg/L, 15 mg/L and 30 mg/L) on the growth of *Synechococcus sp.* IU 625 have been studied by comparing turbiditystudy to exopolymer production. Growth was monitored by turbidity study usingspectrophotometer at wavelength 750 nm. In the cultures containing differentconcentrations of $CuCl_2$ and $CdCl_2$, the growths weresimilar except 30 mg/L, where the growth was inhibited. Rao and Pattabiraman method was used for thequantitative determination of exopolymer production. The heavy metals affectthe content of exopolymers when compared with the control.

Title: **CSAM-P39:** ***Effects of p38 Mitogen-Activated Protein Kinase Inhibitors on the Filarial Parasite, Brugia Malayi.***
Presenter(s): Akruti Patel, Agnieszka Chojnowski, William De Martini, Areej Belal, Michael Spinelli, Ronald Goldberg
Advisor(s): Dr. John Siekierka
Abstract: Lymphatic filariasis (or elephantasis) is a major neglected disease with an estimated 120 million individuals infected and approximately 1.5 billion at risk in endemic regions. It is a highly disfiguring and debilitating disease and one of the major causes of global morbidity. Treatment options for this disease are few and new drug therapies are needed. We have been studying a protein kinase expressed by the filarial parasite, Brugia malayi (B. malayi), which we termed BmMPK1. BmMPK1 is closly related to the human stress-activated protein kinase p38 mitogen-activated protein kinase (p38) which plays a critical role in cellular processes such as cell cycle progression, apoptosis and protection from oxidative stress. We hypothesize that BmMPK1 plays a similar important role in nematode parasites and may therefore be a good drug target. We have expressed and purified recombinant BmMPK1 enzyme and demonstrated potent inhibition of this enzyme with human p38 inhibitors. We evaluated the effects of these inhibitors against female adult B. malayi parasites in culture. We have observed several effects including inhibition of parasite motility, viability and embryogenesis. Our results indicate an important role for BmMPK1 in parasite growth and replication.

Title: **CSAM-P40:** ***The Hubble Diagram***
Presenter(s): Oscar Patterson
Advisor(s): Dr. Mary Lou West
Abstract: In 1930 Edwin Hubble discovered that the universe is expanding. Galaxies are moving away from each other as shown by his graph of measured distance vs. redshift for 30 galaxies. In the last decade the Sloan Digital Sky Survey has measured the redshifts and other parameters for millions of galaxies, and made this data set freely available. However, distances are not measured directly. We have found that a function of the flux of green light combined with low values of extinction can be used as a stand-in for a galaxy's distance from the Earth. This results in a modern Hubble Diagram with many more data points than he had.

Title: **CSAM-P41:** ***Instability of magnetic fluid flows in microchannels***
Presenter: Joy Prescod
Advisor(s): Dr. Phillip Yecko

Abstract: Ferrofluids are unique liquids which respond to magnetic fields in unusual and sometimes surprising ways. They can also be controlled by everyday magnets, making them of great potential value to a wide range of industries. The biomedical and energy industries would both have much to gain from the ability to precisely manipulate very small quantities of fluids, such as in bio-assays. Our research here performs direct numerical simulations of ferrofluids flowing through microchannels adjacent to another fluid. Guided by recent theoretical predictions, we look at the growth of instability and identify particular cases which are most promising for precise droplet generation or pumping of the companion fluid. We discuss the feasibility of using ferrofluids to control or manipulate other fluids in microfluidic devices and important factors in the design of such devices.

Title: **CSAM-P42:** ***Transportation & Parking needs for a hypothetical North Jersey University***
Presenter(s): Danielle Prioleau, Neil Joshi
Advisor(s): Dr. Greg Pope
Abstract: The project is to redesign Montclair State University campus as North Jersey State University and campus village. We will be working in small teams each with a different focus. Our focus is to redesign transportation for the campus. This will address surface parking lots, parking garages, NJ Transit, on campus above ground light rail and underground subway system, sustainable campus shuttles, walkability, bicycles, carpool/public transit incentives, alternate shared-use roadways and additional bridges with exit/entrances to local highways. Our goal is to provide sustainable MSU campus vehicles, for example, clean air hybrid electric shuttles buses. This will reduce pollution, improve accessibility and improve traffic flow. We plan to provide campus grounds and maintenance employees with efficient electric carts for quick transport throughout campus. The Student Center will act as a transportation hub for all modes of transportation for the campus. Some faults, soils, and slopes are not suitable for a transportation network of roads and railways. No transportation will be placed in any flood prone areas on the campus. The presence of slopes limits where we can place roads and railways. A transportation survey was conducted using faculty and student's data analysis will be used in this project.

Title: **CSAM-P43:** ***Resource Light Morphology***
Presenter(s): Michael Reynolds
Advisor(s): Dr. Anna Feldman
Abstract: Research in Natural Language Processing (NLP) often requires automated systems that can take a large collection of texts and break it up into individual words (lemmas), and assign tags (short text encodings with descriptive values that represent grammatical information) to each piece. The need for these systems is not solely limited to academic endeavors, but is also relevant to commercial applications such as machine translation, internet searching, and grammar checking. Modern automated tagging systems are often very accurate, but require a significant amount of resources in order to attain that level of accuracy. Most employ a statistics based approach that relies on training data consisting of hand annotated compilations of texts made up of 100,000+ words. In many cases finding those types of resources is very difficult. Furthermore, these systems must also store a manually compiled lexicon of lemmas often numbering in the hundreds of thousands; the Czech tagger (Hajic, 2004) uses a lexicon of 300,000+ individual words, for example. The problem with these methods is that for most of the world's languages resources such as those described above are not available. There have been many attempts at addressing this problem; unsupervised methods do not rely on pre-annotated data but determine grammatical information by inferring it from the clustering of different constructions. In another approach, known as bootstrapping, the system builds its knowledge base by deriving increasingly complex rules from simpler ones it already knows. There are yet other approaches that rely on parallel corpora to transfer syntactic and morphological knowledge between languages. All of these approaches have drawbacks of their own. Most importantly, they have been shown to be considerably less accurate than the more traditional supervised methods. Also, parallel corpora are rare, thus it does not really address the lack of resources that are available for many languages. The aim of this project is to develop, test, and evaluate a tool that can automatically tag a language without target language training data or parallel corpora. Instead, this method requires that there is a grammar available from which a set of general morphological rules (paradigms) can be extracted manually, and that there are resources available for a language that is sufficiently similar to the target one. This method works by using the tagger trained on another language to disambiguate the output generated by the morphological analyzer's reading of the paradigms. Because this method presupposes much less material than the other methods, it is referred to as a resource-light method of automatic text annotation. My poster will focus mostly on the processes of creating a set of encodings to describe the language (tagset design) as well as how powerful morphological rules can be created using only a grammar book (morphological paradigm definition). I will also briefly explain how a tagger trained on one language can use these paradigms to successfully tag a different one.

Title: **CSAM-P44:** ***Analysis of the Effects of Cadmium and Lead on Stressed Cells In Vitro***
Presenter(s): Fahad Rouf and Katherine Alberco
Advisor(s): Dr. Ann Marie DiLorenzo and Constantino Lambroussis
Abstract: Cadmium (Cd) is a toxic metal with no physiological functions. Due to its long biological half life of approximately 30 years, there is evidence for increasing occupational and environmental concern. The main sources of human exposure are consumption of contaminated food and tobacco products, as well as employment in primary metal industries. Another harmful toxic metal is Lead. Lead can be found in air, soil, leaded gasoline, lead based paints, and products of manufacturing. Lead toxicity has a higher incidence than other heavy metals. Lead toxicity has diminished in the United States since 1970's. Young children are more susceptible and endangered by lead exposure than adults. Lead is quickly absorbed by growing bones. Also, lead exposure during pregnancy and lactation causes premature births, malformation of bones, neurological/cognitive defects, soft tissue damage of kidney and reproductive organs. The cartilage in a growing fetus is converted to bone. The osteocytes in lacunae of long bones deposit calcium. Lead and calcium compete in the mineralization process. Damage from lead is modified by simultaneous exposure to both lead and calcium. The ongoing experiment is testing to see the effect of lead and cadmium on bone cultures. The samples being tested were placed under specific concentrations which are the following: control media with 2.5% and 1% FBS and the experimental media with 2.5% and 1% serum FBS. All experiments are done parallel with their respective serums. The experimental levels used to determine the role of the physiological stress on potential damage from lead and cadium were 250PPM lead nitrate and cadmium sulfate, 25PPM lead nitrate and cadmium sulfate, and 2.5PPM lead nitrate and cadmium sulfate. Daily, each of the experiments was monitored for growth of the bones and any development, differentiation, deterioration or malformations. Bone growth or loss was expressed as a percentage of the total number of millimeters gained or lost over the course of the study. Cadmium's role in inhibiting DNA repair gives rise to the concern of what happens at low levels of cadmium. Concentrations that are not considered toxic may still be causing detrimental effects in the cells and result in a high level of genetic instability.Cadmium (Cd) is a toxic metal with no physiological functions. Due to its long biological half life of approximately 30 years, there is evidence for increasing occupational and environmental concern. The main sources of human exposure are consumption of contaminated food and tobacco products, as well as employment in primary metal industries. Another harmful toxic metal is Lead. Lead can be found in air, soil, leaded gasoline, lead based paints, and products of manufacturing. Lead toxicity has a higher incidence than other heavy metals. Lead toxicity has diminished in the United States since 1970's. Young children are more susceptible and endangered by lead exposure than adults. Lead is quickly absorbed by growing bones. Also, lead exposure during pregnancy and lactation causes premature births, malformation of bones, neurological/cognitive defects, soft tissue damage of kidney and reproductive organs. The cartilage in a growing fetus is converted to bone. The osteocytes in lacunae of long bones deposit calcium. Lead and calcium compete in the mineralization process. Damage from lead is modified by simultaneous exposure to both lead and calcium. The ongoing experiment is testing to see the effect of lead and cadmium on bone cultures. The samples being tested were placed under specific concentrations which are the following: control media with 2.5% and 1% FBS and the experimental media with 2.5% and 1% serum FBS. All experiments are done parallel with their respective serums. The experimental levels used to determine the role of the physiological stress on potential damage from lead and cadium were 250PPM lead nitrate and cadmium sulfate, 25PPM lead nitrate and cadmium sulfate, and 2.5PPM lead nitrate and cadmium sulfate. Daily, each of the experiments was monitored for growth of the bones and any development, differentiation, deterioration or malformations. Bone growth or loss was expressed as a percentage of the total number of millimeters gained or lost over the course of the study. Cadmium's role in inhibiting DNA repair gives rise to the concern of what happens at low levels of cadmium. Concentrations that are not considered toxic may still be causing detrimental effects in the cells and result in a high level of genetic instability.

Title: **CSAM-P45:** ***Remote Estimation of Crop Water Stress Index in Almond Orchards using Thermal Aerial Imagery***
Presenter(s): Sagarika Roy
Advisor(s): Dr. Mark Chopping
Abstract: The important method for estimating Crop Water Stress Index (CWSI) is by measuring surface temperature of the canopy. The surface temperature and water stress is based on the fact that as a crop transpires, the evaporated water cools the leaves below the air temperature and as a crop becomes water stressed, the transpiration will decrease and the crop surface temperatures will then increase. Two methods will be used for estimating CWSI: the Idso empirical model and Jackson theoretical model. CSWI is calculated from infrared canopy temperature (Tc), air temperature (Ta), vapor pressure deficit and surface energy balance values. This study will focus on the estimation of CWSI for an almond orchard near Lost Hills, California. An aerial remote measurement using MODIS/ASTER (MASTER) thermal band data is used to measure surface temperature of the canopy. The empirical relationship for canopy- air temperatures difference (Tc-Ta) versus vapor pressure deficit (VPD) will represent whether the crop is water stress. The hypothesis is that Tc-Ta would be negative number (canopy cooler than the air). The purpose of this

study is that to establish the comparison between both the method and evaluate the relationship amongst CWSI, yield and water stress. CWSI value is useful for irrigation scheduling and water management.

Title: **CSAM-P46:** ***Is chronic hypertension an autoimmune disease?***
Presenter(s): Derek Rudge
Advisor(s): Dr. Vladislav Snitsarev
Abstract: Chronic hypertension, a major risk factor both for heart disease and stroke, affects a third of American adults. Though widely studied, the precise causes and mechanisms of chronic hypertension remain unclear. A recent genetic study in mice has implicated Acid Sensing Ion Channel type 2 (ASIC2), an important determinant of the arterial baroreflex found on axonal termini innervating the aortic arch, as a potential site of dysfunction in hypertensive patients (Lu, Ma, Sabharwal, Snitsarev et al. Neuron 64, 885-897, 2009). We hypothesize that these putative mechanosensitive ion channels may be potentially exposed in patients with inflammation-mediated endothelial damage that simultaneously attracts elements of the immune system and gives them greater access to the ASIC2 subunits normally shielded from bloodflow by endothelium and smooth muscle tissue in the aorta. The convergence of these events in the human body may create an environment where a slow but cumulative autoimmune response to chronic inflammation can take place. Specifically, circulating antibodies could potentially bind the exposed large extracellular domains of ASIC2 and disrupt baroreceptor mechanosensation resulting in dysautonomia. Intrinsic cleavage sites in the extracellular domain of ASIC2 may also be targets for circulating proteases. Tissue culture experimental models have already been devised to study mechanosensitivity on a single cell level (Snitsarev et al. Hypertension 46, 540-546, 2005) and heterologously express ASIC subunits, including ASIC2, in single isolated cells (Petroff et al. PNAS 105, 3140-3144, 2008), in order to test the effect of different subclasses of antibodies on mechanosensation of ASIC in general and ASIC2 in particular, and will serve as a starting point for exploration of these ideas.

Title: **CSAM-P47:** ***Ixodes scapularis seasonal activity at the New Jersey School of Conservation***
Presenter(s): Nathaly Salazar-Vasquez
Advisor(s): Dr. Mary Egan
Abstract: Ixodes scapularis, commonly known as “blacklegged” deer ticks are the vector of Lyme disease and other parasitic human diseases. They have an irregular distribution in the United States, but in the Northeast there is some of the highest population densities and reported cases of Lyme disease. This project aimed to examine seasonal activity of the I. scapularis tick at the New Jersey School of Conservation (NJSOC), field campus of Montclair State University. Tick population was sampled; beginning of summer 2009 continued through the fall of that year, was discontinued for the winter months, and re-started again in early spring 2010. Areas of the NJSOC were drag sampled to survey for ticks. The number of ticks encountered was used to analyze the seasonal activity of each of the tick’s life cycle throughout the year. Our results support that ticks remain active most of the year. At their larvae stage (first life cycle) they were active through the middle of summer until the beginning of the fall, peaking in the July-August time frame. Ticks at their nymphal stage (second life cyle) were active throughout the entire summer months peaked in late July and declined activity in the middle of the fall. Finally, adult ticks (third life cycle), became active in the beginning of the fall and continue to be active at the beginning of the spring. A population density and infection rate of ticks will benefit the NJSOC and surrounding recreational areas. These results could be utilized to map high risk areas and help prevent Lyme disease and other parasitic human diseases.

Title: **CSAM-P48:** ***Growth of three different plant species in soilless medium***
Presenter(s): Pablo Salcedo and Elisha Ford
Advisor(s): Dr. Dirk Vanderklein
Abstract: The purpose of this project was to determine the best method in which to germinate and grow catnip, alfalfa, and grass seeds in a water-absorbing crystal medium (provided by SoilMoist, JRM Chemical Inc., Cleveland, Ohio). The results of these experiments are of particular interest to horticulturists because if germination and growth are successful in the crystal gel medium, a potential commercial product of a “cat garden” in which minimal watering would be required could be developed. In the first and third experiments, the three seed types were grown in plastic containers that were subdivided into three independent sections. The three seed types were grown in different environments: sand only, sand only covered with Saran wrap, crystals only, crystals only covered with Saran wrap, sand with crystals, and sand with crystals covered with Saran wrap. In the second and fourth experiments, only bleach treated catnip was grown in the plastic containers with crystals only. Saran wrap was used to cover some of the containers to test whether another difference in germination and growth would occur. In all four experiments, germinating seeds and growing plants in the crystals-only medium proved to be the least successful approach. Plants were more successful germinating and growing in either sand only or a combination of sand and crystals. For all seed types

regardless of the growth medium, germination of the seeds was generally better when the containers were covered with Saran wrap, but survival of the plants was better without the covering. Across all treatments, catnip grew the worst and grass grew the best. Alfalfa faired reasonably well.

Title: **CSAM-P49:** ***Laboratory Models of Folding in Geology***
Presenter(s): Deepa Shah
Advisor(s): Mary Lou West
Abstract: This exploratory research examines the ductile deformation of laminated rock layers. High temperatures and pressures occur deep within the crust of the Earth to generate these changes. Physical models were created in a laboratory pressure box to test the folding that would occur in layers of construction paper or bags of sand. Lateral pressures were applied and many trials were conducted to explore the various parameters of the deformation, such as properties of the materials being deformed, pressure applied and the rate at which the pressure was applied. Some of the results replicated the deformations that occur in nature, such as syncline, anticline and recumbent folds. These experiments accommodate for the study of various parameters because the time taken to replicate a single deformation was approximately 15 minutes, whereas this process in the natural world can vary from thousands to millions of years. In future, we hope to investigate better models that act as more accurate representations of rock competency including the use of visually contrasting materials to enable the study of parasitic folds within the larger folds.

Title: **CSAM-P50:** ***Hormonal control of ion secretion by the nasal salt glands of two desert lizard species***
Presenter(s): Jairo Sierra, Harriet Terodemos, Luisa Caro **Co-author(s):** Lisa Hazard
Advisor(s): Dr. Lisa Hazard
Abstract: *Uromastyx dispar* (herbivores) and *Eumeces schneideri* (insectivores), are desert lizards that use their nasal salt glands in order to secrete excess sodium, potassium and/or chloride, depending on the ion load that they receive. While other species can vary cation secretion, *U. dispar* secretes predominantly KCl and *E. schneideri* secretes a relatively even combination of sodium and potassium, regardless of cation load incurred. To examine the regulation of secretion rate and the ratio of sodium:potassium in secretions, six *U. dispar* and twelve *E. schneideri* were treated with either sodium chloride or potassium chloride, in conjunction with aldosterone (a sodium-conserving hormone), spironolactone (an aldosterone inhibitor) or ethanol (vehicle control). In U. dispar, sodium chloride alone induced sodium secretion but not in large quantities. On the other hand, potassium chloride induced large amounts of potassium secretion, and decreased sodium secretion as expected. Aldosterone and spironolactone appeared to have no significant effect on sodium or potassium secretion. Similar results were obtained for E. schneideri. The lack of variability of cation secretion may reflect a lack of sensitivity of the salt glands of these species to sodium-regulating hormones, giving further insight into the potential mechanisms involved in secretion by lizard salt glands.

Title: **CSAM-P51:** ***Isolation and characterization of Helisoma trivolvis dihydrofolate reductase***
Presenter(s): Laura Simone
Advisor(s): Dr. Nina Goodey
Abstract: The dihydrofolate reductase (DHFR) gene is highly conserved amongst several species and has been shown to be an important target for treatment of diseases such as cancer and malaria. There is a significant interest in understanding how drug resistance to commonly used pharmaceutical inhibitors arises in DHFR targets from several disease causing organisms. The gene that codes for DHFR has been isolated and characterized from several species but has not been isolated from any species of snails including the fresh water snail, Helisoma trivolvis. Here we describe the steps taken to isolate and sequence the DHFR gene from snail tissues. We successfully obtained snail cDNA and attempt to isolate DHFR in two separate parts, using general 5' primers (Generacer Kit, Invitrogen) with a gene specific reverse degenerate primer and a general 3' primer with a gene specific forward primer. Once these two separate sequences are obtained we expect to be able to determine the complete DHFR sequence. We will then be able to isolate the entire gene at once, and subsequent experiments will be done to further characterize this gene.

Title: **CSAM-P52:** ***Establishing a Local Economy through Commercial Use at Hypothetical North Jersey State University***
Presenter(s): Amanda Smalley, Kassandra Archer
Advisor(s): Dr. Greg Pope
Abstract: Commercial use at universities includes such facilities as restaurants, grocery stores, entertainment venues and buildings. At our University Village we incorporate all of these things while basing our buildings around the ideas of environmental sustainability, community integration and New Urbanism. All of our buildings will be LEED certified. We will also use

environmentally sustainable tactics to reduce our impact on the environment. Our arena is focused on community integration and will be complete with a concert venue and a greenhouse where people can attend seminars on sustainability and other environmental issues. New Urbanism is an urban design movement which promotes walkable neighborhoods that contain a range of housing, jobs and commercial buildings. Commercial buildings are integrated with housing buildings in order to utilize as much space as possible. We will put commercial stores such as bars, grocery stores, and restaurants underneath residence halls as well as attached to academic buildings. Environmental hazards such as flooding is not anticipated to be a problem.

Title: **CSAM-P53:** ***In Vitro Stress & Cytotoxicity Analysis of World Trade Center Particulate Matter on MRC-5 and WI-38 Human Pulmonary Fibroblast Cultures***
Presenter(s): Barbara Soares, Michelle Hernandez, Constantino Lambroussis
Advisor(s): Dr. Ann Marie DiLorenzo
Abstract: Particulate matter (PM) pollution has been linked to declines in cardiac and pulmonary health. PM pollution can consist of a variety of materials (organic chemicals, acids, metals, solid, and dust particles) that range in size. Previous studies have indicated that the MRC-5 and WI-38 human pulmonary fibroblasts undergo apoptosis logarithmically in comparison to increased World Trade Center dust (WTC) concentration. In this study, we attempted to elucidate the types of chemical and physical changes that occur within the cells before they undergo apoptosis in order to better understand potential WTC toxicity. MRC-5 and WI-38 fibroblasts were exposed to various concentrations of WTC, household dust (HHD), and gypsum (GYP). Glutathione (GSH) and lactate dehydrogenase (LDH) levels were used to determine cytotoxicity as well as cell membrane integrity. By measuring GSH levels and LDH release, we will gain further insight into the mechanism by which the WTC dust inhibits normal cellular regulatory responses and incites cellular degradation.

Title: **CSAM-P54:** ***Amphibian and reptile mortalities caused by human transportation***
Presenter(s): Christina Soman, Jikai Xu
Advisor(s): Dr. Meiyin Wu
Abstract: In spring, amphibians and reptiles emerge from their wintering locations in the woods and migrate to nearby ponds or pools in order to breed. Their migration pathways are often intersected by roadways commonly referred to as crossways. High mortalities caused by transportation are often identified at the crossways during the migration season. This project aims to study wildlife mortality caused by human transportation. 24 pitfall traps (5 gallons in size) were installed at approximately 15 feet from the roadway. Traps were placed at 25 ft intervals along a silt fence parallel with the roadway. Organisms found in the traps were recorded twice a day at 12 hour intervals. Daily temperature and precipitation data were obtained from the New Jersey Weather and Climate Network. Between 3/14 and 4/7/2010, 481 organism across 10 species were recorded including American toad (Bufo americanis), four toed salamander (Hemidactylium scutatum)), green frog (Rana clamintans), chorus frog (Pseudacris triseriata), red spotted newt (Notophthalmus viridescen), snapping turtle (Chelydra serpentina), eastern garter snake (Thamnophis sirtalis), spotted salamander (Ambystoma maculatum), northern grey tree frog (Hyla versicolor) and spring peeper (Pseudacris crucifer). The most dominant species was American toad at 72%. We expect to continue monitoring the traps for the rest of the migratory season and plan to examine the effects of precipitation and temperature on migration, population densities and richness.

Title: **CSAM-P55:** ***Faunal Edge Effects Among Seagrass Beds From Hoga Island, Indonesia***
Presenter(s): Anthony Suleski
Advisor(s): Dr. Paul Bologna
Abstract: Benthic faunal spatial distribution was investigated from seagrass meadows in Hoga Island, Indonesia with varying levels of human disturbance. For each site, samples were taken at shallow near shore edges, seagrass bed interiors, and deeper reef side edges. Results indicated that faunal densities were higher at both deep and shallow seagrass edges compared to interior regions. Sites also differed in faunal abundance potentially related to the level of human disturbance in the area. Floral growth was also elevated when it came to the seagrass bed edges. As such this study indicates the importance of seagrass beds in primary plant growth and faunal density.

Title: **CSAM-P56:** ***Sequencing the Natterjack Toad (Epidalea calamita) Mitochondrial Genome***
Presenter(s): Archana Tare, Maureen Dempsey
Advisor(s): Dr. John Gaynor, Dr. John Korky, Dr. Kirsten Monsen
Abstract: The Natterjack toad (*Epidalea calamita*, formerly *Bufo calamita*) is native to northern Europe. This toad, the only toad species native to Ireland, lives in loose, sandy soil and is sometimes found in brackish water. There has been a

significant decrease in the Natterjack toad population due to loss of habitat from human overpopulation, reduction in habitable coasts due to construction of dykes and seawalls, and acidification of aquatic habitats from acid rain. DNA samples of this species have been collected from Castlegregory, Ireland and Roscullen Island, Ireland. In this study mitochondrial DNA encoding for 12 tRNAs, large and small rRNAs, D-loop and 12 protein-encoding genes have been sequenced for the first time. Protein-encoding genes sequenced include ND1, ND2, COX1, COX2, ATP8, ATP6, COX3, ND3, ND4L, ND4, ND5 and CYTO B. To date 11,278 bp (ca. 64% of mitochondrial genome) have been sequenced and assembled into 7 contigs. This study is ongoing and once completed may permit a better understanding of the phylogenetic and phylogeographic relationship of the Natterjack. In addition, a completed mitochondrial genome will permit an examination of genetic differences among Natterjack toad populations throughout Europe and facilitate current conservation efforts for this species.

Title: **CSAM-P57:** ***Geochemistry of the Diorite Pluton from the Stony Point Complex, New York, and its Relation to the cortlandt Complex***
Presenter(s): Andrew Temples, Melissa Hansen
Advisor(s): Dr. Matt Gorring
Abstract: The Stony Point Complex sits on the western side of the Hudson River and is directly across from the Cortlandt Complex on the eastern side. The Cortlandt Complex consists of six plutons, while the Stony Point Complex consists of two, each having exposures of diorite and cortlandtite (Bender et al., 1984). Earlier studies involving the main Cortlandt Complex have provided valuable information regarding Sm-Nd data and their implications on its age and origin. The Stony Point Complex is considered to be an extension of the Cortlandt Complex, with both plutonic bodies having a similar chemical and mineralogical makeup (Bender et al., 1984), as well as similar ages, approximately 430 +/- 34 Ma (Domenick and Basu, 1982). The latest study from Bender et al. (1984) provided a more in-depth and detailed geochemical analyses of the six main plutons of the Cortlandt Complex and one sample of the Stony Point Diorite. He concluded, based on geochemical and isotopic data, that the diorite of Stony Point originated from a different parental source than the rest of the Cortlandt Complex. Ten representative samples of the Stony Point diorite and dikes within the diorite pluton were collected from around the exposed parts of rock body. Major and trace elemental abundances will be determined using the Inductively Coupled Plasma Optical Emissions Spectrometer (ICP-OES) and ICP-Mass Spectrometer (ICP-MS) to provide an in-depth geochemical analysis. The goal of this project is to potentially determine the source melt and to compare the results to the rest of the Cortlandt Complex.

Title: **CSAM-P58:** ***Curcumin Inhibits SinV in Vero Cells***
Presenter(s): Parth Vyas
Advisor(s): Dr. Sandra Adams
Abstract: Turmeric (*Curcuma longa*) is one of the oldest and most widely used herbal spices, which originated in Southeast Asia, where it was the single most valuable herb for ancient ayurvedic (herbal) medicine. It's active ingredient, Curcumin, has been recognized to have powerful antiviral, antibiotic and antibacterial properties in several viruses including Hepatitis C, HIV and Japanese encephalitis virus. Nonetheless, no studies have been conducted on Curcumin's ability to inhibit Sindbis virus, SinV, the virus responsible for the Sindbis fever, a common febrile illness in many parts of the world. In this study, cultured Vero cells were infected with SinV in the absence and presence of low concentrations of Curcumin (Sigma-Aldrich). Concentrations were determined by conducting a cell viability assay and highest dose-range concentrations with non-toxic effects to cells were used. The virus was then harvested and viral titers were quantified by plaque assays. In this study, we found that Curcumin treated cells showed a lower cytopathic effect when compared to non-Curcumin treated cells when infected with SinV. Furthermore, this data was supported by a lower viral titer on Curcumin treated cells than non-Curcumin treated cells. We conclude that Curcumin effectively inhibits SinV in Vero cells and moreover shows potential in future Sindbis fever preventatives.

Title: **CSAM-P59:** ***Identification of Breed Composition in Mixed Breed Dogs Using Microsatellite Loci***
Presenter(s): Kevin Ysabel **Co-author(s):** Kirsten Monsen
Advisor(s): Kirsten Monsen
Abstract: It is often difficult to determine the breed composition of mixed breed dogs based solely on physical characteristics such as size, coat pattern, and ear shape. It is important to determine breed composition for several reasons. There are many breed-specific diseases and behaviors that may be inherited by mixed breed dogs. Determining mixed breed dog composition may make it possible to predict (and hopefully prevent) disease. It may also be possible to predict potential behavioral patterns and/or needs and provide appropriate activities to prevent destructive behaviors or boredom. The National Center for Biotechnology Information (NCBI) has recently established a database of breed-specific genetic markers that can be used to appropriately match purebred dogs to their breed with 98% accuracy. It may be possible to use these genetic data to

determine breed composition of mixed breed dogs with similar accuracy. We plan to determine breed composition using a PCR-based assay to amplify breed-specific microsatellite alleles from diagnostic loci from the NCBI Dog Genome Project microsatellite database. We will isolate DNA from cheek swabs of test dogs donated by owners in the local community and determine the percent composition of dominant breeds based on the frequency of breed-specific alleles.

Title: **CSAM-P60:** ***Evidence for Concerted Electron Proton Transfer in Charge Recombination between FADH– and Trp• in DNA Photolyase***

Presenter(s): Agnieszka Zieba
Advisor(s): Dr. Johannes Schelvis

Abstract: Evidence for Concerted Electron Proton Transfer in Charge Recombination between FADH– and Trp• in DNA Photolyase Presenter: Agnieszka Zieba; Advisor: Johannes Schelvis DNA photolyases belong to the class of blue-light photoreceptors which use blue light photons in repairing cyclobutane pyrimidine dimers (CPDs) by a light-driven electron-transfer mechanism. CPDs are formed in DNA when cells are exposed to UV light, and they can lead to skin cancer. Photolyase can also undergo photoreduction followed by charge-recombination through a proton-coupled electron transfer (PCET). PCET is important for many biological processes. When the proton and electron are transferred together in a concerted electron-proton (CEP) transfer step, the high-energy intermediate states associated with the pathway are avoided. In DNA photolyase, the question is whether charge recombination between the photoreduced flavin adenine dinucleotide and a tryptophan radical occurs by a concerted or a stepwise electron-proton transfer mechanism. In this work, the reorganization energy, λ , is determined by measuring the rate of this charge recombination process as a function of temperature and pH by using transient absorption spectroscopy. The relatively high reorganization energy of 2.0 eV between pH 5.5 and 7.0 suggests that a pure CEP transfer step occurs. At higher pH values, λ gradually decreases to 1.0 eV at pH 10.0 indicating a simple electron transfer (ET) step. Between pH 7.0 and 10.0, both CEP and ET may occur as competing pathways.

ALPHABETICAL LIST OF PRESENTERS,CO-AUTHORS, AND ADVISORS