HONORS THESIS ABSTRACTS

SPRING 2004

Andrew Alwine, History
Dr. Jeff Hamilton, mentor

From Hero to Saint: Changing Views of King Alfred the Great

In the history of the rulers of medieval Britain, King Alfred the Great stands apart as the most prominent pre-Conquest king and the first ruler to hold all England under his sway. This thesis is an examination of the character of Alfred and attempts to identify and dispel attributes ascribed to him after his death. After providing an overview of primary sources and a narrative of Alfred's reign, the paper then investigates the concept of kingship as it appears in Bede's *Ecclesiastical History of the English People* and Einhard's *Life of Charlemagne*. These two sources are then compared with Alfred's reign and character to demonstrate which of the attributes of kingship espoused by Bede and Einhard can be truly accredited to him and which were ascribed to Alfred by posterity. The thesis concludes that Alfred was indeed a military hero and great leader, but was not as religious and saintly as some later writers have suggested.

Amy Anderson, Neuroscience
Dr. Barry Harvey, mentor

The American Church's Changing Attitude Towards the Death Penalty

Capital punishment has been part of American culture since the Puritans, Separationists, and Quakers fled from severe persecution, including death, in England and other European countries. Yet these groups brought with them the same practice they were fleeing from, capital punishment. Today Christian churches stand on both sides of the capital punishment debate: does the Bible support the death penalty? By looking at Biblical commentaries from various periods in Christian history, editorials and articles written by pastors and parishioners from early American history, and contemporary authors, this thesis examines where American Christians of all denominations stand on this issue and how their attitudes towards the death penalty have changed. For centuries, people met their death at the hand of the religious leaders; now most Christians tend to argue against the death penalty and are trying to save people from death.

Allison C. Backus, Philosophy
Dr. James Marcum, mentor

What Children Never Tell You: Child Phenomenology in Pediatric Terminal Care

How children perceive illness and death continues to transcend our understanding, especially in the case of pediatric cancer patients. Perhaps *because* their experience is a psychological quandary, it begs for philosophical insight. This paper highlights the phenomenological perspective in philosophy and suggests its applications to children with terminal illness through the idea of "child phenomenology." This method is an attempt to better understand a terminally ill child's experience and improve pediatric end-of-life care. The possibilities of narrative art therapy in facilitating this search are explored. The paper includes practical applications of narrative art therapy as a means to step into the phenomenological world of the child.

Brooks Barber, History
Dr. Mark Long, mentor

Judging the East: A Critique of Western Treatment of Islam and Sufism

The intellectual tradition of the West has decided that the East is inferior, especially the Arab/Islamic world. My thesis is a plea for people of the West to recognize the authentic and unique nature of the Muslim world, which deserves respect as much as any other culture. Edward Said's book *Orientalism* argues that the West has stereotyped and classified the East in western terms and contexts; I apply Said's framework to the study of Islamic mysticism. The first chapter covers the major developments of Orientalism, in specific regard to Islam, from Napoleon's invasion of Egypt in 1798 to WWI, drawing from the works of nineteenth century Orientalists such as Carl Becker, C. Snouck Hurgronje, and Ignaz Goldziher. The second chapter incorporates more modern Orientalists that refer to Sufism - Louis Massignon, H.A.R. Gibb, and Margaret Smith – who carry on the tradition of condescension to and classification of the East. The final chapter attempts to discern the principles that should form the foundation of any study of another culture. I conclude that the West has created constructs within which to fit the East, and these can only be avoided through the principles of tolerance and world-mindedness.

Anne Cioletti, University Scholar
Dr. Tamarah Adair, mentor

Construction of a Single Chain Variable Fragment from the A-HER2 Hybridoma Cell Line

This research concentrates on creating a single chain variable fragment (scFv) from a hybridoma cell line which produces an antibody against the A-HER2 receptor on SKBR-3 breast cancer cells. A scFv is the variable region of the heavy and light chain segments of an antibody linked together by a synthetic peptide which forms a receptor that will acknowledge and bind to the targeted cell. In order to accomplish this, the complimentary DNA has been obtained by mRNA extraction of the established hybridoma cell line and amplification of the variable regions by using the reverse transcription-polymerase chain reaction (RT-PCR). This cDNA is then inserted into the TA cloning vector using standard plasmid cloning procedures. In the vector, the cloned region can be amplified in large numbers and used as a template for sequencing and for construction of the single chain variable fragment. Sequencing results confirmed that the variable region of the heavy chain matched published data. Once the light chain has been cloned and verified, the two variable fragments are linked by a peptide sequence, thus forming the scFv. Then, the sequence is linked to a tobacco mosaic virus (TMV) vector. Once the DNA sequence is in the vector, expression of the scFv is tested by extracting protein (antibody) from the virus-infected plant. When the antibody molecule is present, the binding affinity of the antibody can be analyzed. This information can thus be used for pharmaceutical application, potentially creating a diagnostic marker for tumors and other pathogens, as well as an alternative source for producing single chain variable fragments.

Chantel Dawson, Biology
Dr. Heidi Marcum, mentor

Using Two Enrichment Devices to Better the Lives of Captive Sea Turtles

Several species of sea turtles exist in various oceans around the world. In the wild, sea turtles often rub their backs on rocks or corals to remove debris or barnacles that may have adhered to their shells. They also typically feed beneath the water on other underwater animals, sea grasses, and algae. In captivity, however, sea turtles often are fed by dropping turtle food, dead organisms, or lettuce onto the top of the water. Moreover, the turtles have nothing in their small circular tanks with which to play or on which to rub. Without any enrichment, the turtles spend most of their time swimming in circles. The objective of this study was to determine if two devices, which Baylor students and faculty previously created, were viable options for providing captive sea turtles with a safe, effective back scratching device and with a device that would allow them to eat as they normally would off the bottom of the tank. When the back scratching device was placed in the water, the turtles changed from swimming at all times to playing with the device 70 percent of the time. The bottom feeding device allowed the turtles to spend 76 percent of their time feeding off the bottom of the tank. These results show that these two devices should be considered for permanent enrichment for captive sea turtles since they allow the turtles to spend more of their time performing natural behaviors.

Kristin Doffing, Environmental Studies
Dr. Bryan Brooks, mentor

Sorption of Ethynylestradiol (EE2) to Bentonite Clay

Ethynylestradiol (EE2) is a birth control compound often found in wastewater effluents. EE2 is an endocrine disruptor, which has been shown to be harmful to fish and other aquatic organisms by possibly causing reproductive dysfunction. The concentration of EE2 in water at which these problems occur has yet to be determined. It is possible that EE2 may adsorb to clay that is present in water beds, removing it from the water body and thereby reducing its bioavailability. This study attempts to determine whether five different concentrations of EE2 adsorb to two different concentrations of bentonite clay. Bentonite was chosen specifically for its ability to absorb large amounts of water. Concentrations of EE2 in ng/L were each placed in 500 mL Erlenmeyer flasks filled with hard water and concentrations of clay in mg/L. Water samples were tested using enzyme-linked immunosorbent assay (ELISA) and a microplate reader. Final concentrations were extrapolated from a standard curve, which was prepared along with the samples. Results suggest that EE2 did not adsorb to the clay. This indicates that EE2 is equally dangerous in bodies of water with or without large amounts of clay in their beds.

Ali Dryden, Biology
Dr. F. Ray Wilson II, mentor

Percutaneous versus Surgical Tracheostomy:
Which is Truly the Better Procedure?

Tracheostomy is the most common elective surgical procedure performed on critically ill patients. The procedure has gained widespread acceptance as a relatively safe means for increasing a patient's mobility and comfort. Percutaneous dilational tracheostomy (PDT) and surgical tracheostomy (ST) are the two most common methods for tracheostomy placement. Researchers have examined both procedures to determine which method is better for the patient. To ascertain which procedure has consistently proved to be the better of the two, I reviewed articles that examined the complications associated with PDT and articles that compared PDT to ST. In addition, I examined the possibility of a learning curve with the PDT procedure. My initial hypothesis was 1) that PDT would have more positive outcomes than ST, 2) that there would not be a statistically significant number of complications associated with PDT that were unique to the procedure, and 3) that a learning curve does exist for PDT. After reviewing the studies, I found the following: 1) the results were inconclusive regarding which procedure consistently had more complications; 2) most complications associated with PDT were not unique to this procedure, but could have occurred with either procedure; 3) a learning curve for physicians beginning their training with the PDT technique was identified.

Lesley-Anne Dyer, University Scholar
Dr. Carl Vaught, mentor

Foundations for Reading Scripture: An Augustinian Study in Biblical Hermeneutics

What underlying philosophies and circumstances prevent the reading of scripture in churches? This thesis examines the literary, philosophical and theological capacity which makes possible the reading of a biblical text. In his *Experiment in Criticism*, Lewis critiques the contemporary person's ability to read any text. When applied to biblical texts, the most important text for the Church, this incapacity to read wreaks astonishing results. The thesis begins by tracing the Enlightenment roots of philosophies that influenced this inability to read a biblical text. The work of Hirsch and Gadamer reflect hermeneutical reactions to Enlightenment ideas and are used for philosophical/theoretical investigation in this thesis, particularly focusing upon Hirsch's *Validity in Interpretation* and Gadamer's *Philosophical Hermeneutics.* Finally, the work of Augustine's *De Doctrina Christiana* gives theological and theoretical insight into the process of reading scripture, and Augustine's various interpretations of Genesis illustrate a practical synthesis of literary, philosophical, and theological faculties as applied to a text. Although standards of authorial intention and methods of conversation help break open a text, the interpretation of scripture is shown to have unique theological aspects, particularly the importance of *ordo amoris* and *regula fidei*. Although there is room for the use of the diverse talents and perspectives of the interpreter, standards of falsifiability remain crucial to a proper reading of biblical texts.

Ruth Ehrenfeuchter, Entrepreneurship
Dr. Nancy Upton, mentor

Tehuacana Creek Vineyards Business Plan

The research compiled has been built into a business plan for the first winery in Waco, Texas. Through comprehensive interviews with founders Dr. T. Ulf and Mrs. Inga-Lil Westblom and extensive industry, environment and market research, the Tehuacana Creek Vineyards Business Plan explains the capital necessary to fund the venture, risks the business will face, the target market analysis, and expected production. Research in many areas -- including the restrictions binding the business by the Texas Alchoholic Beverage Commission, the current state of the industry according to the Texas Wine Marketing Research Institute, as well as a survey of over 80 restaurants in Waco -- was essential in completing the business plan. In the growing wine industry of Texas, the launch of a winery holds tremendous potential. This thesis is constructed in the form of a business plan that will be suitable to present to potential investors; it will serve as a springboard for the successful launch of the business and act as the foundation for growth and change.

Prashanth Francis, Biochemistry
Dr. Kevin Pinney, mentor

Synthesis of a Bifunctional Cancer Drug by Combining Enediyne and Combretastatin A4

With cancer is on the rise, one of the new areas of drug research that shows promise is the area of vascular targeting agents. Vascular targeting agents work by binding to the colchicine binding site of tubulin, preventing it from polymerizing. Combretastatin A-4 has proven to be one of the most powerful vascular targeting agents and provides the backbone for the molecule. Enediynes are molecules that under a Bergman cyclization to produce a diradical which abstracts hydrogens from the DNA backbone to cause double-stranded cleavage of DNA. Enediynes have a considerable antibiotic effect, but do not make effective cancer drugs because of lack of a targeting mechanism. The goal of this research is to combine these two forms of drugs to form a bifunctional drug that would be able to fight cancer through both inhibition of tubulin polymerization and double-stranded cleavage of DNA. This is to be done by substituting the normal double bond of the bridge of the two aryl groups in combretastatin with an 8-membered enediyne. This will allow for a molecule that can act as a vascular targeting agent and also undergo the Bergman cyclization.

Martin Gallagher, University Scholar
Dr. Carl Vaught, mentor

The Question of Thomas Aquinas: Multi-Directionality, Mediation and the Hermeneutic Project

The goal of this inquiry is to re-open the question of Thomas Aquinas, to question again concerning the received interpretation of his philosophico-theological project. Aquinas seems near to our understanding, his project as transparent as possible. Indeed, it is so transparent that we can normally summarize it in a sentence. This sentence is normally something along the lines of "Thomas Aquinas synthesized Augustinian Christianity and Aristotelian philosophy." We customarily describe the period after Thomas Aquinas as "the breakdown of the medieval synthesis." But it is finally time that we ask: is there another Thomism that has not yet been realized, that has heretofore been masked to us by the common picture of St. Thomas? There are features of his biography, his theology, his method, his metaphysics, his ethics, and his delimitation of reason that have the potential to make our confidence in the traditional views begin to waver. The claim of this study is not that previous interpretations are wrong, but rather that they are narrow, and its aim is to open up what has been omitted, to allow these elements their full sway and to see how they might open new horizons for our understanding of St. Thomas.

Eitandria Gatlin, Psychology
Dr. Keith Sanford, mentor

Interruptive Behavior in Conversation and its Effect on Marital Satisfaction

Marital satisfaction and its relationship to an interruption sub-type in conversation -- the overriding interruption -- was a focus in the study. It was hypothesized that higher rates of overriding interruption would be correlated with low marital satisfaction. Archival data from 36 couples was used. The couples participated in four videotaped conversations in which they tried to solve a current problem in their relationship. Assessments of marital satisfaction were also given. Analysis of the videotapes computed communication scores for both spouses and their respective interruption rates. The only significant correlation between each partner's communication and his or her interruption rate revealed that for wives, the more their husbands interrupted them, the more negative the husband's communication became. No significant correlations were found between the number of interruptions and marital satisfaction. Therefore, the hypothesis was not supported. A regression analysis showed that communication style had a more significant effect on marital satisfaction than interruptions. The relationships between interruptions, communication, and subsequent marital satisfaction were also discussed.

Nathaniel Glass, Computer Science
Prof. William Booth, mentor

The Viability of Web-Based Quizzing Versus Paper-and-Pencil Quizzing

Before adopting a new system of testing in an educational environment, it must be shown to be statistically and practically equivalent to its predecessor. This research seeks to show the equivalence of a web-based quiz system to its paper-pencil counterpart at Baylor University. In order to show this equivalence, a web-based quiz system was designed and was used by four sections of CSI 1430 (Introduction to Computer Science 1). Ten quizzes were administered throughout the semester. The first five quizzes were administered via paper and pencil, and the remaining five were taken using the web-based system. Student score data was recorded and statistically analyzed. An ANOVA test was used to test for equivalence between the four sections. T-tests were used to test for equivalence between the paper-pencil quiz scores and the web-based quiz scores within each section. Additionally, feedback from the students was collected via a survey given at the end of the semester, which contained questions relating to their experience with the quiz system as well as questions relating to their prior experience with computers. The web-based quizzes yielded scores statistically equivalent to those yielded by the paper-pencil quizzes. Additionally, students preferred the web-based system over the paper-pencil system. X2 tests were run on the survey feedback to determine relationships between prior computer experience and satisfaction with the web-based quiz system.

Sachin Gupta, University Scholar
Dr. Lenore Wright, mentor

Tantric Yoga and its Application to Modern Western Medicine

Two lines of thought converge to help form the basis of *kundalini yoga*. The first is a branch of philosophy that gives kundalini yoga its philosophic basis, a line of Indian theosophy called *Tantra*. The answers that Tantra brings to the question of mind-body dualism help pave the way for an understanding of the innate kundalini energy. The second principle behind kundalini yoga is *hatha yoga*. This form of yoga teaches the yogi mental and physical fundamentals that serve as a preparation for kundalini yoga. In all, any discussion of kundalini yoga and its potential to affect Western medicine must begin with an understanding of the two lines that form this yoga. The analysis as a whole is pursued through a literature review of positivist thought as well as Tantric and yogic thought. A cross-analysis is then made between the foundations of Western and Tantric philosophy. The adoption of kundalini yoga practices into Western medical thought is considered as a means of improving patient care. The assimilated knowledge will help answer the question: What can be done to improve the state of modern Western medicine?

Angela Heape, University Scholar
Dr. Dan McGee, mentor

The Ethics of Withholding Life-Saving Blood Transfusions from Children of Jehovah's Witnesses

Every physician swears to uphold the life and health of every patient outside of discrimination—this premise comprises the very foundation of medicine. The physician declares this intention publicly via the physician's creed (founded in the Hippocratic Oath). However, every physician may also face a dilemma when his or her interest in protecting the quality of life, the wellbeing of the patient, and the law of the land collide. For example, when a child is denied a lifesaving treatment by his or her parents, based on their religious beliefs, several codes are challenged simultaneously: state protection of minors, state protection of religious freedom, and the physician's duty to perform everything in his power to save a life. Such is the case with blood transfusions for the children of Jehovah's Witnesses. This thesis explains the core beliefs of the Jehovah's Witness faith as well as their specific reasoning behind the forbidding of blood transfusions; analyzes the Hippocratic Oath and what it means to become a physician; presents case studies as well as other examples of religion interfering with medicine; argues from the Jehovah's Witness perspective; and relates my own religious convictions to this topic and to my future practice of medicine.

Jennifer Heath, Journalism
Dr. Karla Leeper, mentor

Lessons In Nation Building: Are We Handing Iraqi Sovereignty Over Too Soon?

With the United States hoping to transfer its power of Iraq over to the sovereign Iraqi citizens by June 30, 2004, it is important to analyze what our role has been in Iraq and the timeframe from which we have operated. The deadline for pulling out of Iraq seems premature. Therefore, to test this theory, I have looked at past U.S. nation-building attempts, as well as their timeframes, in order to come to a better understanding of the reconstruction of Iraq and our short occupation there. I have referred to various presidential and political speeches, past foreign policy documents and news articles as well as several interviews with those familiar with or connected to the current nation-building process in Iraq. The thesis explores past nation-building attempts, beginning with Japan and Eastern Europe through Bosnia and Kosovo, and the current situation of social and political reform in Iraq under the U.S. occupation. The last chapter develops the premise that if we hand over complete sovereignty at the current designated time, we will be doing the country of Iraq and its citizens a great disservice.

Stuart Hebert, Health Science Studies
Dr. Rodney Bowden, mentor

Risk Designation using the National Cholesterol Education Program Guidelines (I, II, III) and Nuclear Magnetic Resonance Technology in End-Stage-Renal Disease Patients

The purpose of this experiment was to investigate the changes to National Cholesterol Education Program (NCEP) guidelines and ascertain what effect they have on the cardiovascular risk designation of a population of patients. An additional purpose was to study the concurrence of small LDL particles with elevated NCEP risk categories for traditional lipid categories. The study used cholesterol data from 541 End-Stage Renal Disease patients, including traditional assessments of total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides, as well as Nuclear Magnetic Resonance (NMR) spectroscopy measurement of LDL particle size. Each patient had risk category guidelines from all three of the NCEP reports applied to each lipid category and any shifts in risk designation were noted. In addition, the presence of an atherogenic LDL phenotype was compared with the presence of elevated levels of traditional lipid measures. Each change in NCEP recommendations affected the risk designation of some patients. The most significant change was in the triglyceride and HDL categories. The changes in risk designation did not affect all portions of the patient population equally. Finally, the majority of patients with an atherogenic LDL phenotype possessed optimal total cholesterol levels. These results reveal that using LDL particle size in assessing patients can identify individuals that do not meet NCEP guidelines for elevated lipid levels, but still possess an elevated risk for CHD.

Jennifer Helander, Forensic Science
Dr. Susan Wallace, mentor

Postmortem Interval Determination

Many means have been utilized to determine the postmortem interval, including physical and chemical changes of a decomposing body. Only recently have researchers had the means to analyze the chemical changes that occur to the body during the processes of decomposition, autolysis and putrefaction. To determine if a correlation between specific biomarkers' concentrations and the time since death existed, soil samples were taken over a period of four months from underneath two decomposing pigs, one placed in the sun and one in the shade, to observe the changes in oxalic acid and GABA concentrations in the soil solution over the postmortem interval. These compounds were chosen based on a study of decomposition chemistry by Arpad Vass where concentrations of different biomarkers were determined in tissue samples. Oxalic acid and GABA concentrations were significant biomarkers in all tissues as a means for determining the time since death. Since samples were taken from soil, soil microbiology also plays an important role in the changing compound concentrations. HPLC was used to analyze soil solution extractions.

John L. Hill, Political Science
Prof. Tiffany Hogue, mentor

The Abandoned Text:
An Analysis of the Supreme Court's Interpretation of the Eleventh Amendment

This thesis considers the development of the Eleventh Amendment to the United States Constitution and its subsequent interpretations by the Supreme Court, particularly in controversies between citizens and states. After beginning with a legal summary of *Chisholm v. Georgia* (1793), the thesis provides an overview of the creation of the Eleventh Amendment before analyzing significant Eleventh Amendment cases from *Hans v. Louisiana* (1890) to the present. Through legal analysis of Supreme Court cases, law review articles, and books related to the Constitution and the Court, the thesis examines the purpose of the Amendment, the issues it raises, its importance, and Supreme Court interpretations of it. The thesis concludes with the author's argument that the Supreme Court has long erred in its Eleventh Amendment jurisprudence, and the best way to adjudicate future legal controversies between citizens and states would be to adhere firmly to the explicit text of the Eleventh Amendment.

Alaina Johnson, Biology
Dr. F. Ray Wilson II, mentor

The Effects of Long Term Creatine Supplementation on Muscular Endurance

Creatine is a naturally occurring substance found in the body that provides a limited source of energy for working muscles by cleaving off the phosphate of PCr to provide energy for ATP synthesis by transforming PCr and ADP to ATP and Cr during times of strenuous activity. As a result, creatine acts as a short term energy buffer during intense muscular effort. This increased ATP allows for maximal muscular effort to be employed. Because the quantity of energy derived from PCr is extremely restricted due to the small amount of PCr available in the muscle itself, it has been suggested that a creatine loading system similar to carbohydrate loading should be explored in order to gain increased muscular performance. The purpose of this research was to determine the effects of creatine supplementation on muscular endurance in mice. This was determined by a series of ten test swims which compared the maximum swim times of mice receiving a 4% creatine supplement with mice not receiving a supplement. The thesis examines the data gathered from this experimental period in order to determine whether or not creatine supplementation enhanced the swimming ability of the mice. The data gathered showed that creatine supplementation does not enhance the muscular endurance of mice during swimming exercises.

Brannon Jones, Forensic Science
Dr. Lori Baker, mentor

A Case Study in Forensic Anthropology

In this project, Skeleton ST-01-1102, an adolescent found near the Mexican border, was analyzed to determine sex, age, ancestry, and stature. Nonmetric cranial and pelvic characteristics were used to determine sex, however, since the individual was a subadult at the time of death, the features were not definitive. To correctly verify sex, the Amelogenin sex test was used, requiring PCR analysis of bone DNA extractions. Age was estimated by examining primarily the epiphyseal fusions of the long bones and the dentition. Ancestry was also difficult to determine since skeleton ST-01-1102 was a subadult, yet nonmetric traits were applied to the skull, and together with the location of discovery and items found with the body, a logical ethnicity could be deduced. Finally, stature determination required metric methods to roughly estimate height, and this was probably the least accurate of the four characteristics. In the end, it will be argued that skeleton ST-01-1102 was a young Hispanic boy, about 13-14 years old, who stood between 5 feet 1 inch and 5 feet 3 inches tall.

David Kidd, University Scholar
Dr. James Marcum, mentor

What is Disease?

A common charge brought against Christopher Boorse's biostatistical theory of disease is that inadequately accounts for the experience of disease. Laboratory tests simply do not capture "what it is like" to be diseased; they say nothing of the ways in which the life of the diseased person may be disturbed. This gap between a scientific account of the world and our individual experiences of it is nowhere more evident than in the reality of disease. Hans-Georg Gadamer provides a means of resolving this difficulty by arguing that all understanding takes place within language. Nothing that can be understood by anyone is fundamentally incommunicable to those who speak that same language. Thus, even scientific claims can only be understood linguistically, and therefore they reflect the concerns and interests of the tradition within which they are made. An adequate definition of disease must be able simultaneously to act as a foundational concept for medical research while also giving at least a minimalist account of the phenomenal of disease as it is experienced by the diseased. The BST is able to act in this capacity as a conception of disease that can be understood in a fruitful way both by pathologists and by diseased individuals.

Erika Hannah Kidd, University Scholar
Dr. Carl Vaught, mentor

Rhetoric and Philosophy

Throughout the history of philosophy, there has been a tension between rhetoric and philosophy because many have construed rhetoric as an art of speaking which is unconcerned about truth. Given this conception of rhetoric, it is absurd to talk about any positive relationship between philosophy and rhetoric. This thesis, however, defends such a positive relationship; I point to a rich understanding of rhetoric (with particular reference to metaphor and to human desire) wherein rhetoric plays a crucial role in philosophy. I consider the writings of Saint Augustine, Thomas Kuhn, Hans-Georg Gadamer, Monroe C. Beardsley and various other philosophers and poets, and I argue that since philosophy should be concerned with truth, and rhetoric provides a means of access to truth, philosophers ought to embrace rhetoric.

Michael Klayman, Economics
Dr. Tisha Emerson, mentor

Politics and Dirty Firms:
Did Events During the 1992 Bush-Clinton Campaign Affect Dirty Firms?

This thesis analyzes the stock return effects on known polluting companies of the potential regime change as the United States faced the possibility of going from a Republican to a Democratic government in the 1992 Presidential election. Specifically, the study analyzes stock returns of these companies around significant events during the campaign to determine if there are any significant negative abnormal returns. For example, the research tests whether occurrences such as the nomination of Al Gore or the expected victory of Bill Clinton (as evidenced by Gallup Poll results) sent signals to the market that the government would begin to increase regulatory pressure on companies that pollute the environment. The expected cost increases these firms would incur in order to comply with new governmental policies would cause investors and analysts to lower their stock valuations of the dirty firms. Significant negative abnormal returns in market values may provide incentives to businesses to reduce pollution, as significant decreases in stock returns may be more costly than engaging in abatement activities. The research identifies the nomination of Al Gore as the Vice Presidential candidate and Clinton's first lead change as causing significant negative abnormal returns. The Vice Presidential debate discussing the environment did not have a significant market effect, while the election of Bill Clinton led to significantly positive returns for these firms.

Amy Lay, Biology
Dr. Christopher Kearney, mentor

Specific Immunotherapy: Raising the Standard in Allergy Treatment

This thesis reviews scientific literature concerning recombinant allergy immunotherapy. The paper commences with a brief overview of the mechanism of immunity and how it is skewed in the atopic patient. It then proceeds to outline the development of immunotherapy from its beginnings in 1910. The bulk of the paper details the most promising new treatment for allergies: specific immunotherapy. Cloning techniques are used to create pure recombinant allergens for use in the component resolved diagnosis of each patient's allergies. Subsequently, specific immunotherapy, as opposed to the crude protein extracts currently employed, can be administered to each patient. The closing arguments explore the feasibility and efficacy of such a line of treatment. But they also questions what value specific immunotherapy would hold for the world society. The conclusion asserts that since specific immunotherapy would prove invaluable to at least 40% of the population of Europe, English-Speaking Countries, and South America (the percent of people who suffer from allergies in these countries alone), that it is worth the investment necessary to make it a clinical reality.

Kimberly Martin, Biology
Dr. Tamarah Adair, mentor

Improvement of the Tobacco Mosaic Virus 30B Vector
Using Site-Directed PCR Based Mutagenesis

Tobacco Mosaic Virus is a plant virus that infects tobacco and related plants causing necrosis of the leaves and possible death of the plant. Despite serious vector instability, it is currently used as an expression vector to produce proteins and has been used as a research tool allowing scientists to learn invaluable information concerning ribonucleic acid viruses. My research has focused on improving the stability of the vector through site-directed Polymerase Chain Reaction based mutagenesis. Previously, transposon mutagenesis was successful in locating and knocking out the nucleotide sequence which was coding for the proposed toxic protein. The current research uses mutagenesis to convert the 5' and 3' ends of the transposon to a DNA sequence that resembles a plant intron. The conversion of the transposon to an intron is required since the transposon sequence also disrupts viral replication in plants. Using this transposon, mutagenic primers were designed to add plant consensus sequences on the ends of the transposon to dictate that the region be removed *in vivo*. Future work will determine if the engineered sequence continues to add plasmid stability and if it will be removed *in vivo* in plants infected with the engineered virus.

Kathryn McAngus, English
Dr. Jay Losey, mentor

Writing Against the Grain: Jack Kerouac and Female Writers of the Beat Generation

Despite Kerouac's role in the progressive Beat Generation, his views of women were defined by his mother and the American standard. He was incapable of seriously considering the literary and artistic merit of women being equal to that of men. After Kerouac's death, the women of the Beat Generation created a counterimage of Kerouac and fought the golden image that had been built by his many novels. I chose to begin with Kerouac's autobiographical fiction novels and researched his treatment of women throughout. I contrasted the portrayal of women in his works with writings by women of the Beat Generation on Kerouac. The first chapter is an introduction to the Beat Generation and to the life of Jack Kerouac. It investigates the way he was publicly perceived and the man he was privately. The second chapter draws from Kerouac's works, including *Atop an Underwood*, *The Town and the City*, *On the Road*, *The Dharma Bums*, and *Satori in Paris*, and explicates specific incidents with women and Kerouac's reaction. The third chapter draws entirely from the memoirs and poetry of Beat women writers and paints a picture of Kerouac through their memories and words. Through the three chapters I argue that Jack Kerouac was a private person, despite his very public life, and he did not handle his celebrity well. He was an individual who believed that men, especially his male friends, were more important than women and were capable of achieving and experiencing things which women could not.

Emily Morgan, Chemistry
Dr. Robert Kane, mentor

Synthesis of Deuterium-Labeled 4-hydroxy-3-methoxypehnylalanine(3-O-methyldopa) from 3,4-dihydroxybenzaldehyde

Aromatic L-amino acid decarboxylase (AADC) is an enzyme that converts 5-hydroxytryptophan to serotonin and 3,4-dihydroxyphenylalanine (l-dopa) to dopamine, two essential neurotransmitters. Individuals with AADC deficiency, a rare inborn metabolic error, are unable to biosynthesize these neurotransmitters, resulting in severe early onset neurological disorders and in some cases early death. One marker of AADC deficiency is the methylation of excess l-dopa to 4-hydroxy-3-methoxyphenylalanine (3-*O*-methyldopa), which then accumulates in blood, urine, and cerebrospinal fluid. Because of its long half-life in these fluids, 3-O-methyldopa could be used as a biochemical marker to screen for AADC deficiency if an isotopically labeled analog were available to use as an internal standard. We have been investigating a novel synthesis route in order to develop an efficient method of producing 3-O-[$^{2}H_{3}$]-methyldopa to be used to screen newborns for AADC deficiency. Each step in this route, up to the final deprotection reaction, has been thoroughly studied and optimized, and it appears that this route is an improvement over previous synthesis methods.

Deborah Oborny, University Scholar
Dr. Charles North, mentor

Vouchers as Trojan Horse: The Role of School Vouchers in the Regulation of Private Schools

The recent Supreme Court decision that private school voucher programs do not violate the First Amendment's Establishment Clause is sparking a new wave of voucher programs. One issue that has been studied insufficiently is the connection between school voucher programs and heightened regulation of private schools, especially religious schools. This paper analyzes the four large state-funded school voucher programs currently in existence, finding that these programs impose heightened regulation of admissions, accreditation, and testing compared to private schools that do not receive vouchers. In some cases, these regulations are likely to have a disproportionate impact on religious schools. In addition, the paper reports the results of a new survey of private school administrators regarding the impact such regulations have had, or might have, on the actual practices of private schools.

Delip Patel, University Scholar
Dr. Kevin Pinney, mentor

Threonineomide Prodrug Derivatives as Potential Vascular Targeting Agents

Tubulin is the primary constituent of microtubules, which are vital in various important cell functions including cell division and intracellular transportation. The main building block is the α/β tubulin dimer which forms protofilaments that associate with microtubules. Compounds that disrupt the dynamics of microtubules formation are potential anti-cancer agents. Consequently, in the progressive endeavor against cancer, more efficient compounds and collateral prodrugs have been synthesized. Target molecules were synthesized with structural features indicative of natural products including combretastatins and colchicines with the effort of discovering novel and innovative drugs against solid tumor cancers. Combretastatin was determined to be a valuable tumor suppressor via antiangiogenesis. It is an antivascular drug, selectively targeting newly formed endothelial cells in tumors. However, the compound was found to be insoluble in water, making it ineffective in biological systems. Consequently, as part of the structure-activity-relationship study, threonineamide prodrugs were synthesized in order to improve the solubility and drug delivery of combretastatin derivatives.

Nisha Babu Patel, Biology
Dr. Christopher Kearney, mentor

Synthesis of Recombinant Human Proteins
Using Tobacco Mosaic Virus and <u>Nicotiana</u> <u>benthamiana</u> Plants

The objective of this research is to synthesize and isolate recombinant human proteins using tobacco mosaic virus (TMV) as the vehicle and *Nicotiana benthamiana* plants as the protein factories. Though bacteria have been genetically engineered to produce proteins, such as insulin, more complex proteins need eukaryotic systems to fold properly and be post-translationally modified, such as glycosylation. Plants have proven to be beneficial and economical systems for protein production. They are cost-efficient, produce proteins fairly quickly, and are relatively easy to manipulate genetically with TMV. Green fluorescent protein (GFP) was the first protein used in the attempt to express human recombinant protein with the TMV. This protein is easily visualized in a plant with ultraviolet light. GFP was successfully synthesized and isolated. Next, a construct of *Jun a 1*, a human allergen of the junipers, was produced. Expression of *Jun a* 1 has yet to be successfully expressed. Ultimately, scientists aim to be able to produce proteins customized for individuals to aid with allergies and other protein-based deficiencies.

Kellen Plaxco, University Scholar
Dr. Daniel Williams, mentor

The Role of <u>Gnōsis</u> in Early Orthodox Christian Theology

Because it has had to compete with its heretical opponent, the role of *gnōsis* in "orthodox" Christian thought has had a long history of assumed exclusion from modern scholarship. Though scholarship has developed a sensitivity to the assumptions behind "orthodoxy" and "heresy", the place of *gnōsis* within the "orthodox" Christian camp has remained largely undefined and unexplored. This study seeks to trace and define the employment of "*gnōsis*" in orthodox Christian theology, testing the following hypothesis: the orthodox Fathers of the church promoted a type of *gnōsis* implicit in early Christian doctrine, which was related to though distinct from contemporary and so-called heretical *gnōsis*. The second chapter discusses the New Testament and early Christian literature's employment of *gnōsis* in general. Then, the Nag Hammadi documents are investigated for the patterns of heretical *gnōsis.* The study then moves to its primary focus: Irenaeus of Lyons' *Against Heresies*, Clement of Alexandria's *Stromateis*, and Origen of Alexandria's *On First Principles*. Primary texts were consulted to detect the patterns and norms of use of "*gnōsis*" in an orthodox context. The study focuses mainly on the writings of these Fathers because of their confrontational positions. Comparisons are drawn between the orthodox *gnōsis* employed by each Father and the respective oppositional *gnōsis*. The Nag Hammadi documents are employed in addition to the heresiological texts to illuminate how the heresiologists' perceived the heterodox *gnōsis*, what Irenaeus refers to as "knowledge falsely so-called." The conclusions of the thesis suggest that these three Fathers' uses of *gnōsis* point to an identifiable orthodox *gnōsis* framework.

Jim Rittimann, Biology
Dr. Joseph White, mentor

Using Cold Tolerance as a Distinguishing Factor of Genetic Analysis for Two Live Oak Species

Quercus fusiformis and *Quercus virginiana* are two oak tree species whose native habitats overlap with varying levels of hybridization throughout much of their associated range. Due to their similar phenotypic characteristics, considerable ambiguity has made classifying and distinguishing between these species difficult. However, *Q. fusiformis* has exhibited an enhanced cold tolerance in natural freezing events (Diggs, Lipscomb, & O'Kennon, 1999). This experiment evaluates cold tolerance as a possible discriminating feature to base a RAPDs genetic analysis of these two species. Sampling was performed through harvesting saplings across an environmental gradient transecting their natural range throughout Texas. Cold tolerance was tested by subjecting transplanted saplings to freezing temperatures and analyzing the response in various manners. This is an ongoing experiment of which a limited number of RAPDs primers have been tested. While a few primers expressed preliminary potential as a species discriminator based on the cold tolerance testing, they did not differentiate on further examination against increased DNA samples.

Blake Royal, University Scholar
Prof. Robert Darden, mentor

A Cinematic Tri-Color: The Troubles Trilogy of Jim Sheridan and Terry George

In the 1990s, Irish film faced the typical challenges of a national cinema, yet these challenges were also uniquely Irish: a need for funding, a departure from romanticism, and representing the Protestant minority. During this decade, Jim Sheridan and Terry George emerged as both culturally and commercially viable Irish screenwriters and directors. Three of their collaborations in particular, *In the Name of the Father*, *Some Mother's Son*, and *The Boxer*, exemplify the challenges of Irish cinema while also displaying the shifting allegiances between the Irish people and the Troubles with Great Britain. It is revealed through the screenplay of each film, and reinforced by an analysis of the films themselves, that Sheridan and George advocate a peaceful resolution to the Troubles. Using the family as a symbol for the nation, the filmmakers display their belief that in order for stability to be achieved in Ireland, the Irish must take the first steps toward peace.

Kali Rubenthaler, Biology
Dr. Bill Pitts, mentor

Theological Differences Between Roman Catholicism and Evangelical Protestantism

There have been many useful books published on the differences between Roman Catholicism and Evangelical Protestantism in addition to primary works by Martin Luther and Roman councils, including the Council of Trent and Vatican II. It is important to look both at the history surrounding the church at the time of the division in the church and at the differences that still exist today. When it comes to the actual theological differences between Roman Catholicism and Protestantism, one can either look at every detail that demonstrates differences, or one can look for the major differences that would cause the major problems for the majority of Protestants. For most Protestant groups there are five major points of difference: priesthood of the believer, transubstantiation, papal authority, the role of Mary and the Saints, and marriage of the clergy. However, the major barrier between the Roman Catholic Church and Protestant Churches is the way that Scripture is used in relation to tradition in the respective churches.

Rochelle Schnyder, University Scholar
Dr. John Ochola, mentor

Overcome? Kenya and Uganda in Crisis

In the more than twenty years that the global community has been affected by HIV/AIDS, many disasters and victories have been marked. My research focuses on the infrastructural impact of the HIV/AIDS epidemic in sub-Saharan Africa, specifically the curious disparity between neighboring states Kenya and Uganda. Uganda suffered mightily in the inaugural days of the pandemic but has since become a worldwide exemplar for its success at national recovery, whereas Kenya is being decimated by the unending death toll and loss of self-sustaining population. Through United States government documents and worldwide relief agency publications, I have been able to chronicle the development of HIV/AIDS, its effect on Africa and the world, what has been done to the structure of these African states, and what might be done to ameliorate the heavy toll levied upon much of the world.

Melissa Staha, University Scholar
Dr. Charles North, mentor

Religious Pluralism and Religious Adherence in U.S. Counties: Assessing the Reassessment

For the past 15 years, sociologists have been embroiled in a debate regarding the effects of religious pluralism on religious adherence. Supporters of the religious economies model have generally contended that the relationship is a positive one, while advocates of the "sacred canopy" view have contended that the relationship is negative. Results have varied depending upon the data sets used and the specific methodologies employed. This paper applies panel estimation techniques to data from U.S. counties that have previously yielded, in cross-sectional analysis, a robust negative relationship between religious pluralism and religious adherence. Consistent with the religious economies model, the paper finds a positive relationship between pluralism and adherence when unobserved county-level heterogeneity is properly accounted for in the panel, which means that where there is a greater diversity of religious denominations, more people participate in church activities.

Matt Steffer, Biochemistry
Dr. Mary Lynn Trawick, mentor

Glutaryl-n-pentylamine as a Potential Inhibitor of Gamma-Glutamylamine Cyclotransferase

A class of enzymes known as transglutaminases catalyzes the post-translational modification of proteins by the formation of isopeptide bonds, or protein crosslinks. γ-Glutamylamine cyclotransferase (γ-GACT) catalyzes the intramolecular cyclization of various L-γ-glutamylamines producing 5-oxo-L-proline and free amine. The isolated protein crosslink, N^{ε}-(L-γ-glutamyl)lysine, is an excellent substrate for γ-GACT. Although glutamine is not a substrate, activity in L-γ-glutamylalkylamines increases with increasing amide side-chain length. The activity of L-γ-glutamyl-*n*-butylamine is comparable to that of N^{ε}-(L-γ-glutamyl)lysine. An analog of N^{ε}-(L-γ-glutamyl)lysine in which the γ-amino group of the L-glutamyl moiety is removed, γglutaryllysine, is an effective inhibitor of the enzyme. To determine structure-inhibitor relationships, a series of glutarylamines have been synthesized. The objective of this thesis is the synthesis of glutaryl-*n*-pentylamine, from the reaction of glutaric anhydride and amylamine in methylene chloride, as a potential inhibitor of γ-GACT. The product was evaluated by solubility testing, gas chromatography - mass spectrometry, thin-layer chromatography, infrared spectroscopy and nuclear magnetic resonance. Further experiments will focus on an enzyme-inhibitor assay of glutaryl-*n*-pentylamine as a potential competitive inhibitor of the active site of γ-glutamylamine cyclotransferase.

Michael Scott Stewart, Biochemistry
Dr. Kevin Pinney, mentor

Synthesis of Bivalent Fluoxetine Homologues as Potential Serotonin Selective Reuptake Inhibitors

Four novel potential Serotonin-Selective Reuptake Inhibitors (SSRIs) were synthesized with a proposed improved adverse reaction profile for the treatment of depression. Serotonin (5-HT), a functionalized neurotransmitter, has been correlated with various psychological abnormalities, such as depression, when present in low quantities within the limbic portion of the brain. Therefore, with the administration of known antagonists of the serotonin transporter protein (SERT), such as SSRIs, serotonin levels increase in the synaptic cleft due to delayed reuptake. Patients thus experience alleviation of depression symptoms but often suffer from several SSRI-induced side-effects such as sexual dysfunction and restlessness. It has been proposed that these side-effects are caused by increased serotonergic activity at other serotonin receptors, most notably the 5-HT_{2A}. Associated with serotonin-mediated disorders such as schizophrenia, anxiety, depression, and anorexia nervosa, blockade of the 5-HT_{2A} receptor by functionalized piperazine antagonists has been found effective in treatment of these psychological illnesses. Consequently, four bi-functional homologues were designed and synthesized to incorporate into one molecular entity both the SERT inhibition moiety of fluoxetine hydrochloride (Prozac ®), a potent SSRI, and the 5-HT_{2A} antagonistic functionalized piperazine moiety. The synthetic methodology to construct these molecules consisted of three known organic reactions. The thesis concludes that these bi-functional molecules will remain effective antidepressant pharmaceuticals but also hold an improved adverse reaction profile over current SSRIs.

Larry Taylor. Psychology
Dr. Charles Weaver, mentor

An Investigation of the Whorfian Hypothesis

The Whorfian hypothesis concerning linguistic relativity states that a language influences the thoughts of those who use it. This has been a controversial area of study. The primary point of conflict in this area has surrounded the issue of whether language has noticeable effects on perception or whether a human's universally identical physiology leads to identical perception. The published literature on these topics is reported and a hybrid of the two sides on the issue is concluded. Specifically, studies that have examined color perception, implicit verb causality, and perception of space are reported. A person's language has marginal effects on one's perception of the world, but only within the confines of the common physiology one shares with all other people.

Katy Watkins, University Scholar
Dr. Judith Lusk, mentor

What Makes a Designer Successful

This investigation seeks to discover similarities between five successful and influential fashion designers. The research is compiled to determine what personal traits and experiences lead to success in fashion design. The report compares the designers in nine key areas including: social class, education, work experience, company profiles, clientele, key design contributions, method of design and brand extension. The conclusion will help future designers in their quest for success. Yearly, several thousand students graduate with degrees in fashion. These students attempt to launch fashion businesses. Many of these enthusiastic entrepreneurs' enterprises quickly fail. What experience or skills will help them succeed instead? The objectives of this project are to develop a comparison of between five influential designers in high fashion, evaluate the information, and draw conclusions for future designers, and create a miniature collection inspired by these designers' significant work. Extensive research was gained from historical documents, the internet, personal interviews, documentaries, trade publications and a two-month internship. The raw data were then organized by research questions and further organized into a table that illustrated the designer comparisons. Potential fashion designers will be able to analyze their qualifications and traits, comparing them to designers who have previously proven to be successful.

Frankie West, History
Dr. Paul Armistead, mentor

Resistance and Radicalism in the American Revolution

In a comparison of the American and French revolutions of the eighteenth century, this thesis argues that the American Revolution was not a conservative revolution but a radical revolution, even in comparison to that of the French. The first and most comprehensive section examines the elements of radicalism and the tradition of resistance in the American colonies and during the Revolution. The second section is a cursory examination of radicalism in the French Revolution. The third and final section of the thesis provides a comparison of the two revolutions and supports the thesis that the American Revolution was an extremely radical event in its own right. The thesis owes much to the works of Bernard Bailyn, Gordon Wood, and Crane Brinton, but also draws upon recent scholarship and biographies of important American revolutionary figures. Due to the enormity of the two subjects involved, the thesis seeks to stay within the bounds of focusing upon the radical aspects of both revolutions only as they are pertinent to proving the American Revolution a radical movement.