

**ABSTRACTS OF  
THESIS PROJECTS**

**SPRING 2012**

**BAYLOR HONORS COLLEGE**

**The Honors Program**

**University Scholars**



**BAYLOR**  
UNIVERSITY



# HONORS THESIS ABSTRACTS

## MAY 2012 GRADUATES

### **Kristin Abbott, Biology**

Dr. Ann E. Rushing, mentor

*A Descriptive Study of Protective Tissue Formation in Stems of Quercus*

Plant stems are covered by a protective layer of tissue known as the periderm. The formation of periderm in plants is a process that includes the development of various layers of cells, beginning with the formation of the epidermis, and then progressing to the initiation and maturation of the periderm. The objective of my study is to describe the steps in this developmental process in stems of *Quercus*. The description of this process is necessarily accompanied by high magnification photographs of protective tissue cells through the use of Scanning Electron Microscope (SEM) technology.

### **Ben Aguinaga, Political Science and Philosophy**

Dr. Thomas Hibbs, mentor

*A Critical Analysis of Inception with Respect to the Culture Industry*

Prima facie Christopher Nolan's blockbuster movie *Inception* presents a seemingly fanciful idea: the idea that one can successfully implant an idea in the mind of an unaware subject inasmuch that the subject believes that the idea is his or her own. Yet, upon further analysis, perhaps there is a more substantive theory that we can gain from Nolan's work—something practical and far from fanciful. Perhaps *Inception* is real. Theodor Adorno's book *Dialectic of Enlightenment* provides a discussion of the deceptive culture industry that undertakes some of the very same actions taken by Nolan's characters in *Inception*. The objective of this thesis is to analyze the deception in Nolan's *Inception*, analyze the deception in Adorno's understanding of the culture industry, and, finally, compare the two analyses.

### **Stephanie Ahrens, University Scholar**

Dr. David D. Corey, mentor

*What Happened to Public Deliberation?*

Today, discussions about politics look more like battle than thoughtful conversations aimed at working toward the common good. My thesis is an effort to imagine what a more healthy political discourse might look like. To do this, I examine three things. First, I address the common good and its place in a liberal regime. This requires looking at what the common good meant to thinkers like Plato, Aristotle, and Aquinas, and attempting to understand how and why the meaning has changed in politics today. The second step of this inquiry involves recovering fundamental ideals that are related to public deliberation from our political theoretical tradition. It is in this context that I treat Socrates, Rousseau, and Rawls, and contrast their ideas to Madison's "Federalist 10." This provides us a means by which to understand the competitive nature of political discourse in the United States. Lastly, I engage with some of the literature on the movement called "deliberative democracy." I look at it critically, seeing what it has to offer us in light of the common good and the tradition which I have outlined. I conclude by bringing together these three elements to understand what happened to public deliberation, and offer a few ideas on how we might bring our society's discourse closer to something that looks more like cooperative discussion than battle.

**Christopher Aitken, Distribution Management and Technology**

Dr. Elisabeth Umble, mentor

*Critical Chain Project Management: An Overview*

The purpose of this thesis is to introduce to the reader Critical Chain Project Management, which is the application of the Theory of Constraints (TOC) process to project management. Eli Goldratt describes the process in the book Critical Chain. Applying Critical Chain protocol will improve the project's due date performance and the quality of deliverables, whatever the project or circumstance. To prove these claims this document explores specific case studies of recent implementations of Critical Chain. It then goes back to look at the history of project management and some of the innovations that led to Critical Chain, including an in depth look at Theory of Constraints. It concludes by exploring the TOC approach to causing change in thinking processes and how this would be done for Critical Chain. This document is written to be accessible to any reader regardless of the level of prior exposure to the Theory of Constraints.

**Christine Aleman, Health Science Studies**

Dr. Darryn Willoughby, mentor

*Effects of Capsaicin and Evodiamine Ingestion on Energy Expenditure and Lipid Oxidation at Rest and After Moderately-Intense Exercise in Men*

Obesity has become a global epidemic within the last 25 years, with about 65% of the adult population in America being classified as either overweight or obese. In response to this epidemic, countless dietary supplements have emerged in recent years as an easy option to assist in the weight loss process. Capsaicin and evodiamine are two thermogenic agents each recognized for their ability to stimulate the sympathetic nervous system and are thus found in many dietary supplements. The exact effects of each agent, however, remain uncertain. In this randomized, cross-over experiment, seven healthy men were given either capsaicin, evodiamine, or a placebo supplement to ingest. Hemodynamics (heart rate, blood pressure, and core body temperature), energy expenditure, and markers of lipid oxidation (serum glycerol, free fatty acids, serum glucose, insulin, epinephrine, and norepinephrine) were measured at rest, after supplementation, after a single bout of moderately-intense exercise, and during recovery. Analyses of variance (ANOVA) were performed for each variable in order to determine whether between-group measurement differences were statistically significant, thus establishing measurable benefits, if any, that these agents offer to the body's metabolic system.

**Samantha Allen, University Scholar**

Dr. Renee Umstatter-Meyer, mentor

*A Theoretical Approach to Increasing Physical Activity in the Colonias*

*Colonias* residents the United States-Mexico border are medically underserved with disproportionate rates of diabetes and other obesity-related diseases. Although physical activity (PA) plays a role in preventing such diseases, a majority of this population fails to meet recommended PA guidelines. Given consistent support of theory to understand and/or increase PA participation, this study examined familial social support and social norms associated with PA engagement among *colonias* children using a *Promotora* model. *Promotora* researchers conducted surveys with mother-child dyads in spring and summer of 2011. Mean parental social support for PA received by children was 6.77 (SD=5.76), and girls reported receiving less ( $\mu=6.0$ , SD=5.5) total parental social support than boys ( $\mu=7.8$ , SD=6.0). Thirty-nine percent of mothers also reported exercising with their children (22% of girls and 16% of boys), and 33% provided transportation to their children for PA. These findings indicate a need for improved social support to increase PA levels

**Caroline Blane Barta, Great Texts and Classics**

Dr. Douglas V. Henry, mentor

*Memory's Consolation: Right Remembrance in Boethius*

The impetus for my thesis is the psychological predicament injustice creates, namely, the paralyzing effect of suffering. As presented in Boethius' *Consolation of Philosophy*, I examine how the resolution to this problem hinges upon memory as it actively works to reorder our conception of seemingly arbitrary circumstances. Over the course of the *Consolation*, the process of remembering rightly moves Boethius from a state of despairing passion toward reasoned consolation, even as his outward condition remains essentially the same. Without denying the reality of suffering, right remembrance in Boethius offers a framework for honest reflection in reconciling the good with the painful. Right remembrance thus becomes not only a theoretical means of achieving peace and happiness

**Paul Baumgardner, University Scholar**

Dr. Jarold Waltman, mentor

*Reevaluating Reynolds: The Constitutional Case for Religiously Motivated Polygamy*

In 1878, the U.S. Supreme Court defined, and applied, the free exercise clause of the First Amendment for the first time. The case, *Reynolds v. United States*, concerned the constitutionality of the Morrill Act of 1862, which made it a federal crime to practice polygamy. This congressional act was neither the first nor the last federal action taken to suppress the growing Mormon faith. Although the Mormon Church believed that the free exercise clause protected such integral faith-based actions as polygamy, the Court deemed polygamy to be "morally odious" and outside the realm of constitutional protection. However, the evolution of marital standards, minority freedoms, and free exercise jurisprudence over the past 133 years of American history has supplied ample room for a contemporary reevaluation of *Reynolds v. United States*. In particular, the Supreme Court's recent protections of same-sex lifestyles and heterodox religious conduct indicate that a religiously motivated polygamy case would receive a much more favorable treatment today.

**Elizabeth Brower, University Scholar**

Dr. Janet R. Crow, mentor

*Parental Perceptions of Twins and the Co-Twin Relationship*

To assess the unique relationship twins share with each other, mothers of twins were self-selected via announcements distributed through 17 Mothers of Multiples Clubs in Texas. Participants completed a survey containing Likert scale and open-ended items including demographic information and questions regarding how participants perceive their twins. Mothers reported that 63.8% of their twins were fraternal, and 36.2% were identical. Factor analyses, correlations, and independent samples t-tests were conducted to determine significant relationships between variables. Significant correlations were found between the Favoritism Scale and the Perceived Positive Twin Relationship Scale, as well as between parents identifying more with one twin and parental perception that parent-child relationships impact co-twin relationships. This was an exploratory study, and further research is needed to more fully understand the twin relationship and how parents perceive it.

**Emily Brower, University Scholar**

Dr. Phillip Donnelly, mentor

*Inventive Translation: Depicting Virtue in C.S. Lewis's Science Fiction Trilogy*

My thesis explores the ways in which C.S. Lewis uses his love for and knowledge of medieval literature in the writing of his science fiction trilogy. I examine and define the medieval intertextual tradition that C.S. Lewis adapts in writing the trilogy, as set forth in *The Discarded Image*. In this work, Lewis explains how medieval authors would rewrite and translate earlier stories in the making of new texts. This is what Lewis himself does in the writing of his trilogy with respects to older works of literature. I argue that Lewis uses this approach in each of his science fiction novels in order to rehabilitate this mode of writing and certain aspects of earlier authors' works. Further, Lewis uses this approach to offer a unique treatment of moral virtues (fallen and unfallen). In *Out of the Silent Planet*, Lewis adapts Dante in order to recover for his readers a sense of what it would mean to understand space as "Deep Heaven" and to illustrate unfallen martial virtues. *Perelandra* retells *Paradise Lost* and aims to rehabilitate the experience of reading an epic in order to imagine unfallen love and unfallen mankind. Finally, *That Hideous Strength* incorporates Arthurian legend and the medieval heavens to reveal how these virtues function in human beings on Earth. Ultimately, only by appreciating all three novels together, as acts of what I call "inventive translation," can we appreciate the powerful literary means by which Lewis attempts to transform the moral imaginations of readers.

**Cameron Byrd, University Scholar**

Dr. Todd Buras, mentor

*A Priori Laws and the External World*

This thesis demonstrates that any interpretation of the status of 'mind-independent reality' or 'the external world' in Kant's transcendental idealism is incomplete if it fails to account for the metaphysical implications of the *Critique of Practical Reason*. Moreover, I argue that Kant's description of 'experience,' when taken in conjunction with the metaphysical implications of the second *Critique*, probably (if not necessarily) excludes the existence of the traditional conception of physical matter.

**Kyrie K. Cameron, Biology**

Dr. William D. Hillis, mentor

*The Process of Healing in Multiple Sclerosis: The Roles and Experiences of the Patient, Physician, Family, and Peers*

Patients who suffer from multiple sclerosis are faced with the reality that this disease, which causes such tremendous physical and emotional distress, simply cannot be cured. Though medical researchers have not yet been able to find a cure, multiple sclerosis patients may certainly experience healing during their struggle. To cure one from disease is a permanent eradication of all physical symptoms that the body experiences, whereas healing is the retaining of a sense of personal integrity and self-worth in spite of the physical manifestations of illness. Healing is experienced by the patient, but is also an experience in which the physician, family members and peers play significant roles. In cases of incurable disease, such as multiple sclerosis, it is important that every patient is provided with an opportunity for healing. In order for each patient to have this chance, it is beneficial for each of the individuals involved in the healing process to recognize those practices and attitudes that contribute to healing.

**Marcus Patrick Capetillo, Political Science**

Dr. Victor Hinojosa, mentor

*Drug Trafficking in Mexico: The Causes and Consequences of Mexico's Militarized Counternarcotic Policy*

During the period of one party rule within Mexico, drug trafficking organizations (DTOs) funneled narcotics through Mexico virtually unobstructed. Throughout this period, the Institutional Revolutionary Party (PRI) protected DTOs, regulated drug trafficking, and prevented infighting between competing DTOs. However, with the transition to a more democratic political system Mexico's counternarcotic policy changed. The PRI lost power and could no longer regulate drug trafficking or control DTOs. Violence between DTOs escalated, posing a significant threat to Mexico's nascent democracy. In response to this threat, both President Vicente Fox and President Felipe Calderon chose to pursue a militarized approach to dismantling DTOs and suppressing escalating violence. This study explores why Felipe Calderon and Vicente Fox chose to pursue a confrontational, militarized approach and reveals some of the consequences of this policy on the drug trade and Mexico's democratic consolidation. The study finds that the new political arrangement within Mexico, incompetence of other security forces, high levels of violence, and increased pressure from the United States all contributed to Mexico's choice to militarize. The militarization of Mexico has produced varied results and its implications are being felt on both sides of the United States-Mexican border.

**Akshar Dinesh Chauhan, Biochemistry**

Dr. Kevin G. Pinney, mentor

*Functionalized Benzosuberene Analogues as Potential Vascular Disrupting Agents*

Functionalized benzosuberene analogues represent an emerging class of anticancer agents that are inspired, in part, by combretastatin A-4 (CA4), a natural product found primarily in bark extracts from *Combretum caffrum*, an African bush willow tree. In recent years, these benzosuberenes have become the subject of scientific scrutiny due to their ability to trigger microtubule depolymerization in the endothelial cells of tumor vasculature, eventually leading to tumor necrosis. Because of this ability, certain benzosuberenes and other similar compounds are more commonly known as vascular disrupting agents (VDAs). This study investigates the hypothesis that the activity of these benzosuberene compounds may be enhanced further by altering several key moieties in the molecular structure. Specifically, it seeks to determine whether various molecular substitutions on the "C" ring of benzosuberenes can improve their binding to tubulin, ultimately leading to enhanced biological activity. For example, one of the molecules synthesized, featuring an  $\alpha$ ,  $\beta$ -unsaturated ketone in the final structure, demonstrated cytotoxicity against several human cancer cell lines ( $GI_{50} = 23.5 \mu\text{M}$  against NCI-H460 lung cancer cells;  $GI_{50} = 20.1 \mu\text{M}$  against DU-145 prostate cancer cells; and  $GI_{50} = 8.46 \mu\text{M}$  against SK-OV-3 ovarian cancer cells). Overall, four new benzosuberene analogues were prepared by chemical synthesis. Ultimately, the structures of these new molecules, along with their accompanying biochemical and biological evaluations, were instrumental in extending the structure-activity relationship (SAR) profile for this new class of anticancer agents.

**Tiffany Clark, Political Science and International Studies**

Dr. Linda Adams, mentor

*Profiles and Policy: Evaluating How the Social Structure and Motivating  
Factors of Modern Terrorist Organizations Impact US Foreign Policy*

My thesis asks who becomes an operative for modern terrorist networks and why. I propose that while religious motivation exists for terrorist networks, the extreme drive for political equality in their region of operation is what creates the most significant impact. By surveying the history, tactics, funding, and motivating factors of two major organizations, the Kurdistan Workers Party and Al Qaeda, I find that extreme nationalism has greater motivation for these groups than religious extremism. I then give special attention to female operatives in terrorist organizations by presenting common themes of motivation and proposing that while these women operate actively to gain political equality for their organization as a whole, they still struggle with the same fight for gender equality within the organization. I conclude my thesis by discussing how foreign policy has changed in a post-9/11 society and what still needs to be done in order to address the growing role of women in terrorist networks.

**Rachel Cliburn, Neuroscience**

Dr. Charles Weaver III, mentor

*The Effect of Annotation on Metacomprehension of Text*

Metacomprehension refers to a person's ability to monitor what information has been learned through reading. Good metacomprehension is important for efficient studying. Prior research shows that most readers have quite poor metacomprehension. Ironically, making reading more difficult improves metacomprehension for that text. In the present experiment, we explored whether reading an underlined text or a plain text produces better pretest and posttest metacomprehension judgments. Consistent with prior research, the more difficult plain text condition produced better metacomprehension judgments. We found that overall test accuracy was the same between conditions, and that there was a consistent trend towards improved metacognition for the plain text group.

**Ashley N. Connelly, Anthropology**

Dr. Benjamin Arbuckle, mentor

*Analysis and Interpretation of Neolithic Near Eastern Mortuary  
Rituals from a Community-Based Perspective*

Early farming communities located in the ancient Near East participated in unique mortuary practices throughout the Neolithic period (9300-4700 B.C.). These practices include a "skull cult," which involved preserving and honoring human skulls apart from the rest of the skeletons. Interpretations of the meaning behind this "skull cult" have been a major focus of archaeology. In this thesis, I critique previous work interpreting the skull cult, particularly Kathleen Kenyon's theory of a venerated male ancestor skull cult, and explore Ian Kuijt's theory on the social role of these mortuary ritual practices, giving insight into the emergence and evolution of social complexity within these developing societies. Ethnographic accounts supporting Kuijt's theory of community-based mortuary practices and their significance in understanding the societal structure during the Neolithic period suggest that while people of the Neolithic Near East were preserving the skeletal remains of their ancestors, it may not have been for veneration purposes, but rather a mortuary rite allowing the deceased to transition to the afterlife, all while preserving and renewing the social relationships involved in the community.

**Ashley M. Davis, Philosophy**

Dr. Todd Buras, mentor

*A Natural Signs Approach to the Argument from Desire*

C.S. Lewis wrote in *Mere Christianity* that "If I find in myself a desire that no experience in this world can satisfy; the best possible explanation is that I was made for another world." From this experience of desire for something transcendent, he formulated an argument from desire for the existence of God. My thesis analyzes the argument using a natural signs approach—instead of arguing that this experience constitutes proof of God's existence, I argue that this experience of desire is one of many naturally occurring signs for God's existence and constitutes the basis for a kind of knowledge about God.

**Hasan Dimayuga, Anthropology**

Dr. Garrett Cook, mentor

*Soccer and Mayan Society: Localization of the Global Game*

Ethnographic field work conducted with Deportivo Santa Isabel, an adult male recreational soccer team in Momostenango, Guatemala, provides a story of local adaptations to the forces of globalization. Soccer is an international game widely popular in Guatemala. The approach is to use ethnographic research on a specific team to illustrate processes of social adaptation and localization of the global game in a Mayan setting. The soccer team incorporated religious symbols and acts as part of their procedures and identity. The meaning of the sport also plays a role in the social and economical imagination of the players.

**Jaclyn Drake, University Scholars**

Dr. Richard Russell, mentor

*Finding the "Right Angle:" Repositioning Waiting for Godot and Rosencrantz & Guildenstern  
Are Dead as Potential Expressions of Holocaust Remembrance*

As the number of Jewish Holocaust survivors continues to diminish, it is important to find new ways to capture their hardships, memories, and legacies. Artistic images and representations possess the ability to meet this need because they put the past into a dialectical relationship with the present. Specifically, the human element and live, performative aspects of theatre enables this medium to speak directly to motifs in many Jewish Holocaust victims' narratives: physical suffering, struggling to communicate, and the burden of "bearing witness." My thesis purposes that culture can keep alive the memory of the Holocaust by revisiting theatrical works composed immediately after World War II and trying to understand them in light of this horrific event. I consider the characterization, fragmented dialogue, and metatheatrical elements of Samuel Beckett's *Waiting for Godot*, as well as Beckett's own biography, to prove its potential to act as a Holocaust drama. I then analyze Tom Stoppard's *Rosencrantz & Guildenstern Are Dead* in the same manner, focusing mostly on the play's textual exchange with Hamlet and other important Western narratives. Both sections conclude by demonstrating how these plays affect the audience and consequently prove the dangers of forgetting the stories of the Jews of the Holocaust.

**Elizabeth Dratz, Business Fellows and Economics**

Dr. Charles North, mentor

*Is Islamic Competition a Paradox? Economic Attitudes and Religion*

Economic attitudes provide a glimpse of development and growth according to each religion's adherents. Muslims around the world trust those around them and are more tolerant of other races and immigrants. As well, they have a strong confidence in their governments, armies and police. While they may not have Max Weber's thrift, Muslims do believe that hard work pays off and competition is good. This research involves a panel of 87 countries and over 250, 000 respondents of the World Values Survey (WVS). It looks at the views of adherents to seven major religions on economic attitudes like trust, government and competition. The WVS recent addition of a dozen majority Muslim countries allows this research to have the ability to disentangle the minority effect from the Islamic effect.

**Christopher A. Egan, Business Fellows, Finance, and Economics**

Dr. William Petty, mentor

*Baylor Angel Network Analyst Guidebook*

For many early-stage companies, one of the primary methods of securing funding is through Angel Networks, which exist to connect investors to entrepreneurs with developed business plans. One of these Angel Networks exists directly as part of Baylor University - the Baylor Angel Network. The BAN model seeks to both increase the value-add to the entrepreneur while also incorporating an academic component through the recruitment of undergraduate Analysts. In the role of student Analysts, Senior Analysts assist the Executive Director in fulfilling operational roles of BAN, while also analyzing and screening deals submitted to the Network. Not only do Analysts receive hands-on education, Analysts also undergo an educational curriculum. The Analyst Guidebook has been created as to record and simplify established processes while further developing analytical frameworks in order to free-up bandwidth, streamline processes, improve operational efficiency, and further increase the overall value-add of the Baylor Angel Network.



**Ben Faus, University Scholar**

Dr. Jonathan Tran, mentor

*Hegel, Marxism, and Yoder: An Examination of Social Change and Christianity*

"In the *Phenomenology of Spirit* G.W. F. Hegel puts forth a number of thoughts on man's relationship with the world. In his chapter on the "Dialectic of Subject," specifically, Hegel looks at the ability of the self-consciousness to relate to the world by putting itself at the center of things. In doing so, Hegel takes the reader through the steps which the self-consciousness undergoes in order to relate properly to the world. In my thesis, I utilize an interpretation of this text by Alexandre Kojève in order to demonstrate that Christians can create the world and thus take a proper place in history as Hegel so desires. In using figures such as John Howard Yoder and other theologians and biblical exegetes, I demonstrate that Christianity is not merely an ethereal concept, as Kojève seems to think, and that Christians are meant to and do in fact take part in social action in our relation to the world. In doing so, Christians properly work in the world, as Kojève demands, and thus take part in the process of "completing" history, in proper Hegelian fashion."

**Kellsie Flowers, Biology**

Dr. Brian Leutholtz, mentor

*Prader-Willi Syndrome and a Potential Weight Loss Supplement*

Prader-Willi Syndrome (PWS) is a genetic disorder caused by a lack of the 11q-13q segment of the paternal chromosome 15. Although the cause of the lack of genetic information varies, the result typically leads to an extreme increase in appetite, hypogonadism, mental retardation, and behavioral problems. Often, the most prominent obstacle the individual with PWS faces is managing the excessive weight gain that comes with having constant, ravenous hunger. Since there currently is no cure for PWS, managing the symptoms is the focus for most doctors. If the issue of excessive weight gain can be mollified, then the disorder would become more manageable. Therefore, I am proposing a hypothetical research project that examines the effects of capsaicin, a potential weight loss supplement, on individuals with PWS. Since the experiment is hypothetical, a guideline for this potential project is explored, along with rubrics for interpreting possible results. Several potential data sets have been prepared, and are accompanied by an interpretation of what these results could mean for PWS patients in the future.

**Chelsea Foong, Medical Humanities**

Dr. Alexander Beaujean, mentor

*Math Based Chronometric Tasks*

Previous research has shown that there is a relationship between speed of information processing, as measured by general reaction time (RT) on various simple tasks, and standard tests of cognitive ability. Moreover, this relationship is partly due to shared genes and partly due to shared environment. When the environmental factors have been further analyzed, it appears that the environmental influences are mostly due to non-shared factors, i.e., the influences that make siblings from the same family different. To date, little has been done to investigate if the same relationships exist for academic achievement domains, such as mathematics. This study compared the relationship between RT and standard tests that measure mathematics. As the sample is comprised of sibling pairs, we were also able to examine the amount of variance due to Between Family (BF) factors (i.e., the environmental factors that make siblings alike) and Within-family (WF) factors (i.e., the environmental factors that make siblings different). This study seeks to examine (a) if there is a relationship between RT and traditional tests of mathematics, and (b), if there is a relationship, how much of the environmental influences are due to BF vs. WF factors.

**Lance A. Forsythe, Classics**

Dr. Timothy Heckenlively, mentor

*Translation and Commentary of Gregory Nazianzus' Oration 38 "On the Nativity of Christ"*

Gregory Nazianzus, one of the three Cappadocian Fathers, was an important pillar of the early Orthodox Church and continues to be a major contributor to trinitarian theology. His arguments against the heresies of Arianism and Sabellianism formulated modern church conception of the falsity of these beliefs, and his discussion of the proper way to celebrate the Feast of Theophany (or the Nativity of Christ) was unique for his time and still calls for reform in the present era. I will be translating the oration devoted to this last issue and providing commentary necessary to gain a fuller understanding of the text as it is situated within the realm of medieval orthodox

**Carmen M. Galvan, Public Relations**

Dr. Barry Hankins, mentor

*Ut Omnes Unum Sint: Examining the Presence of the  
Catholic Intellectual Tradition at a Baptist University*

The purpose of this research is to acquire and analyze firsthand accounts of faith and teaching from both Catholic and non-Catholic faculty at Baylor University. These interviews will aid in proving or disproving the claim that in an increasingly secular academic world, Baylor's decision to welcome non-Baptist faculty from other Christian traditions, specifically Roman Catholics, has strengthened the university's religious identity because of the faculty's knowledge and practice of the Catholic Intellectual Tradition, which is based on faith integrated with learning.

**Maria A. Gannon, Political Science**

Dr. Julie A. King, mentor

*Dissecting a Disaster: The Deepwater Horizon Oil Spill*

In April 2010, an explosion on the *Deepwater Horizon* oil rig set off a chain of events that resulted in millions of gallons of crude oil gushing into the waters of the Gulf of Mexico for nearly three months. This disaster would ultimately be the largest and most catastrophic oil spill in the history of the United States. Because of the enormity and complexity of the spill, many do not fully grasp the nature of what occurred and what is still ongoing. This research attempts to present a clear and detailed picture of the *Deepwater Horizon* oil spill and the multitude of events that followed. Provided is an in-depth study of the explosion on the oil rig, the containment and cleanup efforts of the spill, an analysis of the ecological ramifications, and a breakdown of the continuing litigation and legal battles that have yet to be resolved.

**Victoria Graves, Vocal Performance**

Dr. Christopher Bartlette, mentor

*Transitioning from romance to mélodie: An Analysis of Hector Berlioz's La captive*

In the eighteenth century, French art song was dominated by the romance, which was simple in its construction and set strophic poems that dealt with love and gallantry. After the Lieder of Franz Schubert (1797-1828) were introduced into France, a desire for a more developed and expressive French art song was stirred. Hector Berlioz (1803-1869) was one of the first composers to call these new songs *mélodies*. However, labeling vocal works from this period as exclusively romance or *mélodie* is difficult, because the two styles have similar characteristics. This thesis explores Berlioz's transformation from the romance to the *mélodie* through four revisions of the song, *La captive*. His setting of *La captive* is then compared to settings of the same poem by his contemporaries—as well as other songs by Berlioz—in order to demonstrate Berlioz's innovative compositional style.

**Alexandra Gutierrez, International Studies**

Dr. Joan Supplee, mentor

*Mothers and Widows: Gendered Violence and the Birth of Female CSOs in Argentina and Guatemala*

From the 1970s into the 1980s, Argentina and Guatemala were both ruled by ruthless military dictatorships that systematically killed and tortured men, women and children as a part of their respective wars on subversion. This violence created a generation of childless mothers and widows. This thesis analyzes the role of these women in the emergence of civil service organizations (CSOs) dedicated to protecting women's rights: *Las Madres de la Plaza de Mayo* in Argentina and *Coordinadora Nacional de Viudas de Guatemala*. This study examines the domestic and international success of each and seeks to identify the factors that either aided or inhibited the growth of these organizations.

**Rebecka Haats, Biology**

Dr. Eva Doyle, mentor

*Oral Health Education for Children: A Delphi Study of Effectiveness*

Oral health can have a large impact on the overall health and wellbeing of a person, yet it is commonly overlooked. In the United States, dental caries is the most common chronic disease of childhood, even though it is highly preventable and treatable. Oral health education may lessen the burden of such oral health problems, and oral health education programs are widely available, but there is no standard for these programs and very little research on whether these programs—especially ones targeting children—are effective. In this pilot Delphi study, three key informants from different fields relating to pediatric oral health education were interviewed about the effectiveness of current oral health education programs for children. From their responses, consensus was developed and recommendations formed regarding further execution of and research into children's oral health education programs.

**Tristan Hamner, Biology**

Dr. Paul LaBounty, mentor

*A Theoretical First Response Model Proposal with a Historic Look at Baylor EMS and a Literary Review of First Response Programs*

Time is often of utmost importance when a medical emergency occurs. First response programs allow trained responders to arrive at the scene of an emergency before an ambulance arrives. A historic look at Baylor EMS was performed to better understand the history of first responding on Baylor's campus and to analyze where the program went wrong and what caused its disbandment. A literary review of current city based first response programs and other collegiate EMS programs reveal the necessity and benefits of such programs as well as the versatility of available programs. Finally a theoretical model for the implementation of a collegiate first response program was detailed and proposed, specifically for use on Baylor University's campus. Such a model, however, could also apply to other colleges or universities looking to start their own program.

**Robert C. Harris, Biology and Biochemistry**

Dr. Kevin G. Pinney, mentor

*Design, Synthesis, and Biological Evaluation of Indole-Based Vascular Disrupting Agents for the Potential Treatment of Cancer*

An established strategy in oncology entails selectively targeting the tubulin-microtubule system, resulting in inhibition or hyperstimulation of tubulin polymerization effecting cell cycle arrest at anaphase. It has been found that small molecule inhibitors of tubulin assembly, vascular disrupting agents (VDAs), damage tumor vasculature by inducing morphology changes in the endothelial cells lining tumor vasculature. Tumor vasculature is poorly established compared to normal tissue vasculature and is susceptible to this form of disruption. A particular benchmark VDA isolated from the *Combretum caffrum* tree is the natural product combretastatin A-4 (CA4), which binds at the colchicine site located on  $\beta$  subunit of the  $\alpha\beta$  tubulin heterodimer. Previous investigations led to the discovery of an indole-based derivative of CA4 known as OXi8006 which demonstrates comparable inhibitory effects of tubulin polymerization and cancer cell growth to CA4. Herein, we report the design, synthesis, and biological evaluation of two new analogs of OXi8006 as potential VDAs for the treatment of cancer. Several advanced intermediates were prepared for future synthetic approaches to diversely functionalized analogs of OXi8006. Details of the chemical synthesis and collaborative biochemical evaluation are presented.

**Amy Heard, English**

Dr. Beth Womack, mentor

*Public Perception and Poverty: The importance of understanding how we think about the impoverished*

Thoughts and attitudes are affected by fact, fiction, and experience. My research explores public perception of the impoverished by explicating academic writing and the popular media, then examines one organization that seeks to change negative perceptions of the impoverished. The first section is a literature review of current poverty theory, followed by a section examining the role of popular media in shaping public perception. A brief survey of *The New York Times*, *The Wall Street Journal* and *The Waco Tribune-Herald*, among others, revealed positive and negative trends in the way poverty is presented. The final chapter examines the strengths and weaknesses of a Baylor Campus Kitchen, a student-led hunger alleviation group that can help reduce negative stereotypes by introducing the middle class to the impoverished without reducing the dignity of the poor. When engaging in any discussion, it

**Philip Heinrich, University Scholar**

Christopher J. Hansen, mentor

*Cave: An Animated Short Film*

Plato's allegory of the cave from *Republic* is one of the most famous and influential ideas from ancient philosophy. In my thesis, a fictional narrative, I have created a fantasy story that examines the theme of humanity's separation from transcendent reality in the Platonic sense, while ultimately leading to a different set of conclusions than Plato. In addition to Plato, the story draws on ideas from many sources, including the Bible, *The Divine Comedy*, the work of J.R.R. Tolkien, and contemporary philosophy such as C.S. Lewis's *The Abolition of Man* and other modern views on the question of objective truth. All of the film's visuals are drawn by my own hand, with artistic influence from the work of Alfons Mucha and Charles Rennie Mackintosh among others. In pulling from many influences, I aim to synthesize something memorable and new.

**Valerie Hoerster, University Scholar**

Dr. Barbalee Symm, mentor

*Smoking Behavior Among College Students: A Survey*

Despite reductions in rates of tobacco use in recent years, smoking remains an important public health concern. Cigarette smoking is the leading cause of death in the United States, resulting in healthcare expenditures of \$96 billion and 5.1 million life years lost annually. Regular smoking is usually established in early adulthood, and people who begin smoking at an earlier age are less likely to succeed in quitting. Previous research shows that factors including risk perception, peer behavior, and participation in other risky behaviors were also shown to correlate significantly with college students' smoking. This study aimed to describe cigarette-smoking behavior among undergraduate students at Baylor University. In addition to basic demographics and smoking history, survey questions examined student perception of smoking-related health risks and use of other tobacco products. Relationships between smoking, peer smoking, alcohol consumption practices, and stress level were analyzed and compared, where possible, with national data.

**Jacob Vanzant Hoffman, Engineering**

Dr. Brian Garner, mentor

*A Medical Image Viewer Plugin For Automatically Detecting  
Ligamentous Injuries of the Occipital-Cervical Complex*

Large magnitude deceleration of the human body, such as that experienced in an automobile accident, has the potential to cause whiplash in the neck. Typically, such injuries result in damage to bone that is visible in CT-scans. However, in rare cases the ligaments that support these bones are damaged instead. In these cases, the damage will not present itself in a CT-scan and the injury will go undetected. When this happens, the patient is in extreme danger of paralysis and possibly death at even the slightest disturbance of the head. Research conducted by Dr. Chaput et al. at Scott and White Hospital reveals that in these cases, CT-scans of the Occipital-Cervical Complex present tell-tale signs of ligamentous injury when the Basion-Dens Interval exceeds 10mm. This thesis describes a medical image viewer plugin that automatically detects the presence of this type of injury. The plugin uses a multi-step image processing algorithm to recognize the basion and the dens in the Occipital-Cervical Complex and measure the interval. In the event that the distance exceeds 10mm, the user is alerted to the possible presence of ligamentous injury. The performance of the plugin reveals that computer vision has promise in automating the diagnosis of orthopaedic injuries.

**Priscilla S. Hor, Biochemistry**

Dr. Kevin G. Pinney, mentor

*Total Synthesis of a Novel Vascular Disrupting Agent*

A promising method for treating developed tumors, vascular disrupting agents (VDAs), interrupt tumor vasculature by inhibiting tubulin polymerization of proliferating endothelial cells. With the vasculature disturbed, tumors are deprived of needed oxygen and nutrients resulting in tumor hypoxia and necrosis. Modeled after combretastatin A-4, a leading small molecule vascular disrupting agent, a novel indole derived vascular disrupting agent, Oxi8006, was synthesized by former Pinney Group members. Oxi8006 displays promising results against tubulin polymerization and is currently undergoing additional biological investigation. Furthermore, an extensive structure-activity relationship (SAR) report is being constructed for this indole derivative. The objective of this research is to explore the total synthesis of Oxi8006. In addition, a new derivative of Oxi8006 is evaluated.

**Josh Jeffrey, University Scholar**

Dr. Thomas Hibbs, mentor

*The Lens Through Which Ye See: Philosophy of Time in the Works of C.S. Lewis*

What can modern philosophers of time learn from the fictional works of C.S. Lewis? In this thesis I demonstrate that Lewis's conception of time as exemplified throughout his works, but particularly in the Chronicles of Narnia and The Great Divorce, makes up a coherent philosophy of time. This philosophy of time draws on Christian theology, particularly the works of Augustine and Boethius, but it is nonetheless applicable to the modern debates about the ontology of time. C.S. Lewis lived through the years following J.M.E. McTaggart's famous essay "The Unreality of Time" and the subsequent polarization which resulted in two distinct conceptions of time called the A-theory and the B-theory. I argue that in his fiction, and particularly in the final chapters of The Great Divorce, Lewis provides a potential answer to this division by creating a synthetic view of the relationship of A-theory and B-theory time series.

**Kelsey Jones, University Scholars**

Dr. Jonathan Tran, mentor

*Daily Bread: A Liturgical and Narrative Guide to Good Eating*

This thesis examines the ways Christians might view and interact with daily bread differently than those operating under secular modern frameworks. In it, I examine certain Christian liturgical practices of fasting and feasting as interactions with food which can serve as correctives for two poles of problematic eating in the modern world: over-eating and under- or not-eating. I will argue that liturgy sanctifies body and soul by inviting participants into a peculiarly Christian narrative about creatures and Creator, one in which God is ultimately responsible for the provision and redemption of his creation. By contrasting the humility and gratitude of these practices to the pride and arrogance of what will be described as wrong eating, I demonstrate how scriptural and liturgical narratives of divine provision, abundance, and salvation determine one's relationship with food and empowers individuals towards more holy relationships with God.

**Shane Kelleher, Biology**

Dr. Rizalia Klausmeyer, mentor

*Development, Effects and Treatment of Arachnoid Cysts*

In my paper I discuss arachnoid cysts, or excess fluid build up in the brain and spinal cord, and the treatments that are used to control or eliminate them. First, I talk about the causes and origin of arachnoid cysts in the central nervous system, and how frequently cysts are diagnosed. Next, I discuss the medical significance of cysts and their potential effects. Finally, I describe the current diagnostic procedures used to find arachnoid cysts, as well as current and developing technologies that are used to treat these cysts.

**Trisha Kelley, Medical Humanities**

Dr. Brian Garner, mentor

*The Effect of Hippotherapy on Balance Ability in Subjects with Balance Disorders*

Hippotherapy is a type of therapy that utilizes a horse to facilitate the stimulation and stretching of muscles in people with disabilities in order to increase strength, balance ability and coordination. Though hippotherapy facilitators, patients and their parents claim that this therapy is effective, there are few studies that offer evidence to this claim. Previous studies have utilized subjective evaluations done by trained testers to evaluate balance improvements. This thesis seeks to find quantitative evidence to support the effectiveness of hippotherapy by evaluating the balance ability of subjects throughout a treatment regimen. We will use a force plate and corresponding computer program to record and analyze patient's balance before, during and after hippotherapy treatment.

**Mahmood J. Khan, Biochemistry**

Dr. Kevin G. Pinney, mentor

*The Synthesis of a Benzosuberene Analogue and the Evaluation  
of Protecting Groups on Various Organic Compounds*

According to an epidemiology survey conducted by the American Cancer Society, about 1, 596, 670 new cancer cases were expected to be diagnosed in the year 2011. Cancer is a term used to categorize diseases in which abnormal cells divide uncontrollably and are able to invade normal tissue in the body. Most cancers can be classified into broad categories such as carcinoma, sarcoma, leukemia, lymphoma, and central nervous system cancers. The discovery and synthesis of new anti-cancer drugs have been well under way since the early 20th century. This thesis focuses on the synthesis of an analogue of benzosuberene, a potent anti-cancer drug, and the evaluation of adding protecting groups to various organic compounds. Using a conventional and experimental method for adding protecting groups to organic molecules, we were able to demonstrate that the experimental method yielded results similar to the conventional methods. Furthermore, this thesis discusses the implications and future applications of using protecting groups on organic molecules. Lastly, this thesis presents the synthesis route of a benzosuberene analogue and discusses its future applications.

**Matthew L. Kirby, Mechanical Engineering**

Dr. Walter Bradley, mentor

*Thermal Degradation as a Function of Time and Temperature  
in a Coconut Shell Powder-Polypropylene Composite*

Due to increasing environmental awareness and the rapid depletion of nonrenewable resources, natural materials have become more common as fillers in polymeric composites. Coconut shell powder (CSP) as a functional filler in polypropylene has been shown to provide mechanical property enhancements. However, specific processing parameters for CSP-polypropylene composites have yet to be well defined. CSP will not be able to transition from a lab-scale natural filler to a full production, commercial natural filler, until the specific parameters for CSP-polypropylene processing are determined. Therefore, the focus of this research is to determine the effects of processing time and processing temperature on CSP-polypropylene composites. The two opposing phenomena in processing CSP-polypropylene composites are thermal degradation of the CSP and encapsulation of the CSP by the polypropylene matrix. The encapsulation of CSP in a polypropylene matrix effectively shifts the onset of CSP degradation to higher temperatures. Additionally, the effect of small amounts of thermal degradation to the encapsulated CSP may enhance processing instead of inhibiting processing, as intuitively assumed.

**Liz Kong, Nutrition Science**

Dr. Janelle M. Walter, mentor

*What a Fat Debacle: Saturated and Trans Fatty Acids Effect  
on Health and the Future of Food Manufacturing Processes*

The recommended consumption of fat has been changed multiple times by the USDA's Dietary Guidelines for Americans in the past decade due to expanding nutrition knowledge. Not only the amount of fat, but the type of fat in the American diet is considered for recommendations to health and food production. Saturated fats in general have long been shown to contribute to chronic diseases such as cardiovascular disease, cancer, and obesity. In response to consumers' demands for healthier food products, food manufacturers started using the hydrogenation process to lower the saturated fat content of foods. However, research on health implications and subsequent policy changes of these trans fatty acids, such as listing trans fat content on food label nutrition facts, led the same food companies to re-evaluate the hydrogenation process, or production of trans fat, and begin using alternatives to partially hydrogenated oils. Fifteen food companies were contacted through their websites and surveyed about what kinds of oils and/or methods they used to replace the previously used partially hydrogenated oils in their food products to maintain standards for taste and texture. This research and literature review reveals that food companies are back to using saturated fats and tropical oils, especially coconut oil, instead of the cheap trans fats in their products. Contradicting facts on saturated fats and coconut oil are further explored, with the emphasis on the beneficial functions of coconut oil. Putting research in perspective, the future of food manufacturing processes is dependent on continued research on the health implications and differences between these types of fats in the American diet.

**Shaun Kuoni, University Scholar**

Dr. James Marcum, mentor

*Electronic Medical Records, Healthcare, and the Patient*

After several decades of development, Electronic Medical Records (EMRs) are now exerting a more significant impact on healthcare practices than ever before. Healthcare providers aspire to implement EMRs to improve the healthcare process, including increased efficiency, more precise record keeping, effective transmittal of health records, financial streamlining, and overall better quality of care for the patient. Although most of these changes focus on improving medical care as a whole, one must also consider the effects increased EMR use may have at the level of the patient-physician encounter. In this paper, both the advantages and disadvantages of EMR use, especially with respect to the patient-physician relationship, are examined, particularly in terms of patient trust, security of patient information, and quality of healthcare. The United States healthcare system stands on the brink of a new age of electronic health information technology. The potential for innovation within this new technology represents a great opportunity for the future of medicine. However, in seeking to implement EMRs caution must be exercised to ensure that implementation does not have adverse effects on the personal nature of the patient-physician relationship—an important issue that must be addressed in order to preserve the integrity of healthcare in the new electronic age.

**Matt Larsen, Journalism News-Editorial**

James Houser, mentor

*How churches and nonprofits are meeting the spiritual and physical needs of the people of East Africa.*

Everyone has needs. Whether we are struck by physical or spiritual hunger, poverty and brokenness, we all must have something or someone come and meet our needs. Ultimately, our physical and spiritual needs reflect our need of a savior. We need someone to come save us from the hunger, poverty and brokenness. For a beautiful and incomprehensible reason, God set up for Himself to be our savior, and for us, His redeemed, to be His body. We are His hands, His feet and His mouth to the rest of the hungry, poor and broken world who need to have their needs met just as much as we do. From a wounded, fatherless generation in Northern Uganda to a starving, government-less population in Somalia, East Africa has needs. Who is filling them?

**Colleen MacCroy, Business Fellows, Marketing, Economics**

Dr. Chris Pullig, mentor

*Just a Game? The Impact of Collegiate Athletics on the Undergraduate Admissions Process*

Approximately 19.5 million people watched the NCAA Men's Basketball Division I Championship in 2008. Beyond the financial gains through ticket and merchandise sales, what type of impact, if any, does this widely publicized event have on the winning university's applications and admissions process? Universities that won Men's Basketball Division I Championships between the years of 1999-2008 were examined in the study. Sample variables included: number of applications, the number of freshman who actually enrolled, whether a waiting list was used, and the percent of applicants in the top ten percent of their class for the year preceding the championship and the two years after the championship. These variables were selected to reveal the positive correlation between winning a national championship and the number of undergraduate applications to the university.

**Stephen Margheim, University Scholar**

Dr. Julia Hejduk, mentor

*Epicureanism in Horace's Odes Concerning Vergil*

During their own lifetime, Horace and Vergil were Rome's two most celebrated living poets, and history relates that they were also friends. Unfortunately, little is known of their friendship, and few avenues exist by which to illumine its nature. In Horace's four books of Carmina, three such avenues exist--Odes 1.3, 1.24, and 4.12. Facets of Epicureanism filter into these three odes. Through careful reading of these three poems, I elucidate how Epicureanism influences Horace's view of poetry's function in certain contexts, that is, how poetry functions as competitive medium, as a means of honest criticism, and in response to death. I will show that Epicurean

**Matthew G. McCallum, Economics**

Dr. Charles North, mentor

*The Pirate's Moral Compass: Religion, Morality, Underage Drinking, and Illegal Music Downloading*

Illegal downloading of music files has plagued the recording industry for years and stricter enforcement of piracy laws has shown little effectiveness in slowing this phenomenon. We study the effect that religion and morality have on illegal downloading practices of music files by college students at a large private Christian university. I conclude that church attendance is associated with lower illegal downloading only for very frequent attenders. Also, students who rate their morals "above average" are less likely to illegally download than those who identified with "average" morals. Additionally I examine other "wrong" acts including copying homework, breaking the speed limit, shoplifting, and underage drinking. The results suggest that college students view underage drinking and illegal downloading as morally equivalent.

**Katy McDowall, Journalism News-Editorial**

Dr. Sara Stone, mentor

*Chicken Noodle News: CNN and the Quest for Respect*

This thesis, focusing on Cable News Network, studies how cable news has changed in the past 30 years. In its infancy, CNN was a pioneer. The network proved there was a place for 24-hour news and live story coverage. More than that, CNN showed that 24-hour-news could be done cheaper than most of the era's major networks. But time has changed cable news. As a rule, it is shallower, more expensive and more political, and must adapt to changing technologies. This thesis discusses ways CNN can regain its place in the ratings against competitors like Fox News and MSNBC, while ultimately improving cable news by sticking to its original core value: The news comes first. To accomplish this, this thesis looks at CNN's past and present, and, based upon real examples, makes projections about the network's (and journalism's) future.

**Joseph Mercer (with John Sommers), Business Fellows, Accounting, Economics, and Finance**

Dr. William Petty, mentor

*The Baylor Angel Network: Angel Investing in Early Stage Startups*

Angel investing constitutes an alternative asset in the portfolios of many high net worth individuals. Although angel networks are relatively uncommon, the Baylor Angel Network develops a unique value proposition to not only Baylor University, the students and faculty, but also the entrepreneurs looking for funding. This thesis follows the work of two Senior Analysts within the Baylor Angel Network, and their coverage of entrepreneur pitches for funding, as well as review of portfolio companies for investor due diligence.

**Amber Miller, Psychology**

Dr. Eric Rust, mentor

*The Evolution of U.S. Child-Protective Services, with Emphasis on the Experience of New York and Texas*

This thesis investigates the history of the prevention of child abuse and neglect in the United States from the Colonial Period until recent times. It also provides information on how other countries have dealt with child abuse in the past, in particular Canada, Mexico, England, Norway, the Netherlands, and Germany. This study highlights the development of the Child Protective Services in the United States and then gives a more in depth look at New York and Texas. This thesis delivers data on how New York and Texas have historically dealt with child abuse in their states and how each state differs from each other.



**Luke Mitchell, English**  
Dr. Alden Smith, mentor

*Sacred Space in Evelyn Waugh's Brideshead Revisited*

Considerations of ways that space influences human behavior resurged in the twentieth century. Many spatial theorists, like Edward Soja, have analyzed the processes of a socio-spatial dialectic; that is, the ways in which individuals or communities impart significance to space and then interpret spatial contexts. Though I am here unconcerned with the Marxist dogmas that have greatly influenced spatial theorists, I borrow the distinction between geographical and "lived," or "socially created" space that has emerged from their studies. I will examine space in the world of Evelyn Waugh's novel, *Brideshead Revisited*. Desire to create and interpret meaning in spatial contexts informs the salvific narratives of the Flytes, the Marchmains, and Charles Ryder. Ultimately, the realization that 'sacred space' is a gift of the Church, not the reward of an individual endeavor, sheds light on the characters' need for the Church and her sacraments.

**David Moore, History and Latin**  
Dr. Gabrielle Sutherland, mentor

*Codifying the Cosmos: Orthodoxy and Cosmography in Twelfth Century Europe*

The twelfth century marked a period of simultaneous political expansion and theological consolidation. Theological and philosophical disputes of that century cannot be separated from the political motivations of the individuals who guided them, and the increasingly systematic attempts to define orthodoxy correlated with a greater desire to incorporate disparate localities into a homogeneous sphere of influence. Solidification of a definition of orthodoxy allowed leaders to silence political dissent under the pretext of theological conflict. Theological debate thus shifted to the process by which orthodoxy ought to be defined rather than the content itself. Amidst this conflict, Bernard Silvestris' work, the *Cosmographia*, presented the interaction of many politically and theologically volatile issues within the context of a Creation account. The *Cosmographia* asserted that conflicts inherent to the formation of orthodoxy had precedent in the model of the cosmos. Silvestris examined how this cosmological structure influenced paradigms of authority and philosophy. Thus he transformed cosmography from a genre primarily concerned with the intricacies of nature into a vehicle of ideological didactics. Following the *Cosmographia*, many individuals and institutions which sought to solidify their political influence through orthodoxy, the papacy in particular, adopted cosmological appeals as a means of legitimizing their claims to ideological authority.

**Preston Morton,**  
Dr. Marline Reed

*New Orleans after Katrina, Policy Decisions in the Impossible City*

Geographically and economically, New Orleans is unique among North American cities. New Orleans is an island city surrounded by marsh, bayous, lakes and rivers constructed on over four hundred square miles of artificial land. It is home to the world's largest port on the world's greatest river system. Paradoxically, the location and its importance lead to the conclusion that New Orleans is both the Inevitable and Impossible City. This thesis traces the policy decisions and historical context that determined outcomes during Katrina and the policy decisions made in the six years after the disaster. Looking back on the policy response to rebuild the city, the first clear successes and failures have become apparent. The dramatic change in the health, education, and justice systems through policy have led to one of the most significant attempts at urban policy reform in the modern era.

**Ashley Nicole Morgan, Political Science**  
Dr. Linda Adams, mentor

*'Innocent Victims' or 'Criminal Aliens?': A Critique of Trafficking Discourse and Policy in the United States*

Human trafficking is a global phenomenon with important implications for conceptualizations of citizenship, gender and sovereignty. The approaches by the US government and many academic studies of trafficking are based upon understandings of trafficked persons as "victims" and methods for identifying the trafficked that prevent them from being identified or self-identifying. These "victim" stereotypes reproduce inaccurate and unethical gender norms and limits of political community that devalue the lives of the trafficked. Problems with trafficking efforts extend beyond issues of identification. The ideologies of human rights and security are unnecessarily injected in anti-trafficking discourse and policy at the expense of providing support for the trafficked. US immigration policies are overly restrictive to the point of putting relief from trafficking out of reach of trafficked persons and actually

**Clinton Mosley, Religion**

Dr. James Kennedy, mentor

*The Characterization of Satan in Biblical Texts*

In modern Christian society, it is difficult to distinguish what comes from the Bible and what is a product of culture and tradition. Henry Ansgar Kelly writes "the impulse to retrofit past events with present-day theories...has bedeviled the history of Satan." Satan is an essential figure to Christian theology; therefore, there is a profound need for clarification on what the Bible does and does not say concerning him. This thesis attempts to identify the characteristics of Satan throughout the Bible and how the development of demonology in Jewish and Christian thought affected the characterization of Satan in Biblical texts. The first chapter examines the ancient Hebrew Adversaries of Job, Zechariah, and 1 Chronicles, and how these few texts formed the foundation for a character that would become central to later Christian theology and demonology. The second chapter documents the satanic figures of other near-Eastern religions that were adjacent to late Judaism both geographically and theologically, and the influences of these satanic figures on the Intertestamental Jewish writings of 1 Enoch and the Book of Jubilees. The third chapter investigates the characterization of Satan in the Gospels, Pauline Literature, Pseudo-Pauline Literature, Hebrews and the Pastoral Epistles, and Revelation; moreover, the third chapter also evaluates the degree of influence exuded upon the New Testament Satan from Intertestamental sources. Altogether, this thesis presents the development of the Biblical characterization of Satan through the perspective of religious syncretism, which eventually produced the final characterization of Satan in the New Testament.

**Ngoc Mui,**

Dr. Sang-Chul Nam, mentor

*The Role of Spectraplaklin in Drosophila Photoreceptor Development*

Cell polarity, the correct positioning of membrane proteins in the apical and basolateral domains, is critical for the proper development of retinal photoreceptor cells. The regulation of cell polarity is controlled by cell polarity complexes. Crumbs (Crb), a transmembrane protein belonging to the Crb complex, has a critical role in the regulation of the rhabdomeres and adherens junctions during photoreceptor cell elongation. In turn, the cell polarity complexes are influenced by other regulators. Here, I found that Spectraplaklin, an actin-microtubule cross-linking protein, participates in the regulation of the localization of Crb during photoreceptor morphogenesis. The Spectraplaklin genes are highly conserved throughout evolution, which makes the *Drosophila* eye an excellent model. The Spectraplaklin gene in *Drosophila* is known as short stop, shot. Shot localizes at the rhabdomere terminal web, located at the Crb domain, and serves as a transition zone for the constant delivery of proteins needed for the photoreceptor. Genetic analysis data indicates that Shot and Crb require each other reciprocally for correct targeting to the final sites within photoreceptor cells. Mutations in shot affect photoreceptor morphogenesis by causing cell polarity defects.

**Daniel Nassar, Biology**

Dr. Lisa Baker, mentor

*Exploring Asthma in Rural, Western Kenya: A Pilot Study on the Upper Nyakach Plateau*

In a pilot study of a convenience sample of eighteen self-identified asthmatic Luo people from the Upper Nyakach Plateau in western Kenya, a cross-sectional study was performed with a sample size of  $n = 18$ . The purpose of the study was to assess the effect of risk factors on lung function among asthmatics from the Upper Nyakach Plateau. Major predictor variables described the type of dwelling the subject lived in, presence of various animals, and location of cooking fire. The effects of these predictors on lung function were measured using the outcome variable of FEV1/FVC Ratio. Statistically significant protective (higher lung function) results were dirt floors within a dwelling ( $r^2 = 0.2380$ ,  $p = 0.04$ ) and ownership of goats ( $r^2 = 0.2651$ ,  $p = 0.0288$ ). There were no statistically significant negative results for other major predictor variables, but trends of decreased lung function were observed with the ownership of cats, dogs, and chickens. Trends of increased lung function were observed with mud walls, cooking fire located inside of the dwelling, presence of cows or sheep, and keeping animals outdoors only. This pilot study suggests that traditional housing (dirt floors) and ownership of goats were associated with a statistically significant increase in lung function among asthmatic Luo people.

**Matthew Naumann, Biochemistry**

Dr. David Pennington, mentor

*Cobalt(III), Chromium(III), Glutathione, and their Relevance to the Glucose Tolerance Factor*

The so-called glucose tolerance factor (GTF) is believed to be a biological complex of chromium that works alongside insulin to enhance the body's ability to metabolize sugar. Chromium and cobalt complexes with glutathione were synthesized as potential analogues to the GTF. These were then analyzed via mass spectrometry and UV-visible absorption for potential clues to the composition and connectivity of the complexes. Upon analysis, the cobalt complex with glutathione appeared to have an uncoordinated sulfhydryl group, consistent with the hypothesis that the GTF interacts with the insulin receptor via a sulfhydryl-disulfide exchange. Such a complex could theoretically be tested for GTF activity.

**Hien Nguyen, University Scholars**

Dr. Wade Rowatt, mentor

*Effects of Supraliminal Superstitious Cues on Attitudes*

Despite detrimental effects on both individual and societal advancement, socially-shared superstitions continue to be reinforced by supraliminal and subliminal environmental cues. This study evaluates the effectiveness of such cues—either for or against superstitiousness—in altering individual attitude and behavior. Approximately 150 participants will be recruited via Amazon.com's Mechanical Turk (MTurk) crowdsourcing population. The participants will read online passages containing pro-superstitious, anti-superstitious or neutral primes. They will then answer passage-related questions which discreetly probe for superstitious inclinations. For each condition, superstitiousness is measured by frequency of positives on veiled questions. Compared to anti-superstitious or neutral supraliminal priming, I hypothesize an increase in superstitious answer choices after pro-superstitious priming. Because superstitious mindsets have been shown to perpetuate rigid stereotypes, prejudice, and even violence against certain minority groups, it is important to research effective mechanisms for curbing such thinking on a societal level.

**Vanessa Nyaboke Onguti, International Studies Major**

Dr. Steve Bradley, Mentor, mentor

*Poverty alleviation efforts in Kenya: Combining the top down approach and the bottom up approach*

In the quest for poverty alleviation, there are typically two approaches undertaken: the bottom up and the top down. The bottom up model consists of grassroots efforts focused on programs in specific communities or individuals. This takes the form of micro-finance, savings and even deworming practices to see an increase in school attendance. On the other hand, the top down entails government efforts for a country as a whole. Education reforms, better health care systems or limiting corruption via a checks and balances system are all means various governments utilize to decrease poverty levels in their respective countries. This thesis explores both models while using Kenya as a case study, arguing that, after careful analysis of a country's true causes of poverty, both approaches be applied in conjunction with each other. Not only will this attack poverty on both ends, it will also see to a quicker means of alleviating if not eradicating poverty.

**Adrian I. Peña, Neuroscience**

Dr. N. Bradley Keele, mentor

*Regulation of Anxiety and Alcohol Drinking Behavior by Neuropeptide Y and Corticotropin Releasing Hormone in the Central Nucleus of the Amygdala*

The rising consumption of alcohol in the West and subsequent alcohol-related life problems that develop is a major health and social issue. Finding an effective treatment for alcohol dependence has been difficult as this is a complex phenomenon that has its roots in a variety of factors including genetic and cultural factors. Anxiety and stress have a strong correlation with alcohol intake behavior, and cyclic bouts of alcohol drinking and episodes of alcohol withdrawal lead to enhanced stress and anxiety reactivity due to the behavioral and physiological stress brought by withdrawal symptoms. Recently, two neuromodulators have been implicated in the regulation of anxiety and ensuing alcohol drinking: neuropeptide Y (NPY) and corticotropin releasing hormone (CRH). Furthermore, it seems that both of these modulators exert their effects on the central nucleus of the amygdala (CeA), a structure that has been labeled the locus of emotion and, more specifically, important in anxiety disorders. How these two neuromodulators interact, the cellular and molecular mechanisms by which they exert their effects, how these mechanisms affect neuronal excitability within the CeA and gene expression, and how ethanol relates to both NPY

**Emma Perry, University Scholar**

Yoshiko Fujii Gaines, mentor

*An Annotated Translation of part 1 of Kokoro: Sensei and I*

*Kokoro*, by Natsume Souseki, is a well-loved classic of Japanese literature. Edwin McClellan translated this novel into English in 1957. Though this translation is easy to read, it is not a perfect translation in the sense that it does not offer the reader many notes on the words, grammar, colloquial expressions, etc. that are not easily translated into English. Therefore, the goal of this paper is to present a fresh translation of the first part of the novel, *Sensei and I*, with annotations. This will hopefully broaden the reader's understanding of the text.

**Catherine A. Peterman, Business Fellows, Finance, and Economics**

Dr. Steve Bradley, mentor

*The Imbirikani Girls High School*

The Imbirikani Girls High School is an all-girls secondary school that educates Maasai girls in southwest Kenya and provides its students with the necessary skills to fulfill their future goals. This business plan outlines specific marketing, organizational, and financial strategies that will allow the school to achieve continued success in its mission to give these young Kenyan women a place "To Learn, To Serve, To Honour God."

**Benjamin D. Peterson, Mechanical Engineering**

Dr. Walter Bradley, mentor

*Effects on Morphology of Coconut Shell Powder in a Polypropylene Matrix*

Due to increasing environmental awareness and rapid depletion of nonrenewable resources, sustainable natural materials have been more common in use as fillers in polymeric composites. Coconut Shell Powder (CSP) is a renewable and abundant resource that when used as a filler in polypropylene has been shown to better mechanical properties in comparison to neat polypropylene. These mechanical property benefits are not intuitive based on results from other natural fillers. The purposes of this research are to determine the effects on morphology of the addition of CSP and to locate the cause(s) of these benefits.

**Samuel A. Pomeroy, Philosophy**

Dr. David L. Jeffrey, mentor

*Praying Towards Deification: A Study in the Theology  
of the Cappadocian Contemplative Tradition*

The last century of patristic scholarship has seen a striking revival in the study of the Cappadocian Fathers, with particular attention given to Origen of Alexandria, Gregory of Nyssa, and Maximus the Confessor. These figures are unique thinkers in and of themselves; yet, their thoughts follow the same kind of theological trajectory, each drawing upon preceding figures to extend their contribution with characteristic insight and philosophic acuity. As Christian theology and practice developed, so too did the meaning, purpose, and forms of prayer; how Christians prayed has always been intimately connected to what they profess as doctrine, particularly in regard to christology. An examination of the theological contours of the three aforementioned figures reveals that for the Cappadocian vein of thought, prayer was largely concerned with man's deification through the reception of the Logos of God. Origen offers an emphasis on receiving the Word through the letter of Scripture; Gregory expounds upon the fact that man is made in the "image of God" to explain how man receives the True Man, Christ, through contemplative prayer and virtuous living; finally, Maximus takes us through three stages of contemplation with the end to know the Unknowable insofar as human nature is permitted. Through this study, I shall demonstrate that each figure unites in a common thread to emphasize that receiving the nature of Christ is to partake in His *kenōsis* love, a love of self-emptying, in order to receive the Divine Nature. Deification, then, is the embodiment of God in the individual, insofar as God is love and man is a creature innately possessing the way to love. For the Cappadocians, contemplation is a recovery of the εἰκὼν [image] of God by which the human is made, and the restoration—also the radical expansion—of man's original state: spiritually attuned living amidst a corporeal world.

**Jordan Potter, Environmental Science**

Dr. Bryan Brooks, mentor

*The effect of diphenhydramine and diazinon toxicity in the invertebrate Daphnia magna*

This paper will investigate the use of *Daphnia magna* in toxicological interactions by looking at organophosphate pesticides and antihistamines. Organophosphate pesticides function by inhibiting acetylcholinesterase activity, leading to a buildup of acetylcholine that continually binds with cholinergic receptors on the post-synaptic cleft, causing neurological damage. In mammalian models, the use of antihistamines is a well-studied antidote for organophosphate poisoning because it competitively binds to cholinergic receptors, thereby inhibiting repeated depolarization of the neuron. Due to increased demand for the use of invertebrate models in experiments, this paper will examine this pathway in an invertebrate model, *Daphnia magna*, over the course of 3 studies. If the neurological pathway is conserved, *Daphnia magna* may prove a useful model organism in future studies to reduce animal testing as well as cost. The first experiment will examine several thresholds associated with a verification trial of variable diphenhydramine hydrochloride dosages. The second experiment will look at the same thresholds in relation to 3 trials of diazinon dosages. This study will provide useful information on the efficacy of using invertebrates to model dose-dependent pathways. If *Daphnia magna* exhibit dose-dependent reactions to the chemicals, there is some degree of target receptor homology.

**Thomas Quehl, Biology**

Dr. Joseph Ferraro, mentor

*Pediatric heat stress injuries and death in vehicle trunk entrapments*

More than 500 children have died over the past 15 years from hyperthermia after being left unattended in or around motor vehicles. Previous studies have measured car temperatures quickly rising well above 130°F in warm sunny conditions and above 115°F in temperate cloudy environments. Unintentional trunk entrapment has accounted for nearly 10% of these deaths, many of which are classified as a combination of hyperthermia and asphyxiation. However conditions within the trunk have not been previously analyzed to see why asphyxiation is often involved. The objective of this study is to compare the magnitude and rate of temperature rise within a discontinuous trunk with that of the cabin over a range of mild and hot environmental temperatures. We also applied thermal tolerance information to scenarios of different humidity in order to estimate the minimum time required for the trunk and cabin to reach dangerous temperatures.

**Aislinn Rogalla, Biology**

Dr. Troy Abell, mentor

*A Cross-Sectional study of the Effects of Stressors upon Blood Glucose Levels in Non-Obese Patients in Rural Western Kenya*

In order to more effectively address the expansion of type 2 diabetes worldwide, this study investigated the role that stressors and the stress response play in the development of diabetes. The study analyzed clinical data collected from a sample population of 685 subjects of Luo ethnicity who attended a clinic in May, 2010, in rural western Kenya. Stressors were self-reported by the patients, and blood glucose levels were determined from blood samples. Diabetes, measured as blood glucose levels over 200 mg/dL, was found to be unrelated to body mass index, an accepted measure for obesity ( $\chi^2=2.51$ ,  $df=5$ ,  $p=0.7753$ ).

**Katie Sanders, Political Science**

Dr. Tyler Smith, mentor

*Earthly & Heavenly Adoption: Exploring Adoption Research, Policies, & Trends through the Lens of God's Adoption of Mankind*

"Pure and faultless religion is this: to look after orphans" (James 1:27). The Bible explicitly references the call for Christians to look after and care for orphans, in accordance to God's adoption of Christ-followers into His Heavenly family. Some take this command as a call from the Lord to adopt orphans into their own family. There is a plethora of research available concerning the many aspects of adoption, the domestic and international policies of adoption, and the current and past trends in adoption. However, there is little research available that parallels this research to adoption theology. In my thesis, I hope to conjoin both the area of adoption research with the area of adoption theology in a way that can be beneficial to Christian adoptive parents.

**Zachary Reece Sartor,**  
Dr. Patrick J. Farmer, mentor

*Synergistic Effects of Hydroxychloroquine on the Antiproliferative Activity  
of Thiomaltol against Melanoma Cancer Cells*

Although melanoma accounts for a very small percentage of all skin cancer cases, it is the most responsible for skin cancer related deaths. Therapeutic agents that induce apoptosis in the cancer cells have been heavily researched. Some recent research has focused on enhancing the effects of apoptotic agents by blocking autophagy, a cancer survival mechanism where the cells digest themselves. Research has shown that inhibiting this pathway with certain drugs can lead to cell death at a greater rate than by using apoptosis inducing agents alone. The main question this study seeks to answer is whether the effects of an autophagy blocking agent used alongside an apoptosis inducing thione drug will increase cell death at levels higher than using the drug alone. The anti-proliferative drug used is thiomaltol (Htma), and the autophagy blocking agent used is hydroxychloroquine (HCQ). The two compounds are tested against B16F1 melanoma cells from mice. Although the two agents used in conjunction demonstrate little synergy over a normal 12 hour study there is an appreciable increase in cell death when both Htma and HCQ are administered over 72 hour drugging period proving that the autophagy inhibiting method has the potential to increase the activity of similar apoptosis inducing thione drugs.

**Adam Schultze, Mathematics**  
Brian Raines, Mentor

*A Survey of the Alexander Polynomials of Rational Tangles of the Same Fraction*

Let  $T$  be a rational tangle in standard form containing negative elements and let  $F = [a_1, a_2, \dots, a_n]$  be its corresponding continued fraction. Now let  $F' = [b_1, b_2, \dots, b_m]$  be the continued fraction  $F$  in standard form (defined as a continued fraction with all ones in the numerators and  $b_2, \dots, b_m$  as nonnegative integers) and let  $T'$  be the name of the associated tangle to  $F'$ . This paper will explore the correlation between the Alexander Polynomials of  $T$  and  $T'$  while using them as a means of verifying their isotopic nature.

**Elizabeth Seto, Psychology**  
Dr. Wade Rowatt, mentor

*Associations Between Self-Reported Narcissism, Self-Esteem,  
and Social-Emotional Functions of Facebook*

The popularity of Facebook has instigated a wealth of research from the fields of psychology and social media. Narcissism and self-esteem have been independently linked to Facebook usage and Facebook-related behaviors. Few studies have explored, however, the interaction between narcissism and self-esteem and one's emotional connection to Facebook. In this study, participants completed the Narcissistic Personality Inventory (Raskin & Terry, 1988), the Rosenberg Self-Esteem Scale, (Rosenberg, 1965), the Balanced Inventory of Desirable Responding (Paulus, 1984), and a self-generated Facebook Activity Questionnaire. Through factor analysis, an aggregate "Facebook Emotional Connection" variable was created. Bivariate correlations reveal a significant positive relationship between narcissism and self-esteem. In addition, self-esteem demonstrated a significant negative association with Facebook Emotional Connection, and narcissism demonstrated a positive association with Facebook Emotional Connection, but it did not reach significance. A statistical trend emerged although the magnitude of the effect was small. Implications for the continual growth of social media and its effects on psychological well-being are discussed.

**Elaine Shan, Psychology**  
Dr. N. Bradley Keele, mentor

*Music and the Mind*

Music is often thought of as a nonverbal language, capable of communicating emotional messages. Areas of the brain have been identified that, when damaged, affect only musical skills. At the same time, while the initial sensation of the sounds that make up music is a predominantly auditory experience, the neural basis of music perception lies in several different areas of the brain and overlaps with those used in language, emotion, and motor tasks. Thus music is a complex experience that utilizes seemingly divergent abilities of the brain. This thesis will

**Grant Shellhouse, University Scholar**

Dr. David Lyle Jeffrey, mentor

*Bearing God, Echoing the Word: Mary as Contemplative Exemplar*

Mary, the Mother of God, is offered in Scripture as a model of prayer after which contemplatives may shape their own prayers. This thesis exegetes Scripture passages involving Mary, and enters into dialogue with Catholic and Protestant theologians throughout time. In doing so, it demonstrates how Christ offers his mother to his Church as a contemplative ideal, and then identifies and analyzes the contemplative virtues that Mary embodies: her selfless and obedient reception of the Word of God, her quiet pondering of its mysteries, her faithfulness in bearing it into the world, and her self-emptying perseverance and humility. These virtues are applied to the contemplative act and presented as ideals in prayer. Finally, this thesis turns to the contemplative action of the whole Christian Church, illuminating how the prayers of each contemplative are connected to the prayer of the whole Church, and arguing that because of this dynamic connection the praying Church takes the contemplative form of the Mother of God.

**Sunny Shuler, University Scholar**

Dr. Jeff Levin, mentor

*"Unusual Forces": A Conceptual Model of the Realm  
Between Naturalistic and Supernatural Healing*

Contemporary research on spiritual healing views healing as occurring either because of naturalistic means (i.e., explainable by the scientific method and by reference to existing scientific theories) or by supernatural means (i.e., explainable as miraculous or due to God or a divine power acting "ex nihilo"). There exists a third category of explanations for healing posited by some investigators, invoking a variety of unusual forces, whereby healing cannot be described as attributable solely to either supernatural or naturalistic categories. This thesis explores explanations for healing attributed to this third category, and presents a conceptual model-taxonomy categorizing the various ways that healing due to such forces has been described. After first explaining the need for such a conceptual model, this thesis next presents an overview of current explanations proposed from those working within numerous scholarly disciplines, including the philosophy and history of medicine, consciousness research, prayer research, Christian religion and theology, and transpersonal psychology. By presenting a conceptual model that differentiates these explanations on the basis of the concept of nonlocality, this thesis provides a way to make sense of cases of healing attributed to such forces. This model will thereby aid in providing a foundation for further theoretical discussion, research, and practice in regard to different types of spiritual healing.

**Erika Smith, University Scholar**

Dr. Phillip Donnelly, mentor

*"Wisdom, Which Alone Is Truly Fair": Wisdom and Government  
in Milton's Political Prose and Paradise Lost*

While the character of Milton's republicanism has been the subject of long debate, this study focuses on Milton's privileging of wisdom as the characteristic which makes rulers fittest to govern and subjects most deserving of liberty. In *The Ready and Easy Way*, Milton draws on distinctions between tutelage, which is designed for overseeing young children, and teaching, which is designed to prepare youths for adulthood, to describe the cultivation of wisdom in the nation under monarchies and republican commonwealths respectively. A re-examination of *Of Education* and *Areopagitica* demonstrates Milton's keen interest in cultivating wisdom in the people by teaching decorum through poetry and temperance through abstaining from pre-publication censorship. Finally, Milton's *Paradise Lost* explores the importance of wisdom in Adam and Eve's relationship and by extension educates the reader in cultivating wisdom through reading and through activity at home and in politics.

**Stephanie Smith, Environmental Studies**

Dr. Sara Alexander, mentor

*Vulnerability, Feelings of Stress, and Coping with Natural  
Disasters: The Case of Hurricane Iris in Belize*

As climate change affects global weather patterns, coastal communities experience more high intensity storms. Social conditions have created more vulnerability to these disasters in some individuals, exacerbating the damage. The village of Placencia in Belize was particularly affected by one such event, Hurricane Iris, in 2001. This study uses data from households of Placencia to examine the relationship between vulnerability to coastal storms, feelings of stress, and coping strategies. My objectives are to: (1) identify levels of stress; (2) explore

**Lindsey Snyder, Biochemistry**

Dr. Mary Lynn Trawick, mentor

*Advanced Kinetic Studies of Novel, Non-peptidic Thiosemicarbazone Inhibitors of Cathepsin B*

The lysosomal cysteine protease cathepsin B is considered to be an attractive target for the synthesis of anticancer drugs due to its over-expression in cancerous cells and its involvement in tumor formation. Among its many roles in the advancement of several pathological events including Arthritis and Alzheimer's disease, cathepsin B is primarily responsible for initiating cancer metastasis as it facilitates the degradation of the extracellular matrix. In order to impede the process of angiogenesis and to prevent the spread of cancerous cells, this study aims to identify an effective, non-toxic inhibitor of cathepsin B from a library of novel, non-peptidic thiosemicarbazone (TSC) compounds which have shown to be effective inhibitors of the cysteine protease cathepsin L (Kumar et al., *Bioorg. Med. Chem. Lett.*, 2010, 20(22); 6610-6615). In order to evaluate the compounds' inhibitory effects, the concentration of the TSC inhibitors causing a 50% reduction in enzymatic activity (IC<sub>50</sub> value) was determined. After an optimization of assay conditions, experiments were performed in a 96-well microplate using the substrate Z-arginylarginyl-aminomethylcoumarin which reacts with cathepsin B and releases the fluorescent product, aminomethylcoumarin. Advanced kinetic studies of the most potent inhibitors were performed to determine the compounds' mechanism of action. All three of the compounds studied exhibited reversible inhibition. Two of these inhibitors, a bromo-substituted, acetylated phenolic benzophenone TSC and a bromo-substituted, di-trifluoromethyl benzophenone TSC exhibited time dependent inhibition; whereas, the monohydroxy-tetramethoxy-substituted benzophenone TSC displayed classical competitive inhibition against cathepsin B activity. By developing a database consisting of TSC compounds with IC<sub>50</sub> values in the low micromolar to nanomolar range, it is possible to examine the kinetics and structure-activity relationship of TSC inhibitors which could potentially be used medically to decrease tumor progression and cancer metastasis. These studies represent a collaborative project between the Trawick (biochemical) and Pinney (synthetic) Laboratories.

**Victoria Soeung, Biochemistry**

Dr. Mary Lynn Trawick, mentor

*Biochemical Studies of Cathepsin B and Cruzain Inhibitors Sharing a Thiosemicarbazone Moiety*

Over-expression of cysteine proteases has been implicated in a number of diseases, making them attractive targets for drug design. The cysteine protease, cathepsin B has been implicated in the degradation of the extracellular matrix and thereby facilitates tumor cell metastasis and invasiveness, suggesting that inhibition of cathepsin B may be an important target for anti-cancer treatment. Natural and synthetic inhibitors of cathepsin B have demonstrated selective enzyme inhibition, but many of these compounds exhibit peptidic characteristics, reducing their bioavailability. A separate cysteine protease, cruzain, is essential for the survival of *Trypanosoma cruzi*, the causative agent of Chagas' disease and is involved in parasitic nutrition, replication, and evasion of the host immune system. In these studies, a library of small non-peptidic compounds that share a thiosemicarbazone moiety were analyzed against cathepsin B and cruzain. A number of thiosemicarbazone derivatives were found that exhibited IC<sub>50</sub> values (the concentration of compound that resulted in fifty percent enzyme inhibition) in the lower micro-molar and nano-molar range against cathepsin B and cruzain respectively. Fluorometric microplate assays were used to determine IC<sub>50</sub> values as a measure of effectiveness of the compounds. Advanced kinetic studies were conducted on cathepsin B in order to determine the mechanism of inhibition. Analysis of the structure activity relationships (SAR) of these compounds show promising results for drug design. These studies represent collaborative research between the Trawick (biochemistry) and Pinney (organic synthesis) Laboratories.

**John Sommers (with Joseph Mercer), Business Fellows, Economics, and Finance**

Dr. William Petty, mentor

*The Baylor Angel Network: Angel Investing in Early Stage Startups*

Angel investing constitutes an alternative asset in the portfolios of many high net worth individuals. Although angel networks are relatively uncommon, the Baylor Angel Network develops a unique value proposition to not only Baylor University, the students and faculty, but also the entrepreneurs looking for funding. This thesis follows the work of two Senior Analysts within the Baylor Angel Network, and their coverage of entrepreneur pitches for funding, as well as review of portfolio companies for investor due diligence.



**Matthew Swift, Baylor Business Fellows, Economics, and Finance**

Dr. Charles North, mentor

*Reexamining the Effects of State Religion on Religious Service Attendance*

This paper reexamines and describes the effects of state religion on religious service attendance across countries through empirical analysis. Using econometric methods to analyze attendance data from the World Values Survey and Gallup World Poll, it pays special attention to the variables used for state religion, regulation of religion, and government favoritism toward religion while utilizing control variables from the *World Christian Encyclopedia* and CIA "World Factbook." Because this analysis uses a larger set of data than has been used in many previous studies, it provides a more representative sample of countries and sheds some light on how particular state religions may affect attendance. Some results vary with the measures used for weekly attendance or for state religion, but they uniformly suggest that most previous scholarship is incorrect to establish a simple negative relationship between state religion and religious service attendance.

**Rachel Taylor, University Scholars**

Dr. Troy Abell, mentor

*Sensitivity and Specificity of Malignant Melanoma, Squamous Cell Carcinoma,  
and Basal Cell Carcinoma in a General Dermatological Practice*

Melanoma is the sixth most common cancer in the United States, making skin cancer a significant public health issue. The goal of this study was to provide estimates for sensitivity ( $P(T+|D+)$ ), specificity ( $P(T-|D-)$ ), and likelihood ratios ( $P(T+|D+)/P(T+|D-)$ ) for a positive test and ( $P(T-|D+)/P(T-|D-)$ ) for negative test of clinical diagnosis compared with pathology reports for malignant melanoma (MM), squamous cell carcinoma (SCC), basal cell carcinoma (BCC), and benign lesions. This retrospective cohort study collected data on 595 patients with 2,973 lesions in a Central Texas dermatology clinic, randomly selecting patients seen by the dermatology clinic between 1995 and 2011. The ascertainment of disease was documented on the pathology reported served as the "gold standard." Major hypotheses were that the percentage of agreement beyond that expected by chance between the clinicians diagnosis and the pathological gold standard were 0.10, 0.10, 0.30, and 0.40 for MM, SCC, BCC and benign lesions respectively. For MM, the resulting estimates were: (a) 0.1739 (95% C.I. 0.0495, 0.3878), for sensitivity; (b) 0.9952 (95% C.I. 0.9920, 0.9974) for specificity; and (c) the likelihood ratios for a positive and negative test result were 36.23 and 0.83, respectively. For SCC, the resulting estimates were (a) 0.0833 (95% C.I. 0.0312, 0.1726) for sensitivity; (b) 0.9976 (95% C.I. 0.9950, 0.9990); and (c) the likelihood ratios for a positive and negative test result were 34.71 and 0.92, respectively. For BCC, the resulting estimates were: (a) 0.2178 (95% C.I. 0.1630, 0.2812) for sensitivity; (b) 0.9910 (95% C.I. 0.9867, 0.9941) for specificity; and (c) the likelihood ratios for a positive and negative test result were 24.20 and 0.79, respectively. For benign lesions, the resulting estimates were (a) 0.4942 (95% C.I. 0.4715, 0.5169) for sensitivity; (b) 0.9305 (95% C.I. 0.9135, 0.9450) for specificity; and (c) the likelihood ratios for a positive and negative test result were 7.11 and 0.54, respectively. Estimates for the kappa statistic (95% confidence intervals) were 0.1896 (0.0261, 0.3532), 0.1898 (0.0899, 0.2896), 0.3308 (0.2608, 0.3532), and 0.3585 (0.3319, 0.3850) for MM, SCC, BCC, and benign lesions, respectively. Over-biopsying lesions and fear of missing malignancy have a significant impact on the sensitivity and specificity of clinical diagnosis, leading to lowered accuracy. These results challenge clinicians to continue to work toward improving their diagnostic skills concerning MM, SCC, BCC, and benign lesions; such improvement can increase both sensitivity and specificity, leading to decreased morbidity, decreased healthcare costs, and the delivery of a higher standard of care.

**Erin Thompson, Medical Humanities**

Dr. James Marcum, mentor

*Partners of the Heart: The Blalock-Taussig-Thomas Shunt and the Blue Baby Operation*

Three individuals played important roles in the development of the surgical procedure to fix the congenital heart defect called tetralogy of Fallot, also known as the "blue baby" syndrome. These individuals include a white doctor named Alfred Blalock, a white doctor named Helen Taussig, and a black, or African American, lab technician named Vivien Thomas. In my first chapter, I discuss the history of the tetralogy of Fallot and the setting during which the development of the surgical procedure took place in 1944. In my second chapter, I introduce Thomas and Blalock and describe the beginning of their partnership at Vanderbilt University. In the third chapter, I introduce Helen Taussig and describe how this procedure came about at The Johns Hopkins University. In my final chapter, I discuss the recognition that Thomas eventually received and evaluate the way racial and occupational hierarchies affected Thomas and Blalock's mutually beneficial 34-year partnership.

**Brittany Noelle Ulrey, Film and Digital Media**

Prof. Christopher J. Hansen, mentor

*Alice*

Lewis Carroll's books "Alice's Adventures in Wonderland" and "Through the Looking Glass" have one of the fantasy genre's greatest examples of a character learning to find her place in the world. They pose the question: how do you know if you are a sane person in an insane world or an insane person in a sane world? My dark comedy screenplay is about a woman named Alice who believes she is the former but slowly has to accept the fact that she may just be the latter. She is independent to a fault and has to learn through the trials she faces in the story, most of which are caused by her own stubbornness, that there are times when she does indeed need to accept help from others. Alice must acknowledge that not everyone around her is insane, or rather, that she is just as insane as they are.

**Robin Vander Pol, Biology**

Dr. Kenneth Wilkins, mentor

*Characteristics of urban constructions occupied by bats*

Certain bat species like *Myotis velifer* (cave myotis), *Pipistrellus subflavus* (eastern pipistrelle), and *Tadarida brasiliensis* (Mexican free-tailed) of Waco, Texas roost in buildings, sometimes even when more natural roosting structures are available. However, not much research has been done looking into the features of these chosen buildings that attracts bats. The purpose of is to identify some of these unknown characteristics. We surveyed and identified 62 buildings, in downtown Waco as roosts using external marks such as guano deposits and bat vocalizations to find their exact positions. 41 were day roosts and 21 were night roosts, used only as resting positions during the night. Using observation and GIS software we gathered characteristics about these buildings such as human occupancy and building footprint area in order to find those characteristics that were common between most of them. We found only human occupancy was a major factor in roost selection. We could find nothing to distinguish day from night roosts. Knowing this feature will aid in conservation.

**Caitlin Washburn, University Scholar**

Dr. Joshua King, mentor

*The Image of Christ in Thomas Hardy's Poetry of Progress*

Although many scholars discuss the importance of Christian images in Thomas Hardy's poetry, most conclude that the ideas and images of the Christian faith were ultimately inadequate for Hardy in his attempts to find hope for the moral progress of humanity. In this thesis, I argue that Christ is crucial as a figure of hope and a symbol of redemption in Hardy's attempt to assert the possibility of moral progress through human actions. Through a close reading of several of Hardy's poems, as well as a study of texts that influenced his ideas about progress and about Christ, I first discuss the importance of concrete examples of human goodness, rather than speculations about miraculous or divine help, as sources of hope for Hardy. I then examine the continued importance of Christian images, especially the figure of Christ, within Hardy's humanist worldview. To Hardy, Christ serves as a historical example of the lasting efficacy of virtuous activity, as well as a poetic symbol with the power to inspire further virtuous activity in other humans.

**Kristine Williams, Biology**

Dr. Kenneth Wilkins, mentor

*Bat Foraging Activity and Insect Abundance in Relation to Light Intensity on Baylor University Campus*

The relationship between bats and urbanization is not yet well understood. Whereas bats are nocturnal and generally operate in darkness, insects tend to be drawn to illumination at nighttime. For this project, the relationships between bats and light and insects and light are being studied to determine how foraging activity of bats and insect abundance in an urban setting might vary in connection to different levels of artificial lighting. Echolocation signals are recorded over four weeks each night from 1900 hours to 0700 hours for five consecutive nights using ultrasonic detectors. The twelve locations on the Baylor University campus fall into groups of four based on the average nighttime light intensity due to the artificial lighting: low, medium, or high intensity. Insect abundance is tested once per week at each sampling location using non-toxic glue traps. To analyze the echolocation data, we are utilizing a program SONG SCOPE 4.0.7. An ANOVA analysis of the collected data revealed that bat foraging activity is significantly related to light intensity, and that higher foraging activity will be

**Preston Yancey, Great Texts**

Dr. David Lyle Jeffrey, mentor

*The Poetics of God: Exegesis and Story in Six Parables of Christ*

In this thesis, I propose to examine six parables of Christ through the interpretive tools common to patristic and medieval forms of exegesis. Beginning with a close examination of primary sources, I consider the fundamental assumptions made by pre-fifteenth century commentators about the nature of the Scripture, our engagement with it, and their particular theological position within the story of our Faith as a whole. Having detailed specific consideration of major and minor commentators, I then proceed to exegete six parables on my own, drawing on the whole of Scripture, the deuterocanonical texts, and the varying commentators previously explored to interpret the passages in an art that has been largely lost in our anti-Incarnational, post-Descartes modern hermeneutic. Grouping the parables into three paradigms--eschatological, subversive, and violent--I read the parables against each other, against the Scripture, and in conversation with the Tradition, arguing for a consideration of the Scripture that emphasizes the poetic language by which God speaks, teaching in story as a means to continually converse with His people throughout time.

## Graduating in August, December, or Later

**Lucas Alexander, University Scholars**

Dr. Sara E. Alexander, mentor

*Peace in Our Time: Policy Proposals to End Ethnic Violence in South Sudan*

In July of 2011 South Sudan became an independent country. Since then, militias associated with several of the country's ethnicities have killed thousands of people. My thesis consists of a critical examination of the unique historical and cultural causes of the conflicts and a set of policy proposals that might help end the violence.

Historical accounts and anthropological case studies of the country and other countries in the region suggest that a government's perceived illegitimacy, the factionalization of politics along ethnic lines, and economic stagnation are three key factors in perpetuating internal ethnic wars. Similar cases in East Africa and developing countries around the world suggest policies appropriate to resolving these issues via democratization, integration into the political system, and economic development.

**Julie Berkhimer, Nursing**

Dr. Christine Limbers, mentor

*The Relationship Between Parental Depression and Child Emotional Functioning: A Meta-Analysis of Current Literature*

Depression is a serious psychological condition for which both genetic and environmental causes have been found. While some research has been conducted examining the potential effects of parental depression on child emotional functioning, a meta-analysis of the data is needed in order to synthesize the findings across studies. The objective of the present study was to conduct a meta-analysis to examine the potential effects of parental depression on child emotional functioning. It was found that parental depression had a moderate effect ( $d=0.49$ ) on child emotional functioning. These data suggest it is imperative for clinicians to identify parental depression in order that timely interventions can be enacted to optimize child emotional functioning. Other implications of these findings are discussed.

**Megan Danner, Secondary Education, English/Language Arts/Reading**

Dr. Wesley Null, mentor

*The Effects of Technology on the Teaching of Literature in High Schools*

This thesis will explore the effects of certain technologies, such as computers and the Internet, upon the teaching of literature in American high schools. A brief history of technology in schools will be explored in the first chapters. This history will include the revolutions of radio, television, and the Internet in the classroom and their overall effects on education as a whole. Later, new media such as Facebook, Youtube, and other social and creative outlets will be explored and analyzed for effects on the teaching of literature, specifically in high school education. Online classes will also be observed for effectiveness in education. Through this research, conclusions will be drawn upon the effectiveness and usefulness of technology in the English classroom.

**Courtney Fewell, English**

Dr. Emily Setina, mentor

*Redefining Religious Tolerance: A Closer Look into Roger Williams's  
The Bloody Tenent of Persecution for Cause of Conscience*

I am taking a closer look at Roger Williams's definition of religious tolerance. Roger Williams was among the first Puritans that came to America. Thinking that the Americas would allow freedom of worship for all religious denominations, Williams was disappointed to discover that the Puritans only intended to follow their religious practices. Perceived as a "radical" and a "separatist," Williams' aggressively advocated religious tolerance among the Puritan community. Eventually banished for his beliefs, and the aggressive manner in which he advocated them, Williams wrote *The Bloody Tenent of Persecution for Cause of Conscience* to refute the religiously intolerant aspects of Puritan ideology. Williams also wrote *The Bloody Tenent* to refute the ideology of New England Puritan Pastor John Cotton, the man Williams blamed for his banishment. Throughout *The Bloody Tenent*, Williams uses violent language as well as religious language to evoke action in his readers, hoping to alter Puritan ideology, as well as successfully refute Cotton. I am taking a closer look at Williams's use of violent and religious language as well as the dialogue of *The Bloody Tenent* to see how this contributes to Williams's definition of religious tolerance.

**Alexandra Frensley, University Scholar**

Dr. Troy Abel, mentor

*The Effect of Maternal Fat Specialization on Infant Birthweight*

Infant vitality is closely associated with infant birthweight. Infants weighing less than 2,500 grams at birth are considered to be low birth weight and experience a higher prevalence of morbidity and mortality than infants born at higher weights. Birthweight is affected by a complex web of anthropometric, social, and environmental determinants and is therefore difficult to predict during pregnancy. The interaction between the factors that influence birthweight needs to be better understood so that women at risk for delivering low birth weight infants can be identified and preventive measures can be taken. Currently, maternal gestational weight gain recommendations are based on body mass index (BMI). However, BMI is a general measurement of total maternal adiposity and does not account for fat specialization during pregnancy. It is hypothesized that upper body maternal fat stores are used to fuel fetal growth during pregnancy whereas thigh fat stores are reserved for lactation. Therefore, it is expected that maternal pre-pregnancy upper body fat will correlate with infant birthweight and lower body fat stores will not. This NIH-funded prospective cohort study follows 1,206 mother-infant pairs from first prenatal visit to delivery with the objective of investigating the impact of maternal height, pre-pregnancy fat distribution, and weight gain on infant birthweight. When birthweight was regressed on traditional determinants of birthweight (gestational age, sex of the infant, parity of the mother, maternal ethnicity, and smoking status) and maternal height, maternal gestational weight gain, circumference of the forearm at the beginning of pregnancy, and sub-scapular skin fold measurement at the beginning of pregnancy, 0.5423 of the variance in infant birthweight was explained ( $p < .0001$ ). Thigh adiposity was not associated with infant birthweight ( $p = 0.9819$ ) and did not add to the explained variance. These results indicate that upper body fat directly contributes to fetal growth during pregnancy, with infant birthweight being independent of pre-pregnancy lower body fat stores. This is consistent with the growing body of knowledge that lower body fat stores primarily are used for lactation.

**Kayla Fricke, Biology**

Dr. Tamarah Adair, mentor

*The Effects of Blue Light on the Biofilm Formation of Staphylococcus aureus*

The formation of biofilm complicates the treatment of *Staphylococcus aureus* infections because antibiotics are unable to penetrate the cells. The use of blue light is being investigated as an antimicrobial agent and treatment, and has been shown to be effective against *Staphylococcus aureus* in planktonic culture. This experiment has a two-fold objective. The first objective was to measure the effects of blue light exposure on biofilm formation before a 48 hour growth period. The second objective was to measure the effects of blue light exposure on biofilm formation after a 48 hour growth period. This experiment measured the variance in biofilm formation in assorted *Staphylococcus aureus* strains that were isolated from healthy carriers and exposed to blue light. Cultures were grown in a sterile 24-well microtiter plate, and a biofilm assay was completed after subsequent exposure to blue light. The plates were washed with deionized water followed by an ethanol fixation step, stained for 10 minutes with crystal violet, and solubilized with acetic acid. The amount of biofilm was measured at an absorbance of 540 nm on the Biotek Microtiter Plate Reader. Initial results reveal that biofilm formation varies among strains, with a range between 0.05 and 4.22 optical density. The results demonstrate that exposure to blue light before a 48 hour growth period inhibits biofilm formation for most strains and that exposure to blue light after a 48 hour growth period does not disrupt biofilm formation. Future studies will test the mechanism of blue light exposure in relation to the formation of these biofilms. If it is further proven that blue light inhibits the biofilm formation of *Staphylococcus aureus*, then it has the potential to serve as a preventative for infections in a clinical setting.

**Carlo Manzana, Biology**

Dr. Tamarah Adair, mentor

*Induction, Purification and Host Range of Lysogenic Staphylococcus aureus Bacteriophages*

Bacteriophage therapy has resurfaced as a potential treatment option against *Staphylococcus aureus* due to the recent increase in antibiotic resistance. The specific objectives of this experiment was to isolate lysogenic *Staphylococcus* bacteriophages and to determine their lytic ability on *S. aureus* isolates from a healthy population. To induce the phages, Mitomycin C was added to 58 *S. aureus* cultures and the product phage solutions were then spotted onto a panel of 10 different isolates to test for lysis. Forty of the fifty eight solutions tested positive for phages. Of these phages, the 15 most lytic on the panel of 10 isolates were chosen to be purified, resulting in 4 purified phages. Phage stocks were produced and a plaque assay was performed to determine the phage concentration. These phages were then assayed for their host range and compared to a well-known *S. aureus* phage, Phage K. The 4 induced phages exhibited less lytic activity than phage K. The data analyzed for this experiment included testing the hypothesis that lytic ability was correlated to antibiotic resistant genes or integrase genes of the host. In conclusion, a single type of induced prophage is not a highly effective option for killing a wide range of *S. aureus* strains.

**Sandy Nguyen, Biology**

Dr. Myeongwoo Lee, mentor

*Plasmid Construction of C23G10.8, gene mapping, and gene expression in C. elegans*

C23G10.8 is a little known gene in the model organism *C. elegans*. To explore the anatomic variations in the *C. elegans* as a result of this gene, scientific methods of gene mapping and plasmid construction will be used for gene expression. As few studies have shown, C23G10.8 has been expressed in larva in the intestine, body wall muscle, nervous system, head neurons. In the adult stage, it has been found in the intestine, nervous system, head neurons, and in the tail. RNAi studies of C23G10.8 have also shown sterility in F2 generations. The studies shown in this article will elaborate on this elusive gene.

**Chidinma Okani, University Scholars**

Dr. Bessie Kebaara, mentor

*Yeast as a Model Organism for the Study of Mitochondrial Disease*

Currently, clinicians wait until a patient becomes ill before diagnosing the cause of the disease. Scientists and clinicians are in need of an efficient and ethical way to study disease alleles. The goal of my project was to create a functional assay that will help scientists predict whether specific mutations are neutral or lead to diseases in people. I aimed to create four yeast strains that I would use in growth competitions to establish an allelic series: a wild type yeast strain, a wild type human orfeome strain, a mutant human orfeome strain, and a yeast deletion strain. Additionally, I created a total of fifteen yeast deletion strains; a set of three strains corresponded with a gene that had been sequenced and identified as having potential mutations. The strains were tagged with florescent reporters for differentiation. I used the polymerase chain reaction (PCR) technique to create five yeast construct which each contained a specific gene, a corresponding marker, and a supporting Bluescript vector. Afterwards, I used isothermal annealing to connect these pieces together. Using a transformation technique, I allowed the yeast deletion strains to capture the gene constructs. Via 96-well plates and a flow cytometer, I grew and collected data from yeast wild type and yeast deletion strains. The growth experiments allowed me to confirm a fundamental relationship between yeast wild type strain and yeast deletion strains.

**Alex Perry, English and German**

Dr. Ann McGlashan, mentor

*Agency and Despair in Doctor Faustus and Faust*

In Christopher Marlowe's *Doctor Faustus* the character of Faustus is defined by his great agency and his fatal striving. His agency and disappointed striving cause him to make toxic associations that result in his despair and ultimate damnation. After the Enlightenment had altered the course of Western thought, the next great Faust story was told by Johann Goethe. By contrast, his Faust's experiences reveal that intellectual striving may lead to the brink of despair, but the greatest sin was to act on that despair and stop striving. This thesis explores how the agency of Faust and Mephistopheles guide the human into despair or contentment.

**Monica Sok, Biology and Medical Humanities**

Dr. Lisa Baker, mentor

*The Effect of Age and Gender on the Prevalence and Severity of Hypertension in Rural Western Kenya*

In order to effectively lessen the drastically increasing morbidity of hypertension in sub-Saharan Africa, new prevalences must be calculated and the causes and aggravating factors of this disease must be more completely understood in this region. The literature repeatedly states how prevalence tends to be underestimated in this area of the world due to lack of blood pressure measurements and the highlighted focus on infectious diseases. Many studies have presented different, solid evidence on potential causes behind hypertension including the common ones of BMI, age, diet, and level of physical activity. The usual sample sizes have focused on older groups. The literature lacks concrete data concerning the nature of high blood pressure in younger groups. This cross-sectional study analyzes previously collected clinical data from a sample population of 685 patients who attended a clinic in May 2010 in rural western Kenya within the Nyando District. Data trends are inferred from blood pressure measurements, anthropometric measurements, blood samples, and the patient's self-report of symptoms. After creating the cut-off age of 18 years, the study's sample size reduced to 321 patients. For those between the ages of 18 and 44, the prevalence of high systolic blood pressure is 19.42%. For those equal to or over the age of 45, the prevalence of high systolic blood pressure is 53.50%. The prevalence of high blood pressure in males is 43.59% and the prevalence in females is 35.48%. BMI is found to be a statistically significant predictor of the severity and presence of high blood pressure only in the young group and the female group. These results show that hypertension is a silent, severe, proliferating problem in the rural area. The pathophysiology behind high blood pressure is typical in the female group, but there is clearly a different physiological process creating hypertension in those who are young and those who are thin.

**Jason Earl Stanton, Biochemistry**

Dr. Charles Garner, mentor

*Synthesis of 4-tert-butyl-1-arylcyclohexanamine and Examination  
of Its Potential Organic Gelling Properties*

The project will examine the amine derivatives of 4-tert-butyl-cyclohexanone for potential gelling properties. Organic gels have a variety of uses, and they are composed from various compounds that can immobilize certain liquids due to the interactions between the liquid and the compounds. However, only specific organic compounds are capable of forming organic gelling agents. In this experiment, the synthesis of 4-tert-butyl-1-arylcyclohexanamine will be conducted in order to evaluate the potential gelling properties. The amine may serve as a potential gelling agent because previous experiments have shown that a similar compound known as 4-tert-butyl-1-arylcyclohexanol successfully created an organic gelling agent when the aryl group occupied an axial orientation. Therefore, the ideal for 4-tert-butyl-1-arylcyclohexanamine will also contain the aryl group in the axial conformation. The presence of the axial aryl group will be confirmed with infrared spectroscopy, nuclear magnetic spectroscopy, gas chromatography spectroscopy, and mass spectroscopy, and the synthesis of the potential amine gel will be optimized. After synthesis of the potential gelling agent, the properties of the gel will be examined for practical use. The thermal stability, high elastic shear moduli, high yield stresses, crystal structure, and concentration necessary to immobilize liquid will be analyzed to determine which organic liquids work best with the gel to form the most stable gel product. Overall, the analysis of the amine organic gelling agent should provide the information necessary to determine possible practical uses in organic chemistry.