

## 2009 ATP Summer Grant Abstracts

- **Toni Aiduk**, Social Work (Mentor: Dr. Arnaa Alcon) A Look at Local Geriatric Competencies

By the year 2030, 61 million baby boomers will be between the ages of 66 and 84. When that number is added to the 9 million "oldest old," those born before 1946, there will be 70 million individuals who will need access to aging related services (Knickman & Snell, 2002). Studies consistently find that currently there are too few social workers in the geriatric field and that many of those workers lack professional geriatric training and may not be adequately prepared to help aging clients. However, these studies focus on national estimates of need and availability of trained workers and have, for the most part, not included information gleaned from a local aging services provider. Administering the Geriatric Social Work Competency Scale to employees and interviewing key staff members of OCES will provide data regarding how frontline workers perceive their geriatric competency compared to supervisor expectations. Other anticipated outcomes include a succinct summary of how the agency prepares incoming workers to best address the needs of their clients, what resources the agency has, or may have need of, as well as how their resource lists are updated.

- **Kira Archibald**, Psychology (Mentor: Dr. Teresa King) The Role of Body Image and Social Anxiety in Problematic Drinking Behavior

The purpose of the current project is to examine the relationship between social anxiety, problematic drinking and body image. Research in the body image lab at Bridgewater State College has found associations between negative body image and problematic drinking in college-aged females, which warranted further exploration. During this project, I would like to determine if social anxiety is a mediator of the relationship between body image and problematic drinking. A negative body image makes interacting socially more aversive (Anderson et al, 2008). Research suggests that social anxiety increases the likelihood of the behavior of drinking to cope (Carrigan et al, 2008). Drinking to cope with social situations may be a byproduct of social anxiety. The present study will be conducted using a self-report survey format. It is predicted that participants with negative body image will report more risky drinking behavior and will have higher social anxiety than those with a more positive body image.

- **Christie Bowles**, Criminal Justice (Mentor: Dr. Dina Perrone) Salvia Divinorum: Patterns of Use

Salvia divinorum is a legal hallucinogen in many states, including Massachusetts. Other states, however, have begun to pass legislation prohibiting salvia in response to media portrayals of the drug and drug user. Currently there is limited research on the drug, even with recent policies taking effect. Based on a sample of approximately 10 users over the age of 18, this study provides a description of salvia users and the patterns of their drug use. It investigates the how, when and why these individuals use salvia. This study seeks to conclude with a discussion of how the factors that shape salvia use can be the foundation for developing effective drug legislation.

- **Melissa Brulotte**, Chemistry (Mentor: Dr. Samer Lone) Archaeal Polymerase Dpo4 Complexed with N-Acetyl-2-Aminofluorene

Cancer is a disease that has plagued humanity and all forms of higher life since ancient times. Cancer-causing agents, known as carcinogens, have the ability to attack DNA, creating DNA lesions that can potentially cause mutations. Mutations in critical genes that are involved in cell growth and maintenance can proliferate into further mutations that lead down the road to tumor formation and

potentially cancer. How DNA lesions are handled by the cell has been a key question to understanding cancer. One way is through a group of specialized DNA polymerases that perform lesion bypass, termed TLS (translesion DNA synthesis). Dpo4 is a TLS polymerase found in archaeal cells. While the structure of this DNA polymerase with undamaged DNA has been identified, little is known about the mechanism by which this polymerase is able to bypass DNA lesions. In order to further discover the mechanism of DNA lesion bypass, it is my goal to determine the structure of Dpo4 with the model liver carcinogen N-Acetyl-2-Aminofluorene (AAF).

- **Liza-Anne Cabral**, Communication Studies (Mentor: Dr. Jason Edwards) Managing Economic Crisis: Bill Clinton and the Mexican Peso Crisis

Crisis rhetoric has long been a fruitful line of research for presidential rhetoric scholars. Most scholarship focuses on how presidents deal with crises involving military intervention. One of the areas that has been largely overlooked in crisis rhetoric scholarship is presidential management of economic crises, particularly at the international level. This research proposes to remedy part of this problem by focusing on how President Clinton managed to successfully deal with the Mexican Peso Crisis. By examining Clinton's discourse over the course of the crisis, a two month interval, this research will determine the dominant strategies Clinton used and it provides the groundwork for a theoretical model in examining economic crises and the presidency.

- **Scott Campbell**, Philosophy (Mentor: Dr. Laura McAlinden) External World Skepticism in Descartes

My inquiry will revolve around evaluation of Descartes' external world skepticism as either- a legitimate barrier of the human mind attaining, or validating, knowledge or, a cleverly composed semantic blockade to higher levels of understanding. I will accomplish this through thorough evaluation of modern day skepticism and its Cartesian Lineage. It will be imperative to understand and explore the form and content of such skeptical arguments which have persisted in time. The argument from ignorance, or use of discriminative evidence, which Descartes employed, remains the strategy of radical skeptics and still riddles epistemology for and against it.

- **Mary Canha**, Social Work (Mentor: Dr. Lucinda King-Frode) Siblings of Children with Autism: An exploratory Study of Sibling Concerns and coping Strategies

Autism Spectrum Disorder (ASD) is a developmental brain disorder that typically affects a person's ability to communicate, engage in social interactions, and respond appropriately to the environment. Studies have shown that siblings of a child with ASD use emotion-focused coping strategies more often than problem-focused coping strategies when addressing their sibling-related concerns; this can be considered maladaptive (Cuskelly & Ross 2006). Older siblings of a child with ASD reported less contact with their sibling and more pessimism about the sibling's future when comparison groups were used (Orsmond & Sletzer 2007). This study will further explore the siblings' concerns regarding their disabled sibling and the coping strategies utilized. Participants will be contacted through convenience and snowball sampling; interviews and/or focus groups will be conducted. The qualitative data will then be coded, analyzed, and discussed. The opportunity exists for professionals to gain a clearer understanding of the siblings' concerns and to identify areas where more adaptive coping strategies could be used.

- **Michaela Clark**, Undecided (Mentor: Dr. Richard Wright) The Torture of Alleged Terrorists: Necessary for Public Safety or a Criminal Act?

Numerous scholars, journalists, human rights organizations and even military commanders have documented that alleged terrorists held in U.S. custody (both at Guantanamo Bay and abroad) have been subject to harsh interrogation techniques including water-boarding (e.g., simulated drowning), electric shocks, sleep and other forms of sensory deprivation, and illegal kidnapping. There are additional reports that detainees in U.S. custody have been murdered and subject to “disappearances.” This timely study will document and critically assess the numerous claims of detainee torture, including the 2004 scandal at Abu Ghraib prison. In addition the study will discuss the legal standards governing terrorism interrogations which include federal law and the Geneva Conventions. The study will analyze the reliability of torture interrogation and their impact on intelligence gathering and public safety. By examining, why, if and how allegations of torture should be prosecuted, we will evaluate the ever-changing balance between preventing terrorism and ensuring human rights.

- **Marlyn Colon**, Psychology (Mentor: Dr. Sandra Nearing) Finding the Pill on the Floor: How Contrast Sensitivity Affects Daily Living Skills in Alzheimer’s disease Patients

Alzheimer’s disease (AD) is a progressive brain disorder that gradually destroys an individual’s mental functioning and social capabilities, including the ability to carry out everyday activities. Although memory deficits affect AD patients’ ability to perform these activities, research suggests that visual perception impairments also contribute. One impaired visual perception ability, contrast sensitivity, enables one to distinguish an object from its immediate surroundings. The present project aims to measure contrast sensitivity in a real-world task by having AD patients find pills of various shades of gray on a tiled background. Laboratory assessments of contrast sensitivity and two questionnaires on activities of daily living will also be administered. Results from this study will aid in increasing the functional independence of AD patients, both in the home environment and nursing home facilities. This increase in independence will result in a reduction in health care costs and promote the overall well-being of AD patients.

- **Angel Cooper**, English (Mentor: Dr. William Devlin) Domination, Individuality and Moral Chaos: Nietzsche’s Will to Power

A problem that scholars have disassociated with Friedrich Nietzsche’s is whether he endorses moral chaos through murder, torture, or manipulation of others. Although this problem was once debated, Walter Kaufmann resolved the problem when he argued that Nietzsche, historically, did not advocate anti-Semitism. However, I argue that Nietzsche is, philosophically, in danger of endorsing moral chaos through his concept, the will to power. Scholars have three different interpretations of this concept, where it is: (1) a description of what is real in nature, (2) a psychological drive, and (3) a myth about human existence. When examining these interpretations, one can see that Nietzsche may still face the problem of endorsing moral chaos. In my research, I will argue that the correct interpretation of the will to power is that it is a psychological drive directed inwardly towards bettering ourselves, which will save Nietzsche’s philosophy from the problem of moral chaos.

- **Michelle Cubellis**, History (Mentor: Dr. Richard Wright) Guantanamo Bay: Just Preventive Detention of Terrorists or a Fundamental Violation of Due Process?

In 2002, President Bush authorized the detention of alleged terrorists at Guantanamo Bay, a U.S. Naval Base on the southern side of Cuba. As of early 2009, there are reports that 245 individuals still remain in detention. President Bush classified these individuals as “unlawful enemy combatants” thus denying them the legal protections of prisoners of war and traditional criminal defendants. Since 2002 there have been hundreds of lawsuits against these detentions, arguing that President Bush violated

key elements of due process. The Supreme Court ruled three different times that the Bush Administration practices were unconstitutional, yet the detainees still find themselves in legal limbo. This study examines the legal and ethical issues associated with Guantanamo detainees. We examine the Bush Administration's rationale for denying detainees to the federal courts and the Supreme Court rulings. With an analysis of the historical precedents, the study assesses the wisdom of this approach.

- **Allison Cullen**, Social Work (Mentor: Dr. David O'Malley) Social Work and the Inception of Religiously and Spiritually Competent Practice within institutions: The Role of Social Workers with Elderly in Hospice Care

Until recently the role of religion and spirituality in the social work profession was rarely discussed; yet a renewed interest in the relationship that religion and spirituality play within the social work field has led to a change in the processes through which social workers administer, help and assess clients' needs. Even with a thorough understanding of religious and spiritual competence within social work practice, implementation may differ as it relates to which clients are being assessed. Elderly people in hospice care may have a distinct impression of the importance of religious and spiritual competence. This study will explore the variation in theory and practice of attending to the religious and spiritual beliefs and practices of these aged clients. This study will also address issues which may not be present in determining whether or not clients are receiving religiously and spiritually competent guidance. This research utilizes surveys and qualitative interviewing with a convenience and snowball sample of twenty social workers who serve the elderly at the end of their lives. Content analysis will be used to collect and analyze information from social workers within the field of elderly in hospice care.

- **Yvonne Estabrooks**, Psychology, (Dr. Elizabeth Spievak) The Effect of Cognitive Processes on the Premenstrual Experience

Premenstrual Syndrome (PMS) is a collection of emotional and physical symptoms that affects millions of women. Previous research has indicated that the level of cognitive disturbance during PMS may be related to how noxious stimuli, such as aches and pains, are processed. I propose that women with higher self-efficacy are more likely to view pain as an obstacle to be overcome and will thus be less likely to experience menstrual distress. I will examine the relationships between pain coping styles, perceived self-efficacy, locus of control, and menstrual beliefs and experiences in a calendar based study. It is hypothesized that participants who report more distressing symptoms of PMS will report higher external locus of control and have lower self-efficacy. Since millions of women experience occasional or regular PMS, often for years or even their entire reproductive life, it is crucial that new understanding and treatment of the syndrome is examined.

- **Derek Ferris**, Geography, (Dr. Robert Hellstrom) Regional vs. Local Impact of Wind on Glaciers in the Andes Mountains

Northern Peru will face critical water resource issues in the near future as permanent ice in the Andes Mountains continues to rapidly melt. Ironically, the melt-water from these glaciers supports the culture of 100s of thousands of people living at lower elevations, particularly during the dry season, and predictions suggest some glaciers may be gone in less than 100 years. The impact of local warming of "U" shaped valleys running down the dryer western slope of the Andes range is largely disregarded in current climate model predictions because of the complexity of the simulating the complex topography. Studies that compare the influence of regional and local warming factors are lacking, particularly in the Peruvian

Andes. This project will use automatic weather station data within the Llanganuco Valley and weather maps to determine the importance of local winds that funnel warm air up toward the glaciers.

- **Gary Forrester**, Physics, (Dr. Martina Arndt) Solar Observations During Solar Minimum using a Small Radio Telescope

The Sun is currently in a quiescent phase called solar minimum. We plan to use B.S.C.'s Small Radio Telescope (SRT) to observe solar radio emission during this quiet phase and correlate our data to solar X-ray data readily available through the National Oceanic and Atmospheric Administration (NOAA). Previous observations made during a period of high solar activity (solar maximum) using one of M.I.T.'s SRTs showed that some solar radio and X-ray emission were correlated, while others were not. We plan to make observations during solar minimum to see if this trend continues.

- **Britta Gingras**, English (Dr. Benjamin Carson) "Double Consciousness" and the Racial Self in Danzy Senna's *Caucasia*, John Okada's *N- No Boy*, Zitkala-Sa's *American Indian Stories*, and Maxine Hong Kingston's *The Woman Warrior: Memoirs of a Girlhood Among Ghosts*

W.E.B. Du Bois presents the idea of double consciousness as the struggle African Americans face to remain true to the black culture while at the same time conforming to the dominant white society. The term was initially specified towards African Americans; however, various ethnic Americans experience this split in consciousness while attempting to merge their cultural roots with their American residency. Literature has been an important tool in the exploration of "double consciousness." In this paper, I will examine the role that double consciousness plays in shaping the racial identities of African Americans, Japanese Americans, Native Americans, and Chinese Americans in Danzy Senna's *Caucasia*, John Okada's *No-No Boy*, Zitkala-Sa's *American Indian Stories*, and Maxine Hong Kingston's *The Woman Warrior: Memoirs of a Girlhood Among Ghosts*, respectively. I will specifically discuss the identity crisis that each protagonist suffers results from his/her "two-ness."

- **Lizandra Gomes**, Mathematics (Dr. Suzanne Ramczyk) The Visions of Women Created by Three Major Female African American Playwrights of the Twentieth Century: Alice Childress, Lorraine Hansberry, and Suzan-Lori Parks

In the late 20<sup>th</sup> century, different aspects of the African American Theater, particularly playwrights, were explored. Most scholarships on the African American Theater focuses predominately on males. However, modern attention toward the female African American playwright has grown. Previous studies have primarily focused on African American female playwrights' analysis of their plays or anthologies that include plays written by black women. However, studies examining the vision of African American women created by African American female playwrights are lacking. This study, therefore, will address the vision of women created by three major female African American playwrights across three time periods: before, during, and after the Civil Rights Movement. Analysis will focus on the similarities between characters and the traditional dramaturgical methodology across playwrights. This information is essential for understanding how the self-perceived image of African American women changed over time.

- **Brandon Green**, Physics (Dr. Edward Deveney) The Relativistic Quantum Field Calculator for Fundamental Particle Interactions

The standard model (SM) is the most successful theory in physics which is fundamentally based on symmetries, correctly accounts for all the known particles, and incorporates three of the four forces in nature. The SM is a relativistic quantum field theory (RQFT) where even the simplest calculations are

complicated. In 1965, Richard Feynman was awarded the Nobel Prize in Physics for introducing pictorial representations of the particle dynamics. Feynman diagrams effectively provide immediate access to solutions however, once they are translated into a mathematical representation they become cumbersome and difficult to compute. Our goal is to write original software code using an advanced symbolic algebra package which features an easy-to-use graphical interface in order to generate Feynman diagrams. Finally, the program will translate these diagrams into mathematical expressions which can be calculated efficiently.

- **Renee Holt**, Earth Science (Dr. Michael Krol) Sedimentary Petrology of the Teddy Creek Group, Blacktail Mountains, Montana: Implications for provenance and landscape evolution

Sedimentary rocks provide information on the provenance (source) and the environmental conditions during deposition, as well as shedding light on the topographic evolution of mountain belts. Previous work has revealed an undocumented sequence of sedimentary rocks at the southern Blacktail range which has been termed the Teddy Creek Group (TCG). This project will conduct a detailed petrographic analysis of the mineralogy, textures, and sedimentary structures preserved in these rocks. Results obtained in this study will be incorporated with existing data to develop a model for the formation and tectonic evolution of the Blacktail Mountains. An important component of this research is to determine the age of these sediments and the age of the source rocks. Over the following year I will also be conducting radiometric dating to establish the age of detrital minerals in the TCG. Of particular interest is the interplay of landscape evolution and sediment deposition.

- **Chelsea Horrocks**, Criminal Justice (Dr. Richard Wright) The Myth of the Female Sex Offender?

In the last twenty years an enormous policy apparatus has been created to control sex offenders including sex offender registration and notification programs, residency restrictions limiting where sex offenders can live and controls on sex offenders' Internet usage. This study examines a central flaw in these laws. These laws do not adequately address the issues associated with female sex offenders. Contrary to the popular stereotype of the predatory, lecherous old man, female sex offenders present complex social and psychological problems. Whether it is the babysitter abusing young children or adult female teachers having sex with their minor students, female sex offenders represent a complicated social problem. The study will assess the prevalence of female sex offending and analyze if, how and why existing sex offender laws fail to address female sex offending. A qualitative case-study approach will be used to evaluate the issue of female sex offending.

- **Paraskevi Liouzas**, Elementary Education (Dr. Uma Shama) Impact of Pathway to College-Level Mathematics on Student Success

Students often enter freshman year unprepared for college-level mathematics (CLM) and avoid certain majors because of the mathematics requirement (Conley 115). At Bridgewater State College, all students must pass one CLM course to graduate, with many students whose majors require more. Placement tests are given to determine whether students have sufficient skills to take CLM. If not, they are placed into remedial mathematics (RM), which must be passed to reach CLM. Some who place into RM are provided the opportunity to attend a refresher workshop and retake the placement test. Consequently, the four pathways possible to CLM are: placing immediately, participating in the workshop, and placing on the retake; participating in the workshop, not placing on the retake, and passing RM; or going directly to RM and passing. For the Fall incoming class, I will research the impact of each pathway on success in CLM and on second-year retention.

- **Brianne McDonough**, Earth Science (Dr. Robert Cicerone) A Two-Dimensional, Linear-Elastic Model to Explain Radial Extensional Fractures, Pantheon Fossae, Caloris Basin, Mercury

Radial extensional fractures observed at Pantheon Fossae in the Caloris Basin of Mercury will be analyzed by using a simple two-dimensional, linear-elastic model in an attempt to explain their origin and distribution. Pantheon Fossae was imaged by the MESSENGER mission flyby of Mercury on January 14, 2008. These fractures are similar to features identified on other planets, namely, volcanic structures on Venus and radial dikes from the Spanish Peaks area of Colorado on Earth, where similar elastic models have been successfully applied to explain their origin. The goal of the analysis is to reconstruct the stress field at Pantheon Fossae and use it to predict the nature and direction of fractures that should form, which can then be compared to the observed fracture distribution. This analysis should allow for a better understanding of the state of stress at Pantheon Fossae, and to the larger-scale regional stress patterns on Mercury.

- **Michelle Mercure**, English (Dr. Matthew Bell) The “Bad Girl” in Film Noir Turned Feminist: (Psychoanalytic) Feminist Theorizations of the Femme Fatale

The femme fatale in classic film noir often uses sexuality as a weapon. The problem with this portrayal is this: the female assertion of sexuality therefore bears negative connotations, undercutting the possibility of a positive development of female sexuality in what is a stifling time period for women whose wishes for equality had not yet become publicly expressed, wishes that would be expressed during “second-wave feminism.” Pursuing the question of the manner and extent to which the femme fatale provides an exemplary figure for psychoanalytic feminist theory, which emerged in the 1970’s, my analysis begins by exploring the origins of these theories, before applying this understanding to the femme fatale. I propose that film noir activates the ideas of these theories prior to their emergence, revealing that only from the present perspective of these theories is a positive interpretation of the femme fatale capable.

- **Samantha Morse**, Chemistry (Dr. Samer Lone) Structural Determination of Dpo4-Thymine Glycol complex

Cancer and aging are two effects of environmental damages on DNA. These occur when damage from ionizing radiation, such as that from sunlight, or other factors oxidize the DNA base, Thymine, resulting in Thymine-Glycol, a DNA lesion. DNA lesions interfere with the ability of a cell to replicate its DNA properly and special polymerases are needed to transcribe the altered DNA. Dpo4 is similar to Polk, a Y-family polymerase found in Eukaryotic cells. Understanding the interactions between Dpo4 and Thymine Glycol is important in explaining the molecular mechanism of a mutation and how it causes cancer. Understanding the interactions could make it possible to prevent or treat cancer and maybe even reverse free radical damage on cells and reduce signs of aging.

**Rachel Mullins**, Psychology (Dr. Sandra Nearing) Do You See What I See?: An Archival Study to Develop a Complete Visual Profile for Individuals with Mental Retardation and Down Syndrome.

Mental retardation is a general term that refers to impairments in intellectual ability and adaptive skills, including activities of daily living, communication skills and social skills. Although most people associate mental retardation with cognitive impairments, previous research suggests that these individuals have visual impairments as well. It has been hypothesized that visual impairments directly affect daily living skills, including pouring liquid into a glass, climbing stairs, grasping objects, and using appliances. The types and extent of these visual impairments, however, differ according to the type of mental retardation one has, for example, Down syndrome

versus Mental Retardation of unknown etiology. This project aims to explore and compare a range of visual impairments (i.e. contrast sensitivity and acuity, color vision, motion perception and depth perception) in individuals with Down syndrome and Mental Retardation of unknown etiology, and relate these findings to impairments in adaptive skills known to exist in these populations.

- **Scott Schlef**, Physics (Dr. Thomas Kling) Dealing with Multiple Lens Planes in Gravitational Lensing

Gravitational lensing is a phenomenon that occurs when light's path from a source to an observer is bent around a massive object or group of objects such as a star, galaxy, or group of galaxies, due to the general relativistic warping of space-time near those objects. The massive objects act as a lens distorting the image of the light source seen by an observer. If there are multiple massive objects or clusters of objects between the light source and observer they may be at different distances from the observer. In practice, these objects are compressed into different lens plane, but the compression is unphysical. I propose to examine how much error is made by introducing the compressed lens planes, by using numerical programming techniques to integrate paths of light rays passing through the thick lens. The thick lens path will follow the exact paths predicted by general relativity.

- **David Spalding**, Biology (Dr. Boriana Marintcheva) Probing viral genomes for translation factor homologues involved in protein synthesis using bioinformatics

Viruses present significant impact on humans and other species. Yet viruses are completely dependent on the cellular machinery of their infected hosts for reproduction. During the infectious process, viruses must hijack both the host's genetic replication and protein synthesis machineries in order to propagate. To subvert the latter to the benefit of the virus, it is reasonable that the virus could carry versions of protein "translation factors" which outcompete native translation factors of the host. This research will attempt to mine the available public domain National Institutes of Health viral databases using BLAST and PSI-BLAST searches with selected known human and bacterial translation factor may then serve as a basis for further investigation. Ultimately, a phylogeny may be created, tracing the degree of relatedness of the result set.

- **Marguerite Vantangoli**, Biology (Dr. Jonathan Roling) Evaluating the Health of the Aquatic Ecosystem: Quantifying the Effects of Endocrine Disrupting Compounds on *Pimephales promelas*

Endocrine-disrupting compounds (EDCs) are an increasing problem in our world today, as their occurrence in lakes and streams is rising. Though EDCs have wide-reaching effects, studies have shown that they play a huge role in altering larval development and reproduction in fish. By using the model organism *Pimephales promelas*, the fathead minnow, we are developing biomarkers to detect the presence of EDCs in the aquatic environment. In order to ensure that the biomarkers target the correct genes, I will be cloning the selected genes by using *E. coli* transformation. After verifying that the target gene is correctly identified, we will expose our minnows to several EDCs. Following the exposures, the fish will be euthanized and their RNA extracted to analyze their gene expression. Based on knowledge of the EDCs, I expect that there will be a difference in gene expression when the fish are exposed to even low levels of EDCs.

- **Bethany Verrilli**, Chemistry (Dr. Samer Lone) The Relationship Between DNA Lesion Bypass and the Chemotherapy Drug Cisplatin

The millions diagnosed with cancer each year are forced to endure pain and suffering in attempts to save their lives. These struggles that all too often lead to death drive society forward in cancer research. An often-prescribed chemotherapy drug, Cisplatin, effectively kills cancer cells, but with each administration of this treatment, the body develops resistance and Cisplatin loses its ability to cause the death of cancer cells. The mechanism by which resistance occurs is unfortunately unknown. One possible way resistance occurs involves the human polymerase Rev 1 and its proposed ability to replicate past DNA lesions. Understanding the interaction between Rev 1 and the Cisplatin may be instrumental in solving the mechanism by which resistance develops. Examination of the interaction between Rev 1 and Cisplatin and the determination of the 3D structure of Rev 1 complexed with Cisplatin will be performed in an effort to understand this mechanism of resistance.

- **Danielle Williams**, Psychology (Dr. Elizabeth Spievak) Hurting to Cope: Self-Injurious Behavior as an Escape from Self-Focus

Self-injurious behavior (SIB) is a prevalent problem in today's society and is estimated to affect 4% of the general population (Darche, 1990; Whitlock, Echenrode, & Silverman, 2006). SIB has been theorized to be a form of coping (Fliege et. Al. 2006) and a means of escaping negative feelings (Violo & Graver 2007; Nock & Prinstein 2004), however it has not been examined as a form of Baumeister's escape-style coping (Baumeister 1991a; 1991b). In addition, although escape-style coping has been linked with self-focused temperament (Spievak 2003), SIB has not been examined within the framework of self-focus. It is my hypothesis that those individuals who self report self injury will also be high in self focus and report other related escape-style coping behaviors. In order to collect evidence to support my hypothesis, I will analyze measures of self focus, self injury, and coping in a college sample.

## 2008 ATP Summer Grant Abstracts

- **Michelle Bayly**, Earth Science, (Mentor: Dr. Richard Enright) An Evaluation of the Environmental Impact of Conjunctive use of Ground Water and Surface Water in the Furnace Brook Well-Field in Marshfield, Massachusetts.

Furnace Brook is the primary source of water for the town of Marshfield. Measurements of flow volumes at several points along the stream course demonstrate the impact of ground water extraction on said stream flow. Flow measurements were made with a Marsh-McBirney flow meter. Seepage measurements were made with meters of our design and demonstrated where the stream was gaining or losing water. Piezometers were used, to indicate head distribution driving the movement of stream gain or loss. Water pumping records were compared with stream flow and showed their connection. In the middle of the water course the Furnace Brook and Furnace Pond completely disappear between well #4 and well #2. In the periods of absence of rain, Furnace Brook completely disappears between School St. and well #2.

- **Louis Bianchini**, Mathematics, (Mentor: Dr. Thomas Kling) Is a Truncated Navarro-Frenk-White Dark Matter Halo Model Sufficient for Current Applications in Weak and Strong Navigational Lensing?

We assume a thick gravitational lens governed by a Baltz  $n=1$  matter density model. From the gravitational potential we then derive expressions for a Weyl tensor component and Ricci tensor component. A perturbative approach is taken to solve for the convergence and shear as given by Sach's equation. By applying the geodesic deviation equation to a bundle of light rays with our expressions for the optical scalars we are able to derive expressions for the image shape and size at any point along the path from source to observer, in the case of an axially symmetric lens and source.

- **Amanda Bragan**, Physics, (Mentor: Dr. Edward Brush) Cost-benefit Analysis for Producing Biodiesel on-site from Waste Vegetable Oil for use in all BSC Diesel Vehicles.

Bridgewater State College has been signed onto the President's Climate Commitment with a promise to decrease their greenhouse gas emissions (GHG's). This feasibility report is an easy tool for Bridgewater State College to evaluate the environmental, health and safety, educational, and economical aspects of producing our own alternative fuel on campus. Within each of these aspects the advantages and disadvantages are assessed within the production of biodiesel on a large scale. Biodiesel is a potential helper in the alleviation of global warming, and a great way to adapt to lowering GHG's. If Bridgewater State College could produce 15% of the diesel fuel used yearly in the fleet vehicles as biodiesel from cafeteria waste vegetable oils, we could save at least \$5700/yea in fuel costs. As well, as showing our commitment to reducing our emissions, we could also socially expand the Bridgewater network, both environmentally, and educationally.

- **Maely Cabral**, Biology, (Mentor: Dr. Edward Brush) Battling Disease with a Trojan Horse Attack on the Model Cysteine Protease Papain

Cysteine proteases are proteolytic enzymes that use the amino acid cysteine to degrade proteins in lysosomes and other cellular organelles. These enzymes perform critical functions; but, when proteases activity becomes uncontrolled or unregulated, various disease stages can result. As the cysteine proteases are considered to be an important therapeutic target, several BSC students have been working on the design of reactive molecules related to the compound 3-methylene-oxindole (MOI) as specific "Trojan Horse" inhibitors of these enzymes. Based on this previous research, an important research question arises to determine whether MOI may act as either a reversible or irreversible inhibitor of cysteine proteases and further allow inhibitor design and synthesis to take place. To help answer this question, I have synthesized both BOAA and MOI and characterized them through NMR and IR spectroscopy, and melting point. My preliminary biological evaluation suggests that while a variety of similar indole and oxindole derivatives have little inhibitory effect, MOI was shown to be a uniquely effective inhibitor of the model cysteine protease papain, likely through a time-dependent, irreversible mechanism.

- **Jeffrey Carboni**, Biology, (Mentor: Dr. Donald Padgett) The Dietary Composition of the Eastern Painted Turtle (*Chrysemys picta picta*) with Special Interests in Seed Composition.

Eastern Painted turtles (*Chrysemys picta*) can have a broad diet. I scrutinized their diet in a southeastern Massachusetts pond to evaluate their potential in seed dispersal. Fifty-two turtles were captured during summer 2008 and kept for five days to collect fecal samples. Preserved feces were dissected under magnification to identify food items. To date, feces from 31 turtles have revealed an array of plants, algae, and animals as food items. 618 individual animals were observed (representing 46 families) including crayfish, dragonflies, damselflies, beetles, caddisflies, mayflies, snails, leeches, water bugs, stoneflies, midges, aquatic flies, nematodes, isopods, fishflies, diving wasps and water mites. Leaves of *Wolffia*, *Lemna*, *Ceratophyllum* were identified, as were seeds of *Bidens*, *Decodon*, *Nuphar*, *Nymphaea*, *Najas*, grasses, and a sedge. As a generalist feeder, Painted turtles can act as a seed disperser of aquatic plant species.

- **Laurie Delaney**, Political Science, (Mentor: Dr. Jordon Barkalow) Moral Lessons for Muggles: Aristotelian Virtue and Friendship in J.K Rowling's *Harry Potter* Series.

The appeal of the *Harry Potter* series for adults is often attributed to its ability to speak to fundamental questions of human existence. Here, Edmund Kern finds a Stoic moral teaching as Harry employs his reason to balance his desires against the demands of the world. The problem

with this argument is that it misses the centrality of friendship to Rowling's account of virtue which suggests that Rowling's theory of virtue is properly understood in Aristotelian terms. Pursuing the question of the manner and extent to which the *Harry Potter* series provides an Aristotelian account of virtue, my analysis begins by exploring Aristotle's understanding of friendship before applying this understanding to the *Harry Potter* series. I argue that the *Harry Potter* series is grounded on an Aristotelian conception of virtue where friendship serves as the fundamental, complete virtue allowing one to lead a good life.

- **Deborah M. deRaadt**, Social Work, (Mentor: Dr. Lucinda King-Frode) The Challenges of Task and Time Management for the Families of Children with ADHD: Strategies and Successes.

Children with ADHD have been found to have difficulties with time management and task execution, due to biologically-created time perception and planning deficits. This study explored the experiences of nine families with children with a confirmed diagnosis of ADHD, focusing on strategies used, both successfully and unsuccessfully, to address the task completion and time management. The study also examined each family's experiences in getting support within their community for their ADHD- diagnosed child. Findings indicate that most families feel unsupported in their community, leading to frustration and feelings of isolation. The community, including the school system, medical establishment, and at times even family members, lacked empathy or a clear understanding of the experiences of families with ADHD children. While most families have been very proactive in educating themselves about the challenges of, and methods for, dealing with the disorder, this study has found few consistencies in either the strategies employed or in the success of those strategies used.

- **Margaret Fiedler**, Chemistry, (Mentor: Dr. Steven Haefner) Singing the Moly Blues: The Direct Use of Molybdenum Clusters as a Precursor in the Development of Molybdenum Blue Ceramic Glazes.

Cobalt is currently the most commonly used blue colorant for ceramic glazes, however, due to its toxicity in the powder form there is a need for an alternative. Molybdenum in the form of molybdenum oxide is one alternative that has shown promise. This research is aimed at the direct incorporation of reduced molybdenum clusters into the glaze matrix. Two compounds have been synthesized,  $\text{Na}_{16}[(\text{MoO}_3)_{154}(\text{H}_2\text{O})_{70}\text{H}_x]^{y-}$  and  $\text{Na}_{21}[\text{Mo}_{126}^{\text{VI}}\text{Mo}_{28}^{\text{V}}\text{O}_{462}\text{H}_{14}(\text{H}_2\text{O})_{54}(\text{H}_2\text{PO}_2)_7]$ , that exhibit an intense blue color. These clusters were incorporated directly into the glaze matrix and fired under a variety of conditions. Under oxidizing conditions, a series of whites, clear, and pale blue glazes were observed. Such results point towards the sensitive nature of the two compounds in the oxidizing/reducing atmosphere of the kiln.

- **Bonnie J. Fletcher**, Physical Education, (Mentor: Dr. Teresa King) A Bridge Between the Mind and Body: Effects of Massage Therapy on Body Image

While research suggests positive effects of massage on psychological health, little is known about the effects of massage on body image. The purpose of this study was to examine the effect of massage on body image and to examine relationships between body image and attitudes toward massage. Twenty-one female college students aged 18-67 ( $M=25.2$ ,  $SD=13.20$ ) were randomly assigned to either a massage or control condition. Participants completed questionnaires measuring body image state and trait, attitudes toward massage, and demographics. It was hypothesized that the experimental group would show greater body image change than the control group. Results showed improved body image in both conditions. No significant correlations were found between body image and attitudes toward massage.

- **Christopher Hallenbrook**, History, (Mentor: Dr. Jordon Barkalow) Exploring the Nature of Anti-Federalist Thought: Republicanism and Liberalism in the Political Thought of Cato.

Scholarships of the American founding remains divided as to the nature of Anti-Federalists political philosophy. One school of thought contends that the Anti-Federalists were the heirs of the republican tradition, while the other maintains that the Anti-Federalists operated from a liberal worldview. Thus in what manner and to what extent Anti-Federalists draw upon the republican and/or liberal political traditions remains unclear. In answering this question I will use the methodology of J.G.A. Pocock to examine the writings of the Anti-Federalist Cato, analyzing what conceptualizations characterize Anti-Federalist thought and from what traditions of political philosophy these ideas arose. As the Anti-Federalists played a crucial role in creating the Bill of Rights, these understandings will establish a framework for interpreting its role in American Governance and Jurisprudence.

- **Aimee Higgins**, Geography, (Mentor: Dr. Robert Hellstrom) The Effects of Land Cover Variability on Evapotranspiration in the Llangunuco Valley.

A process-based understanding of the effect land cover has on evapotranspiration (ET) in alpine valleys is lacking. It is conveniently assumed that ET is a negligible part of the water cycle in the Peruvian Andes, a critical source of water for the local inhabitants, due to lack of precipitation during 6-month dry season and high humidity during the 6-month wet season. However, recent research findings from an embedded sensor network indicate that ET is in fact an important part of the Andean water cycle in Peru. Water resources within Peru are affected by the glaciers within the Cordillera Blanca, where the Llangunuco Valley is located, which will severely impact people away from the valley. This project incorporated GIS, remote sensing, meteorological data and ET modeling to further show that ET is affected the Valley's terrain and land cover and it varies according to seasonal and daily time scales.

- **Bruce Hunt**, Political Science, (Mentor: Dr. Jordon Barkalow) What Happened to God?: An Empirical Assessment of the Continuity Thesis in American Political Thought

Presently, scholars agree that the political theory of the American founding is a blend of liberal and republican political thinking. While this understanding is important, it says nothing about how American political thought arrives as this consensus. More specifically, how is the religiously inspired thought of colonial America transformed into secular, enlightenment philosophy? Addressing this question through an empirical analysis of political sermons written between 1730 and 1805, I expect to find evidence indicating that American clergy have recourse to less orthodox parts of the Bible as American moves closer to 1766 which allows them to incorporate other, especially liberal, political thought into their sermons. Thus, evidence supporting my hypothesis will support the minimal form of the continuity thesis.

- **Emily Legassie**, Communication Arts & Science, (Mentor: Dr. Jason Edwards) Examining the Strategies Used by Celebrities When Promoting International Causes

Celebrity diplomacy has become an increasingly popular phenomenon over the past decade. This paper was an exploratory study that examined what specific rhetorical strategies celebrities use to promote their international causes. Specifically, it performed a generative criticism across a variety of celebrity's texts- speeches and interviews- to demarcate this phenomenon. It was found that celebrities use two common strategies across those missions: 1) they use tactics that increase their ethos; 2) they use civil religious appeals, both American and universal. Future

research should expand this study by looking to specific international causes or specific celebrities to confirm and expand these findings.

- **Julianne Martell**, Chemistry, (Mentor: Dr. Edward Brush ) Development of the Analytical Methods to Evaluate the Purity of Biodiesel Produced from BSC Waste Vegetable Oils.

Biodiesel is an alternative and renewable fuel made from vegetable oils which possesses numerous benefits including decreased toxicity, green house gas emissions, cost, and dependence on foreign oil. A significant problem for biodiesel producers is product contamination with reactants and by-products leading to reduced engine performance and costly repairs. The goals of this project were to identify, assess, develop, and execute analytical methods to test the quality of synthesized biodiesel. These techniques were developed following standard methods set by the American Society for Testing and Materials (ASTM) and using instrumentation available in the BSC chemistry department. Procedures to test water and sediment, cloud point, and acid number were developed and implemented. We also developed <sup>1</sup>H-NMR methods that evaluate the percent completed reaction, methanol, and free and bound glycerides. Our long term goal is to become established as a regional testing center for biodiesel produced from WVO. This research was supported through grants from the Adrian Tinsley Program, 2007-2008.

- **Kelly Medeiros**, Social Work, (Mentor: Dr. Lucinda King-Frode) Eye-Movement Desensitization and Reprocessing: *Implementation and Modification of the Treatment Protocol for Use with Youth Clientele*.

This research study explores the decisions made by therapists regarding the implementation and possible modifications of the Eye-Movement Desensitization and Reprocessing (EMDR) protocol in their practice, as well as the criteria used by these therapists to determine which clients are promising candidates for the EMDR therapy. There is a specific focus on the treatment of childhood trauma, both in children and adults. The findings will inform future research studies and provide preliminary guidelines for therapists who are interested in integrating EMDR into their therapeutic treatment plans. I have used qualitative methods of research, and have contacted participants through convenience and snowball sampling. Ten therapists were interviewed, and their answers were coded and analyzed. It has been determined that there are a number of practical concerns practitioners must consider before using EMDR with a client. I have also discovered various modifications that some therapists have successfully made to the protocol. Furthermore, many new users for EMDR surfaced during the interview process; further research is suggested.

- **Ashley Reidy**, Political Science, (Mentor: Dr. Deniz Leuenberger) Modernization and the Effects on Cultural Identity

Modernization and development are imperative of national-level economic, political, and economic change and growth. There is a relationship between economic and political development and social indicators. This relationship does not necessarily follow a linear path, making it difficult to trace social and cultural changes. In this paper, modernization, development, and social indicators are defined and data presenting changes in social indicators is introduced. Through data collection, document review and literary analysis the paper examines relationships between modernization, development, and social indicators in Pakistan, the United Arab Emirates, and the United States. By collecting data on various social indicators and tracking fluctuations over a period of time, the impact of development and of modernization on the social indicators is explored.

- **Daniel Schepis**, Biology, (Mentor: Dr. Donald Padgett) The role of Eastern Painted turtles (*Chrysemys picta*) in influencing the distribution of Fragrant water-lilies (*Nymphaea odorata*) by seed ingestion in Southeastern Massachusetts.

Many factors can help determine the distribution of a plant species. Distributing seeds away from a parent plant affords its offspring great survival advantages. Seeds of aquatic plants are known to be distributed great distances by wind, water, and animals. Yet the influence animals, particularly turtles, may have on seed dispersal is not well understood. In this study, Painted turtles (*Chrysemys picta*) will be scrutinized as a suitable seed dispersal agent for the Fragrant water-lily (*Nymphaea odorata*) by way of internal seed transport. In the laboratory, wild-collected turtles will be given a diet of *Nymphaea* seeds and their feces examined for intact seeds. Seed integrity and viability, after defecation, will be analyzed and compared to non-seeds. See integrity and viability, after defecation, will be analyzed and compared to non-ingested seeds. This study will reveal what effects, if any, are expressed on the aquatic plant seeds by the turtle after digestion (and presumed transport to nearby ponds). This study will give us a better understanding of the role turtles may have in influencing the distribution of aquatic plant species.

- **Jennifer Swanson**, Psychology, (Mentor: Dr. Elizabeth Spievak) Running on Empty: How College Students Cope with Attentional Difficulties

An analysis of archival data indicated a relationship between sleep disturbances and attention deficits. The current study extended this work to include a more thorough examination of self-reported symptoms of attention deficit hyperactivity disorder (ADHD) and sleep disturbances. This college student survey was a replication and expansion of two earlier studies linking attention deficits to addictive tendencies, such as eating disordered behaviors and substance abuse. In those studies, attention deficits were also correlated with engaging in more aerobic exercise and symptoms of depression and anxiety. Data from the current study indicates that the results regarding sleep disturbances will be replicated, but there was insufficient data to test the hypotheses regarding addictive behaviors, depression, and self-medication with exercise.