

# HONORS PROGRAM



## Message from the Director

**Martha Bradley**

What distinguishes most an education at a Research I University is the on-going production of new knowledge. What this lends to both classrooms and even the most casual conversations on the lawn in front of the Union building is a freshness, an awareness of what is important and new. Research is what invigorates teaching, scholarly production, and the contribution we might make to the academic community. Research brings students into collaboration with faculty and introduces them to processes, ways of knowing, and interpretation and invites them to apply what they have learned in the classroom.

The Honors Program believes that every student should have a meaningful experience in research and that excellence in research and writing ought to be celebrated. This is why we are joining with the Undergraduate Research Opportunities Program for the fifth annual Research Symposium. In fact, now every student who graduates with the Honors degree and completes an Honors thesis or capstone project participates in this symposium. This day recognizes our commitment to research, our belief in the immense benefit it provides for students, and our involvement in the larger research agenda of this great university. We are also pleased to feature the Honors students' abstracts in the University of Utah's Undergraduate Research Abstracts Journal. We invite you to join us in celebrating the achievements of Honors students in completing their theses, and in making a contribution to the production of new knowledge at this University.



# Art Music: Building Perspective for the Average Listener

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The music of the current era is dominated by what professional musicians refer to as "Popular Music." You will find commonly-accessible genres such as Rock, Country, and Pop within this category. The average music student, however, will spend years studying "Art Music," which is music from the Early- and Common-Practice to the Contemporary Age (about 500 A.D. to the present); this is the body of work that represents the maturation of music in the Western World. I am struck by how unpopular this music seems to be!

Today's society identifies with Popular Music in the same way it identifies with all modern inventions; it is a part of their immediate culture, personal experience, and general knowledge. My interest is to excite a wider-range of listeners by educating them in the process and history of musical development, therefore making Art Music more real to them. I have formed my thesis into a presentation encompassing my senior recital of Art Song and a set of program notes that will discuss the background of each composer and piece as it fits in the body of music. I will explain the technical factors and points of interest to begin to illustrate why this music is important to music as a whole.

My goal is to present the listeners with an experience to help bridge the gap between these two worlds of music. Although a comprehensive understanding might take years of study, I endeavor to offer a glimpse of Art Music that is real and builds an interesting perspective for the average listener.



# Pricing Callable Municipal Bonds

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Municipal interest rate derivatives are important since most municipal bonds today are embedded with options. There are many issues associated with the pricing of these derivatives, specifically which volatility to use in order to accurately price them. This information is typically derived from the market conditions of other interest rates. Through the study of bonds, municipal bonds, options, and current markets this paper shows where to find and how to more accurately estimate the volatility to price callable municipal bonds.

The goal of our study was to understand if callable municipal bonds are being reasonably priced and to understand more concerning the underlying volatility inferred from the LIBOR market used in pricing the embedded option found in these instruments. The approach we took to understand these goals involved creating a trinomial model based off the work of John Hull and Alan White and calibrating it to represent current market conditions.

Before we started this project we hypothesized that the volatility inferred from the LIBOR market was too high because there is insufficient municipal bond market data. Our results support our original hypothesis, that the volatility used to price callable municipal bonds is too high. If we use the volatility inferred from Black's model, the embedded bond price is consistently lower than the market price because the market does not give enough discount for the option. The results of our study showed that the average price difference between our model and the market price is \$2.97. Thus, the trinomial model consistently produced a price approximately \$3.00 lower than the market.

We believe there are two plausible explanations for this pricing difference. The first being that the market essentially "cheated" the investors by not discounting enough for the embedded options and the second is that the volatility inferred from the LIBOR market for the callable municipal bond is indeed high, which is what we set out to verify.

Additional research in understanding why the market volatility inferred from the LIBOR market for callable municipal bonds is so high is needed. One of the current major limitations involved in studying these instruments results from the restricted amount of publicly available data on municipal bonds. Further collection and analysis of municipal bond data is needed to gain a more accurate picture of this market, specifically the volatility.

# Multiplex Analysis of TLR 1-6, NOD1, and NOD2 Stimulated Cytokine Production in Human Neonates

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Human neonates are uniquely susceptible to bacterial infections. The mechanism of this increased susceptibility is poorly understood. Toll-Like Receptors (TLRs) have been described as having a central role in innate immune responses. TLRs are a family of pattern recognition receptors that recognize pathogen-associated molecular patterns (PAMPs). Several distinct TLR ligands have been identified, representing a wide range of bacterial, viral, and fungal motifs. Nucleotide-binding oligomerization domain 1 (NOD1) and NOD2 are novel intracellular pattern-recognition receptors that initiate pro-inflammatory signaling through NF- $\kappa$ B, via the detection of bacterial peptidoglycan (PG) products. The minimal PG breakdown product detected by NOD1 is MurNAc-L-Ala- $\beta$ -D-Glu-meso-diaminopimelic acid (MTP), which is found mostly in gram-negative bacteria. NOD2 minimally detects muramyl dipeptide MurNAc-L-D-isoGln (MDP), which is found in both gram-negative and gram-positive bacteria. Here, we utilize multiplex analysis to examine the profile of 12 cytokines in cord blood with ligands for each of TLRs 1-6 and compare these responses to adult controls. We also examine NOD1 and NOD2 production of TNF- $\alpha$ , IL-1 $\beta$ , and IFN- $\gamma$  in mixed mononuclear cells (MMCs) isolated from cord blood and compare these responses to adult MMCs.

Whole blood was collected from healthy adults and umbilical cord blood was collected from healthy term deliveries. MMCs were isolated on Ficoll-paque. The following TLR ligands were utilized: TLRs 1&2 (PAM3CSK4), TLRs 2&6 (Zymosan), TLR-3 (Poly I:C), TLR-4 (LPS), TLR-5 (Flagellin) and TLR-7 (Loxoribine). MTP was used for stimulation of NOD1 and MDP for NOD2. Cytokine production was measured using Luminex multi-analyte technology by an in-house developed procedure.

TNF- $\alpha$  production in response to LPS, the ligand for TLR-4, was significantly lower in cord blood (319.09 pg/ml) than in blood from adults (645.11 pg/ml) ( $p=0.0272$ ). LPS stimulation of TLR-4 also induces the Th2 cytokine IL-10 at significantly higher levels than through any other TLR ligand, suggesting both a proinflammatory and inhibitory cytokine profile. Furthermore, LPS stimulated IL-10 expression was significantly higher in blood from adults (1,574.42 pg/ml) than in cord blood (478.91 pg/ml) ( $p=0.0250$ ). In response to MTP, which stimulates NOD1, TNF- $\alpha$  production was significantly lower for cord blood MMCs (21 pg/ml) than adult MMCs (2013 pg/ml) ( $p=0.0028$ ). IL-1 $\beta$  production was also significantly diminished in cord blood MMCs (4 pg/ml) compared to adult MMCs (5416 pg/ml) ( $p=0.0090$ ) in response to MTP. IFN- $\gamma$  production was also significantly diminished for cord blood MMCs (3 pg/ml) compared to adult MMCs (13 pg/ml) ( $p=0.0282$ ) in response to MTP. TNF- $\alpha$  production in response to MDP, which stimulates NOD2, was significantly lower for cord blood MMCs (17 pg/ml) than adult MMCs (2089 pg/ml) ( $p=0.0018$ ). In response to MDP, IL-1 $\beta$  production was also significantly diminished for cord blood MMCs (6 pg/ml) compared to adult MMCs (5858 pg/ml) ( $p=0.0029$ ). IFN- $\gamma$  production was higher in adult MMCs compared to cord blood MMCs, but this difference was not statistically significant.

Defective cytokine production in response to stimulation of TLR-4 (TNF- $\alpha$  and IL-10), NOD1 (TNF- $\alpha$ , IL-1 $\beta$ , and IFN- $\gamma$ ) and NOD2 (TNF- $\alpha$  and IL-1 $\beta$ ) may play a significant role in the neonate's increased susceptibility to bacterial infections. TLR-4 stimulated production of TNF- $\alpha$ , as reported by others, was again confirmed to be diminished in neonatal leukocytes. These are the first data to suggest an abnormality of NOD1 and NOD2 signaling in neonatal host defense.



# Citizen Involvement and Public Participation in Scenario Planning

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The purpose of this research is to examine the role of public participation in transportation-based land use scenario planning.

This research is divided into two parts: a review of literature discussing the role of public participation in the decision making process and an evaluation of specific cases of participation in scenario planning programs.

The literature review is used as the foundation for evaluating the cases. In the review, the author develops three standards of analysis, or questions, to determine the effort and intention of administrators of a participation program: One, is the government pre-committed to a decision and is there potential for controversy in an action? Two, has the government agency prepared the public for its role in the participation process? Three, does the agency give feedback to its participating public and offer a rationale for the final decision?

In evaluating the cases, the author is following up on the research of his advisor, Keith Bartholomew, who created a database of information on scenario planning programs and studied it for a number of qualifications. Bartholomew notes in his Summary Report (2005), "Of the 49 projects that concluded with the selection of a preferred scenario, only 19 (39%) significantly involved citizens in that selection process." The author will further analyze the projects' efforts in citizen involvement to determine the success of participation within the whole project, whether the public's input was meaningfully used, and the quality of the participation program.

# Pakistan's Educational System: A Breeding Ground for Violent Extremist Ideologies or a Scapegoat for Terrorism?

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Since the events of September 11, 2001, much has been written and analyzed with regard to the roots of terrorism. Many have claimed that violent extremist ideologies spawn from biased and intolerant educational systems that indoctrinate children at a young age. The educational systems of Pakistan, especially the religious madrasa schools, have been the recipients of countless criticism claiming that they are perpetuating the spread of such violent extremist ideology. This thesis seeks to test the validity of such claims through a thorough examination of the three systems of education currently found in Pakistan, public education, madrasa education, and private education. In addition, the legitimacy of the assertion that low levels of education and madrasa education have a direct link to international terrorism will be explored.

Through analysis and a thorough examination of the data, this thesis concludes that there is credible evidence to support the claim that current education systems in Pakistan, in many instances, teach and encourage violent extremist ideology. While the majority of the madrasas found in Pakistan do not participate in the spread of these ideologies, about 10% of these schools receive funding and are essentially operated by violent extremist groups. In addition, outdated and distorted curriculum, corruption, and poor government funding in the public education sector contribute to the promotion of this ideology. Further, current private schooling opportunities are beyond the financial means of many families, and public or madrasa education are their only options.

Finally, the link between madrasa education in Pakistan and the promotion of violent extremism is valid only in the domestic realm and not on a global scale. Acts of sectarian violence and participation in holy wars, such as conflicts between India and Pakistan or the Taliban in Afghanistan, can be directly linked to such educational systems, but acts of global terrorism like September 11th or the London tube bombings cannot. Overwhelming evidence suggests that the type of education received in madrasas is not sufficient to provide students with the necessary tools to carry out a complicated global terrorist attack. In the five most prominent and recent global terrorist attacks, including September 11th, the Madrid bombings, and the London tube bombings, an insignificant number of the participants had ever attended a madrasa school, and the large majority had obtained a degree from an institution of higher education.



# Studies of Identity Theft: A Methodological and Political Analysis

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Identity theft is frequently mentioned in news stories in the United States and abroad, and is often called “the crime of the 21st century.” Banks, computer programs, and other companies offer protection services against identity theft and go so far as to advertise on television and radio. Government policy makers have taken a number of steps to both prevent and prosecute identity theft. Yet there is disagreement on the most fundamental facts about identity theft – its definition, prevalence, causes and pathways, and consequences for individual consumers. For example, two studies by highly respected organizations (the U.S. Federal Trade Commission and Gartner Group) covering roughly the same 2005-2006 time period yield very different estimates of the number of identity theft victims in the U.S. (8.3 and 15 million, respectively).

The purposes of this research project are to (1) compare findings of identity theft research conducted in the last decade in the U.S. and other countries, (2) analyze differences in these findings in terms of their scientific impact and influence on policy, and (3) recommend ways in which future studies can improve our understanding of identity theft.

Having collected fifty reports and surveys about identity theft, I am organizing them into a matrix, showing the source of the report (government, business, or consumer organizations or independent research) and the country the report was published. This matrix also notes differences in definition, frequency, sample size, and findings about the causes and consequences of identity theft. I examine the strengths and weaknesses of these surveys and reports and look at how their methodology impacts the results of their survey. In addition, I analyze the groups’ purposes in publishing their reports or surveys. After examining these reports, I present conclusions about what should be done to make identity theft reporting more accurate and useful.



# Memento Mori: Zippo Lighters and the Vietnam Veterans Memorial as the Objects of Mourning Self and Nation

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The objects that people carry and the monuments that are built speak to the psyche of the possessor. Through an attentive study of the Zippo lighters, the Vietnam Veterans Memorial and the objects left at its base, we can understand how American soldiers of the Vietnam War era prepared to face what seemed to be an imminent death and the nation mourned the death of a myth in the period following.

The materiality of the Zippos reveals the soldiers' prognostications of their own deaths and their consignment to such prophesies. The Zippos' erotic imagery of naked women, apocalyptic imagery of helicopters, and textual messages act as these soldiers' epigraphs on the "grave" markers carried in their pockets. The Vietnam Veterans Memorial stands at an opposition to the Zippos, making us question how we mourn and react once death (of the myths surrounding war, individual soldiers, and/or the identity of America) has occurred. The imagery of the Wall acts as a registry and repository for memory, but also for the repressed emotions of the trauma of war.

Analysis of the materiality of these objects as well as the emotional and psychological weight that is carried with them comes from an inquiry into death, loss and trauma as understood through philosophical, psycho-analytic, historical and visual theories. This extends into a questioning of the ability of an object to embody and represent such acts - where the limits of their representational abilities lie and how they reflect the state of the nation, self, and the relationship to life and death. This study of not only the physical objects, but also the histories and memories that emerge with them lead us to question how American society has dealt with this death and the multiple layers and implications of the ability or inability to mourn.





# Phenotypic Consequences of mRNA Decapping Defects in Arabidopsis are Suppressed by Ursula

## Ursula Suppresses Phenotypes Associated with mRNA Decay Defects in Arabidopsis

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A study of vascular mutants in Arabidopsis revealed a critical role for mRNA decapping in early seedling development. The trident (*tdt*) mutant shows numerous vascular patterning defects, and TDT encodes the mRNA decapping enzyme. The phenotypic severity of *tdt* mutants, however, depends on the plant's genetic background; mutants in Col-0 produce no leaves and have severe vascular defects, whereas following introgression into Ler, the *tdt* (Ler) mutants are partially suppressed, and produce modestly-sized leaves and have fewer vascular defects. Our data indicate that an unlinked locus in Ler suppresses the *tdt* phenotype, and we have named this suppressor URSULA (URS). The goal of this study is to understand the molecular basis for URS suppression. Decapping initiates the 5' to 3' RNA decay pathway, and occurs in cytoplasmic particles called P-bodies. An alternative bulk mRNA decay pathway initiates at the mRNA's 3' end, proceeds in a 3'-to-5' direction, and is carried out by the exosome. Models for phenotypic suppression of the *tdt* decapping mutant include: (1) URS could enhance mRNA decay from the 3' end or (2) URS could partially restore either decapping or P-body formation. To distinguish between these, and alternative models for URS function, we are using three approaches. First, we are working to characterize URS molecularly. We are using map-based strategies, and have defined an interval at the top of chromosome 3 that contains the URS gene. Second, we are comparing the levels of accumulated mRNAs in *tdt* mutants in Col-0 and Ler backgrounds and are comparing the mRNA decay kinetics for specific mRNAs in wild type (Ler and Col-0) and *tdt* mutants (Col-0 and Ler backgrounds). Finally, we are using GFP fusion proteins to assess whether P-bodies can form in partially suppressed *tdt* mutants.

# Storytelling Unraveled: An Analysis of Collected Narratives

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The art of storytelling offers significant contributions to exploration and analysis of world cultures. In my research, oral narratives were collected from long-term residents of Holladay city under the direction of Professor Ann Engar. These narratives were collected to compile a more complete historical record of Holladay and the city's development from a rural farmland to a commercial suburbia. The research significantly contributes invaluable data to shaping Holladay's past; and, by incorporating the same techniques used for analyzing ancient oral stories, I also tracked the transition of storytelling methods and cultural values.

My strategy began by analyzing *The Odyssey* by Homer. As an epic oral masterpiece, *The Odyssey* gave framework to the project and allowed for a firm basis on which the collected Holladay narratives could be compared to and analyzed. For the research I focused on themes, customs, heroes, and language. The results were surprising. While the function of storytelling had changed in certain aspects, many of the elements found in Homer's story transcended historical boundaries to dictate the Holladay narratives. While the modern stories did not need to convey important survival tactics or cultural origins as a pre-literate society required, other function of *The Odyssey* appeared in the narratives—residents recited their stories for the retention of community details and for the remembrance of their lives. Interestingly, many of the values and other cultural aspects in *Odysseus'* story also appear in the Holladay stories.

Just as modern narratives are important to shaping the character of a community, the analysis of ancient literature is important in framing the analysis of modern storytelling. In conjunction with modern oral storytelling, ancient oral literature allows for analysis and evaluation of the cultural evolution of storytelling techniques and values.

# Unquiet Crisis: The Fletcher Years at the University of Utah (1964-1971)

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James Chipman Fletcher assumed the presidency of the University of Utah in 1964. During Fletcher's seven year presidency, the University of Utah received its first baby-boomer students while the campus assumed the shape and form it has today. New avenues in research were pursued during the Fletcher Administration which included artificial organs, computer science, and participation in the founding of the ARPANET, the forerunner of today's Internet. Many familiar campus buildings were completed during this time. The Fletcher Administration was not a smooth ride however. As an administrator, his experience was limited to the business realm and some faculty members resented this bottom-line approach. In addition, the instability of the rapidly changing campus combined with the war in Vietnam led to a period of student unrest at the University of Utah. In 1970 after the Kent State killings, there were two weeks of unrest that have not yet been wholly or accurately recounted. Drawing on many original documents from the University Archives plus Special Collections at the Marriott Library and The Daily Utah Chronicle, I am presenting the first detailed overview of the University during the Fletcher Administration. My goal is to show how the Fletcher years are a bridge between the small and quiet campus of yesterday to the research university of today.



# Activation of Fluorine-Carbon Bonds Through Manganese (I) Coordination

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Fluorine, because of its high electronegativity and small size, forms the strongest single bond with carbon. These properties give fluorocarbons their unreactive reputation and bring about such conventional products as Teflon. However, these stable and unreactive bonds also have negative consequences. Chlorofluorocarbons (CFC's) and perfluorocarbons (PFC's) have an undesirable impact on the earth's atmosphere concerning ozone depletion and greenhouse effects, and some PFC's remain for thousands of years (tetrafluoromethane has an estimated lifetime of 10,000 years).

Despite the strength of carbon-fluorine bonds, R. P. Hughes and coworkers have shown that bond cleavage is possible (and under surprisingly mild conditions) through acidic hydrolysis using various Rhodium (III) and Iridium (III) complexes. This evidence provides a basis to examine similar transformations using a pentacarbonyl manganese (I) template. Former UROP student Paul Oblad, with the help of Chemistry Departmental Staff Crystallographer Dr. Atta M. Arif, has already characterized several of these compounds of the form  $\text{RMn}(\text{CO})_5$ , including  $\text{R} = \text{CF}_3, \text{CF}_2\text{H}, \text{CFH}_2, \text{CF}_3\text{CF}_2, \text{CF}_3\text{CO},$  and  $\text{CF}_3\text{CH}_2$ . Interestingly, the recurring motif in these species involves the lengthening (and thus weakening) of the carbon-fluorine bonds alpha to the metal center by approximately 5%.

This project is centered around synthesis and characterization of similar perfluorinated derivatives of  $\text{RMn}(\text{CO})_5$ . One compound of interest is a perfluoroisopropyl derivative. Unfortunately, due to difficulties encountered in the synthesis of the perfluorinated isobutyric acid chloride precursor— $(\text{CF}_3)_2\text{CFCOCl}$ —the complete synthesis of this is currently unattainable. However, a second compound of the structure  $\text{C}_6\text{F}_5\text{CF}_2\text{Mn}(\text{CO})_5$  has been synthesized through the decarbonylation of  $\text{C}_6\text{F}_5\text{CF}_2(\text{CO})\text{Mn}(\text{CO})_5$  and has been characterized by IR, x-ray crystallography, and  $^{19}\text{F}$ -NMR. Similar bond-lengthening of the alpha-carbon-fluorine bonds has been observed in the crystal structure and, as a result, it is suspected that these bonds will hydrolyze under mild acidic conditions to form  $\text{C}_6\text{F}_5(\text{CO})\text{Mn}(\text{CO})_5$ .

The other aspect of this project is the theoretical investigation of compounds of the form  $\text{RMn}(\text{CO})_5$ , where  $\text{R} = \text{CF}_3, \text{CF}_2\text{CF}_3, \text{CF}(\text{CF}_3)_2,$  and  $\text{C}(\text{CF}_3)_3$ . Calculations have been performed (with the help of Dr. Anita Orendt and the center for high performance computing) on these species utilizing density functional theory, and these calculations support previous hypotheses of the role of the metal center, particularly providing evidence for the existence of a non-bonding resonance form of these species.



# Comparison of the Foreign Body Response and Tissue Diffusivity Induced by Multiple Cell Transplantation in the Brain

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Transplanted cells have been investigated as sources for sustained therapeutic molecule delivery and as substrates to support tissue regeneration in the central nervous system (CNS). In previous studies we showed that transplanted cells released soluble factors that exacerbate the tissue response to implantation, which was accompanied by inhibited diffusion through the surrounding scar tissue at 4 weeks. To determine if these effects persist at longer, more clinically relevant, time points, we examined the influence of constitutively released factors from transplanted adult rat astrocytes, meningeal fibroblasts, and olfactory ensheathing cells (OECs) on the brain tissue reaction and tissue diffusivity at 12 weeks. We found that OEC transplantation reduced glial cell encapsulation compared to transplanted astrocytes or meningeal fibroblasts. Interestingly, the diffusivity of a 70kDa dextran probe through the surrounding scar tissue in the acellular control group was not different when compared to any of the transplanted cell types, and was lower than previously observed at 4 weeks. Our study suggests the use of transplanted cells as a source of sustained molecule delivery may be limited by the long-term brain tissue reaction to the implant.

# Studies on the Regioselective Metallation of Imidazo [1,2A] Pyridine

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Imidazopyridine is an important backbone molecule for many pharmaceuticals. In the process of screening small molecules for pharmaceutical applications, slight variations of functionality on a skeleton of the molecule are common. It would therefore be useful to design a simple method for producing a large number of derivatives using the same starting compound.

There are two sites that are preferential for substitution on imidazopyridine; the three and five positions. This is due to resonance stabilization of the carbanion at those positions. It would therefore be of academic and practical interest to determine a method to regioselectively direct electrophilic addition. While previous examples in literature had indicated that 3-selective lithiation and substitution of imidazopyridine was possible, replication of the experiment resulted in a mixture of three and five substituted compounds.

During the course of this research, imidazopyridine was first reacted with an organolithium reagent, followed by a deuterating agent, and then analyzed using deuterium NMR to determine the selectivity of the substitution location. Pure imidazopyridine was screened with variations in reaction conditions such as time, temperature, relative concentration of imidazopyridine to deuterating reagent, solvent, and quenching reagent.

Upon observing no significant selectivity for either position, halogenated imidazopyridine was then substituted for imidazopyridine. Screening of reaction conditions saw greater preference for substitution at the three and five positions. Lithiation of the substituted imidazopyridine was subsequently abandoned in favor of forming novel Grignard reagents. The Grignard imidazopyridine reacted with the deuterating agent to yield selective products at both the three and five positions.

Additional study is planned for the reaction of the Grignard imidazopyridine with more complex electrophiles.

# Paddle Politics: Fraternities, Hazing, and Masculinity

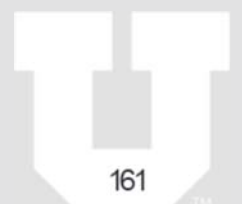
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Infamous yet secret, the hazing of Greek fraternity members is both brutish and sophisticated. The timing and tactics each house use are varied, but all effectively establish a power dynamic in which pledges are essentially slaves for active members. Media reports and popular discussion yield an overwhelmingly negative impression of such hazing, but those who complete fraternity hazing processes proceed with a positive outlook on the experience. While this opinion may seem contradictory, a historical examination of Victorian America reveals that secret fraternal rituals importantly provided a rite of passage for boys into manhood when no established path to adulthood existed. The symbolic death and rebirth present in every fraternal organization's initiation ritual represents the death of a naïve and incapable boy and birth of a capable and respectable man who had sufficiently proved his masculine worthiness by completing the physically, emotionally, and psychologically taxing ritual. Contemporary fraternities and their accompanying hazing attract men for the same reason and through similar operations. Using an interview based detailed account of one fraternity's pledge process, my analysis suggests that young men seek affirmations of their masculinity in a modern society where masculinity is in flux. By completing an arduous and demeaning pledgship, young men prove their dedication to the organization and masculinity is sufficient for membership, but they also crack their Western masculine shell to develop bonds of brotherhood. While the tasks performed may seem dangerous or demeaning, the result of collaborative and supportive brotherhood in the face of competitive Western masculinity indicates hazing may not be as overwhelmingly negative as modern convention holds.

# No More Excuses: Making the Case for Equal Employment Laws in Utah

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Since 1974, members of Congress have been trying to pass legislation that would afford employment non-discrimination protections for gay, lesbian, bisexual, transgender and transsexual employees. This year, the Employment Non-Discrimination Act (ENDA) came closer to becoming law than ever before. However, ENDA's progress has not been achieved easily. Along the way, opposition from conservative individuals, legislators and groups, as well as factions within the queer community, have divided and stalled the progress of federal ENDA legislation. Until all-inclusive ENDA legislation is passed to protect all members of the queer community at the local, state and federal levels, these able and ready members of the workforce will continue to suffer from injurious employment discrimination, at detriment to them as well as state and federal employment markets. For many reasons, now is the time to pass ENDA laws to afford equal employment protections to all workers in Utah.





# Structure and Composition of Cat Sciatic Nerve

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As the field of neuroprosthetic implantation into peripheral nerves advances, an understanding of the normal peripheral nerve microanatomy is important for diagnosis of peripheral nerve injury and evaluating the effects of device implantation. For peripheral nerve experiments, cats are commonly used because of their comparatively large size; however, research literature regarding nerve size, organization, and composition of fascicles on a cellular level in cats is incomplete. To gain knowledge about the structure and composition of the sciatic nerve, normal sciatic nerves were harvested from three cats following transcatheter perfusion with 4% paraformaldehyde in phosphate buffered saline. The left and right sciatic nerves were characterized morphometrically at the macroscopic and light microscopic levels. For macroscopic measurement, digital calipers were used by two independent investigators to measure the major and minor axis at the bifurcation of the tibial and the peroneal branches and at 1 cm intervals both distal and proximal to the bifurcation for distances up to 4 cm. The mean  $\pm$  SEM of nerve areas, assuming an elliptical geometry, for the trunk and the branches were calculated. Nerves were then examined using light level histology coupled with morphometric analysis. Morphometric parameters, including fiber diameter and g-ratio (radius of axon over total fiber radius), were obtained at the light microscopy level with a total magnification of 1000x using ImagePro Plus. Histograms of fiber diameters showed a bimodal distribution with peaks centered at 6-8 and 16-17 $\mu$ m while histograms of the g-ratio were normally distributed with a peak around 0.6. The average values for fascicle areas were  $3.66 \pm 0.04$  mm<sup>2</sup> and  $3.84 \pm 0.36$  mm<sup>2</sup> and for fiber counts were  $18910 \pm 939$  and  $20908 \pm 2073$  for the left and right side respectively. The average percent fascicle area occupied by fibers was  $54 \pm 7\%$  and  $55 \pm 4\%$  for the left and right side respectively. This study provides information regarding the general structure and composition of the normal cat sciatic nerve that can be used as a comparison for peripheral nerve injury animal models.

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# Economic Development and Gender Inequality in Southeast Asia

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The three Southeast Asian nations of Malaysia, Indonesia, Singapore and the nation of Hong Kong have strong economic and social histories. This paper will follow the economic history of these four countries beginning within the late 1980s, through the Asian Financial Crisis of 1997, and into their current economic standing. Both Singapore and Hong Kong are two of the "Four Asian Tigers" and are considered to be fully developed economies. Hong Kong is considered to be the most economically free in the world, while Singapore is a highly successful capitalist mixed economy with one of the highest GDP rankings in the world. Malaysia and Indonesia, while not at the status of Singapore and Hong Kong, are economically advancing and are considered to be secondary emerging nations. As of 2007 Malaysia had the 34th largest economy in the world and is slowly strengthening largely due to its membership in the ASEAN Free Trade Area. Although Indonesia was the most negatively affected of these nations by the Asian Financial Crisis of 1997, it too is looking toward the future with high hopes of economic growth. Its current economic standing is on the rise and as of 2007 it had the 15th largest economy in the world.

This paper will not only analyze the economic growth of these four nations, but more importantly it will analyze the effects that this growth has had upon the social dynamics of each country. More specifically, it will analyze the gender inequality within each nation and how the economic advancement of these nations in turn has affected the status of women. This will be done through the statistical analysis of opportunities afforded to women of these nations, within areas such as employment and education, by following both the employment rates as well as the educational enrollment rates of both men and women within these nations. Through the analysis of these aspects of Malaysia, Indonesia, Singapore, and Hong Kong this thesis will portray the importance of gender equality within each nation for their ultimate economic advancement. Specifically this paper will analyze the success of Hong Kong and Singapore as fully developed nations and will discuss the difference in women's rights compared to the rights of women within Indonesia and Malaysia. It will analyze the difference in rights as well as the difference in economic growth between these nations in order to observe a coinciding trend between the correlation of the success of Hong Kong and Singapore with the focus on women's rights within these nations. This will show that these nations, and those who emulate them such as Malaysia and Indonesia, will be more likely to achieve economic growth and success if there is an emphasis on the importance of gender equality within national policy.



# An Analysis of the Chinese Leasing Market

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We examine public financial data from over 1,000 Chinese companies between 1987 and 2005. Our analysis reveals that for the period between 1993 and 2003 the use of capitalized lease obligation peaked in 1998. Similarly total liabilities decreased while long term debt and capital expenditures increased. This suggests that Chinese companies during this period relied more on long term debt and equity to finance their investments. There are several possible explanations for the up-and-down trend in the use of leases, but the trend suggests that the Chinese leasing market is emerging and unstable; however recent legislation in 2007 should help to stabilize the leasing market's trends and performance in the future. Subsequently an important source of growth in the Chinese leasing market will be in the small to mid-size firms once the country achieves an environment that decreases the risk in leasing to this segment of the market.