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PROCEEDINGS

Student Research
and
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April 14, 2012

Kettler Hall 241,242,243,244

Office of Research, Engagement, and Sponsored Programs
Indiana University-Purdue University Fort Wayne
April 14, 2012

Welcome to the annual IPFW Student Research and Creative Endeavor Symposium. It is with great pride that the Office of Research, Engagement, and Sponsored Programs sponsors this Symposium. Active learning through research is an extremely valuable part of the student experience at IPFW.

Many of the projects presented today were supported by summer research awards to students. I congratulate all participants for their dedication to the expansion of knowledge and their commitment to experiential learning.

Finally, I offer a special thank you to the numerous faculty sponsors who have guided the research being presented today. Because they understand that learning is best achieved through active participation in research in the discipline, the experiences they provide are essential to the core mission of the University.

Best wishes,

J. Albayyari
Associate Vice Chancellor for Research
Does Product Differentiation Have an Impact on Rate of Returns on Equity?

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Microeconomic theory predicts firms that produce differentiated products generate higher rate of returns to equity for their constituents. In this paper we scrutinize this hypothesis using a multiple regression model with returns to equity as the dependent variable against selected intervening explanatory variables. Our model is an extension of the model suggested by J. A. Dalton & D. W. Penn (1976) updated with more recent data. Noteworthy among the explanatory variables are industry growth, absolute firm size, market share, and sellers’ market concentration ratios. We used a pooled data set with thirty firms producing various electronic products from 2005 to 2009. The literature suggests that companies with high product differentiation and high seller concentration earn higher profit, than companies with low concentration and low product differentiation. In addition, the effect of share on profitability is expected to be stronger in industries experiencing a moderate rate of growth.

The results from our regression suggest that product differentiation, as was expected, indeed had a significant impact on the rate of returns on equity, while concentration ratio did not. We found that on average firms with higher product differentiation earned 1.75 times higher returns to equity than firms with lower product differentiation in our sample. We suspect that concentration ratio was insignificant partially because among these firms changes in the ratio was averagely concentrated and lacked significant variability.

Finally we scrutinized the robustness of the estimated coefficient by testing for multicollinearity and Heteroscedasticity. Since we used the industry growth rate and market share variables concurrently, we expected a collinearity problem. The model’s Variable Inflation Factor (VIF) was low and did not indicate presence of sever multicollinearity problem. Also, since data from firms of different size was used in our model, we expected to experience heteroscedasticity. However, the results of Park Test did suggest absence of heteroscedasticity in our model.
The Use of Spanish Preterite and Imperfect Tenses among IPFW Students

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Dr. Jens Clegg
International Languages and Culture Studies
Indiana University Purdue University Fort Wayne

In the Spanish language, there are two ways of speaking in the past tense: preterite and imperfect. For Spanish speakers, the two tenses are so distinct that the tense used changes the meaning of the sentence. Because there is only one past tense used in English, the use of Spanish preterite and imperfect tenses is difficult for English-speaking students to learn. Spanish teachers have tried many different ways of presenting these tenses to their students and try to focus on specific uses of the tenses that continue to present difficulties for their students. In order to evaluate the effectiveness of the teaching methods on the IPFW campus, third and fourth year Spanish students were interviewed, and their understanding of the preterite and imperfect tenses was analyzed. Questions were compiled which tested the students’ knowledge of the different uses of both tenses. Student researchers conducted the interviews with both female and male Spanish students, as well as native speakers. The ability of the students to choose the correct tense in conversation was analyzed and compared to that of the native speakers. The students’ responses were also categorized according to the specific uses of both tenses to determine weaknesses in understanding that need to be addressed in the introductory classes on campus. Preliminary data show that IPFW Spanish students have 68% accuracy when using preterite or imperfect verbs in conversation. The results suggest that this area of Spanish grammar may need a larger emphasis in introductory and upper level classes.
A Software-Define Radio Testbed for Research in Dynamic Spectrum Access

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With the rapidly-increasing amount of wireless devices, technologies and services appearing on the market today, there is an increasingly large demand on the wireless spectrum. The present model for spectrum allocation is such that fixed bands of frequency are assigned for specific functions. This method of allocation prevents unlicensed users from interfering with a licensed user’s spectrum and subsequently their communication. The method does a good job of protecting the licensed users in their frequency bands, but it can lead to inefficient usage of the spectrum and the waste of potential bandwidth for other users. Dynamic spectrum access (DSA) shows promise to increase spectral efficiency. DSA aims at dynamically sharing spectrum that is licensed to primary users (PUs) with non-licensed secondary users (SUs). In order to effectively share spectrum the SUs must sense the spectrum to avoid interference to the PUs.

This work describes a software and hardware test bed for research in DSA with a focus in spectrum probing methods. Spectrum probing methodology is an often overlooked component of spectrum sensing research. This work provides theoretical concept, simulation results and experimental results comparing different spectrum probing methods for independent SUs and for a cooperative network of SUs.

This research aims at providing new alternatives to traditional spectrum probing techniques to provide for more flexibility in DSA-enabled radio designs. Experimental test results are presented to support these alternative techniques. The development of the testbed in this research has provided the IPFW Wireless Technology Center with a software defined radio testbed enabling future research opportunities.
A brief survey of the interaction between predator and prey (*Agaronia propatula* and *Olivella semistriata*, respectively) was conducted at Playa Grande in Costa Rica during the summer of 2010. Experiments with different stimuli were performed to determine the mechanism that causes the prey species to display an attack response. It was discovered that *A. propatula* largely depends on receptors located in the propodial region of its metapodium to sense movement. The predator also can ‘smell’ its prey out along the beach using separate chemoreceptors in the same area of the metapodium.
Standard and Poor’s 500 vs. the Economy: 
Is there a correlation between the two and how does the stock market affect the economy in the short-term?

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Indiana University Purdue University Fort Wayne

The stock market in the United States has an immediate effect on people’s lives and can change from day to day. Though, with the Standard and Poor’s 500 is comprised of 500 publically traded companies and provides a collection of these firms and their performance since the formation of the S&P 500 in 1950. This paper analyzes the data from the performance of the S&P 500 and what has resulted in the United States economy after any significant change in the stock market. In addition, the analysis investigates the time that it takes for the S&P 500 to have an effect on the United States economy. The United States economy is analyzed by looking at the Consumer Price Index, Unemployment rate, and the Gross Domestic Product (GDP). This reviews the changes over the past 55 years and comparing it to the stock market.
Burmese parents’ experiences and communication with teachers

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Burmese community is a new addition to Fort Wayne’s ever diverse population. Fort Wayne is estimated to host .... Burmese refugees that settled after year..., 10 years after the first Coup d’état in Burma (Myanmar, in military definition). Since the population carries unique characteristics, the children as well as their refugee parents experience American educational practices for the first time in their lives. Early schooling experiences for Burmese children and their parents often consist of elementary schools in Burma and la the informal schooling by the refugee camp workers and volunteers in Thailand.

This study is a part of larger study that explores educational experiences of Burmese parents with schooling in Fort Wayne. In this presentation, I will focus on the parents’ communication and experiences with classroom teachers. 10 parents were interviewed and issues that come up as patterns in the communication between classroom teachers and Burmese parents were identified. The results indicate that

1. Out of 10 parents interviewed, none of the parents had a teacher visiting their homes.

2. All of the parents expressed a great desire to help teachers get to know themselves, their family and their culture.

3. The biggest obstacles for stronger communication....
Insight Into the Encapsidation Process of Varicella-Zoster Virus

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Dr. Robert Visalli  
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Indiana University Purdue University Fort Wayne

The Varicella-zoster virus (VZV) is a human herpesvirus which causes chickenpox and may reactivate within dorsal root ganglia leading to herpes zoster or shingles. Post herpetic neuralgia, a long term, painfully debilitating disease, may coincide with reactivation. Various drugs, mainly nucleoside analogs, are used for the treatment of both disease states. These drugs are moderately effective at best and resistant viral strains may develop in immunocompromised hosts.

Our laboratory is interested in the machinery involved in packaging genomic DNA into preformed viral capsids. Proteins involved in the VZV encapsidation process are promising novel targets for new drugs. Analogous to bateriophages, concatemeric DNA must be “guided” into the capsid through a series of steps involving a capsid portal structure, proteins that recognize the ends of viral DNA, and an endonuclease plus a DNA translocase. The current studies are focused on defining the enzymatic properties of the VZV terminase protein components whose HSV and HCMV homologs were shown to exhibit ATPase and endonuclease activity.

The C-terminal portion of pORF45/42 was synthesized as a GST fusion protein and purified from E. coli via glutathione bead affinity chromatography. C-terminal ORF42 GST fusion protein and GST control protein were tested in an endonuclease assay by incubation with supercoiled plasmid DNA and analysis via agarose gel electrophoresis. Results showed that the target plasmid DNA was degraded completely with both samples. A contaminating E. coli nuclease was suspected. The purification process must be optimized before further work can be done using fusion proteins. Current studies are underway to increase the concentration of purified protein, and thus lowering the total protein used in the assay. This may dilute the contaminating nuclease. Alternatively, the terminase genes have been cloned into plasmids for use in the PURExpress cell-free transcription/translation system. The PURExpress platform preserves the integrity of DNA and RNA templates/complexes in a nuclease-free and protease-free environment. Proteins derived from this strategy are being tested in both ATPase and endonuclease assays to define the enzymatic properties of the VZV terminase subunits.
Teaching Elementary Student with Specific Learning Disabilities to Improve Reading Abilities: Adapting Procedures and Strategies from Reading Recovery

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The purpose of this special project was to create a handbook. This handbook was created based on the research and a needs assessment survey which interviewed six participants with four questions. The results revealed how Reading Recovery trained teachers used their training with their general education classrooms. Reading Recovery is an intense one-on-one program for the lowest performing first graders. The teachers took their knowledge and training about how a student learns to read and applied it to their whole or small group instruction. A literature review was also conducted to research the available information on Reading Recovery and how to combine its proven techniques with students with specific learning disabilities. The findings of the needs assessment and research were used to help create a handbook. This handbook combines Reading Recovery types of strategies with students with specific learning disabilities in reading. It could be used by special needs teachers in a resource classroom to help improve their students’ abilities in reading.

There were several steps involved in the development of this special project including: IRB approval that was requested and received, a literature review was completed, a needs assessment survey was developed and reviewed and then a handbook was created based on the results. In reviewing the available information, two commercially available handbooks were reviewed to examine how they try to address the need for these strategies to be used with students with specific learning disabilities in reading. The entire special project was created to show how Reading Recovery types of strategies could be adapted and used in the resource room by special needs teachers when teaching reading to their students with specific learning disability in reading.
Costs and Benefits of Education
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The cost of education is an ever growing subject these days. This paper looks at the cost, quality, and benefits of college education. First, the paper looks at past data from 1987 to 1996 and investigates how the cost of attending college increased. Then, the paper looks at the cost of attending Indiana University Purdue University Fort Wayne during the past six years I was in college. Specifically, the paper compares the actual cost of tuition over the years for a full time student attending IPFW under the assumption that the student took 12 credit hours of coursework per semester. The analysis is very interesting because the tuition kept increasing every year, while there was not a proportional increase in quality of education.

Then, the paper looks at the quality of education. This part of the paper heavily relies on the study conducted at the Clemson University in the Department of Economics. The data is detailed and has information on students by race, gender, and state residency. The data also allows us to compare quality of college education in different states. The last part of the paper evaluates the benefits of attending college. Specifically, it looks at how education can help one to get a better job and what the employers are looking for when someone attends college.
Analysis of α-methylbenzyl thiourea inhibitors that target the putative VZV portal protein, pORF54

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Indiana UniversityPurdue University Fort Wayne

Varicella-zoster virus (VZV) is the human herpesvirus that causes chickenpox and may reactivate within dorsal root ganglia leading to herpes zoster (shingles). Postherpetic neuralgia, a long-term, painfully debilitating disease, may result from reactivation. Currently, clinical treatment options for herpesvirus infections are limited to nucleoside analog drugs, like acyclovir, that act by interfering with viral DNA replication. These drugs are moderately effective at best and resistant viral strains may develop in immunocompromised hosts. Proteins involved in the VZV encapsidation process are promising novel targets for new drugs. Our laboratory is interested in the machinery involved in packaging genomic DNA into preformed viral capsids. Analogous to the DNA packaging process in bacteriophages, concatemeric viral DNA must be “guided” into the capsid through a series of steps. After the terminase-DNA complex interfaces with the portal protein, the viral genome is translocated inside the procapsid in an ATP-dependent manner, where the terminase-portal complex acts as a molecular motor. In 2003, Visalli et al. reported a novel class of α-methylbenzyl thiourea compounds that inhibited VZV replication by acting specifically on the portal protein. Understanding interactions between the portal protein and thiourea compounds could result in development of novel treatments that target the encapsidation process. VZV mutants resistant to one of the thiourea compounds were used to identify portal as the potential target (Visalli et al., 2003). In the current study, IC50 data of additional compounds against both wild type and mutant strains suggest that compounds in the inhibitor series target the same protein, pORF54. Mutations identified from a panel of resistant isolates indicate a potential compound binding site that consists of multiple, non-linear regions of pORF54.
Prime Numbers: Familiar Only To Themselves

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Why do we need prime numbers? There are a few reasons in society that we would need prime numbers. The biggest reason I know of is that modern encryption relies on the unpredictability of prime numbers. Another idea is that prime numbers are important, and the name itself implies strong meaning, “prime”. Discovering the number lines' primal roots is a noble effort that mathematicians have been searching for for many generations, with the most effective method being the sieve of Eratosthenes, and the most effective big prime number generator being the Mersenne formula. My reason is a far simpler one, simply that that which is worth knowing is difficult to know.

My method began as a method to check for primes, and I decided to flip it to see how accurate it was at predicting primes. The formula always generated every prime up to a number, but it made some errors, saying that certain numbers appeared prime that were not prime. I eventually discovered a formula to represent every one of those errors, and now the set of all numbers in the first formula, that do not appear in the second, is the set of exactly all prime numbers.

It works like this: The sum of two numbers who share a factor will not be prime, so the sum of the product of prime numbers “1 to x” and a number that is either 1 or a “x+j”th prime, where j>0, will generate the previously mentioned “chart of numbers” as I call it. The set of all errors in the chart can be represented by the product of two known members of the chart when the product is greater than the product of prime numbers “1 to x”, but is less than the product of primes “1 to x+1”.
“Probing Reactivity Differences of an Unknown Fullerene with Lewis Acids”

Merkel, Madeline; Nott, Alyssa; Byers, Tim; Rose, Coralie
Dr. Steven Stevenson
Chemistry
Indiana University Purdue University Fort Wayne

Electric-arc vaporization of metals and graphite rods produce extracts containing complex soot mixtures of empty cage fullerenes, classical metallofullerenes, and metallic nitride fullerenes. These different fullerene structures demonstrate varying reactivities. Recent advances have led to the creation of a new molecule present in substantial quantities. Separation attempts have shown that the new “mystery” molecule exhibits reactivity greater than that of the least reactive fullerenes but less reactive than that of the most reactive fullerenes. A Lewis Acid study has been conducted to isolate this unknown molecule by selectively binding then subsequently releasing it from the Lewis acid complex. Lewis acids in this study include: MnCl₂, SnCl₄, CuCl₂, and ZnCl₂.
Preparation and Characterization of an ORF54 Transposon Library for Mutagenesis Studies of the Varicella-Zoster Virus Portal Protein

Pearl Pfiester and Vi Tran
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Biology/ Virology Research
Indiana University Purdue University Fort Wayne

Varicella zoster virus (VZV) is a double-stranded DNA virus that causes a self-limiting primary infection known as chickenpox and can manifest into a painful debilitating disease known as shingles in its latent form. Current therapies focus on inhibiting the DNA replication process, but novel studies have proposed shifting the focus onto the encapsidation process of VZV. The encapsidation process of VZV is based on indirect information from its homologous counterpart, Herpes Simplex 1 (HSV-1). Seven genes or ORFs are shown to be essential for HSV-1 DNA encapsidation. The portal protein homolog pORF54 could prove to be a novel target for antiviral therapy. Little is known about the role of specific functional regions within the portal polypeptides. The purpose of this study is to prepare and characterize an ORF54 transposon library for use in functional studies. It is expected that specific regions of pORF54 will be essential for DNA encapsidation. Briefly, ORF54 with flanking regions was isolated from the VZV genome of Ellen strain by PCR, inserted fragment into Invitrogen’s Zero Blunt TOPO PCR cloning vector, and transformed into E. coli. The Epicentre EZ-Tn5 In-Frame Linker Insertion Kit was used to prepare in frame insertions of the 19 amino acid transposon throughout the ORF54 plasmid for mutagenesis. Characterization of wild type ORF54 and mutated ORF54 will be accomplished by complementation with a null ORF54 bacterial artificial chromosome (BAC) via transfection (Roche’s FuGene6) into human retina cells (ARPE-19). The BAC ORF54 null virus was a kind gift from Dr. Hua Zhu’s (Rutgers University). The importance of ORF54 regions will be determined by complementing the ORF54 null virus with the mutated ORF54 gene. It is hypothesized that specific regions of pORF54 will be essential or detrimental since it is known that deletion of the HSV-1 portal protein counterpart is lethal. This will be the first comprehensive study to characterize potential important function regions within any large DNA virus portal protein.
“Release and Recovery of Trapped Fullerenes through the Use of Organic Acids”

Amanda Sauders  
Dr. Steven Stevenson  
Chemistry Department  
Indiana University-Purdue University Fort Wayne

Samples of the recently discovered metallic nitride fullerenes (MNFs) are in high demand for application development due to their interesting chemical and physical properties. The "Stir and Filter Approach" (SAFA) effectively purifies the most chemically inert MNF (e.g., Sc3N@Ih-C80) due to its lack of reactivity with diaminosilica, the separation medium. The problem, to date, with this separation method is an irreversible binding of empty-cage fullerenes (e.g., C60, C70, C84) and the more reactive MNFs (e.g., Sc3N@C68, Sc3N@C78, Sc3N@D5h-C80) to the silica. In lieu of discarding the spent SAFA silica to waste, we have instead developed a novel method for releasing the trapped fullerenes. The recovered fullerenes can then be re-used in subsequent purification methods for the isolation of more MNF samples. In this presentation, we will discuss specific procedures for removing the fullerenes from the spent silica which includes the utilization of an array of organic acids. We will also describe the selective release chemistry based on the effect of the different acids.
Por and para, a comparison of Spanish prepositions and their use by native Spanish speakers and IPFW Spanish students

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In order to effectively communicate with native speakers of Spanish, the English-speaker must develop a proper understanding of the Spanish prepositions “por” and “para.” In a basic sense, both words denote a variant of the English “for.” However, misapplication and misallocation of either word will result in a message’s lack of clarity and may confuse its recipient. Additionally, confusion of one for the other marks the speaker as apparently non-native.

To better understand IPFW student use or misuse of these prepositions, this study tested their use by 3rd and 4th year Spanish students at IPFW and compared these results to those of native speakers. The format for testing was an interview of 20 pre-determined questions between a research student and either another (non-researcher) student or a native speaker. Each researcher chose a male and female student to interview as well as a native speaker of Spanish.

The results were isolated, categorized and coded. Each incidence of an interviewee’s use of “por” or “para” was examined, determined to be either correct or incorrect and then coded based on its type of use. To determine both correctness and type of use, student researchers did individual and group research on each pronoun’s proper uses in Spanish grammar.

Data were analyzed, and it was determined that while native speakers almost always used por and para appropriately, their non-native counterparts made some predictable errors in misapplying the prepositions, to be discussed later.
Using Music Activities in Early Childhood Inclusive Settings to Improve Emergent Mathematics and Literacy Skills
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Previous studies concerning using music to enhance learning in mathematics and literacy were reviewed. Why and how teachers are or are not using music activities with their students, including students with disabilities was also investigated. Findings show that although music activities unquestionably can improve mathematics and literacy learning, many teachers are not utilizing music activities in their classrooms for this purpose. The reasons for teachers not using music activities include lack of time, pressure to follow predetermined curriculum, pressure to prepare students for standardized tests, lack of awareness of connections between music, literacy and mathematics, limited musical knowledge, or lack of comfort in using music activities with their students.

A needs assessment in the form of a teacher survey was given to 14 early childhood educators working with students with disabilities. The survey contained 13 questions that asked how teachers define using music in their classrooms, how teachers feel about using music with their students, and how they are currently using music to help develop skills in mathematics and literacy. The results from the needs assessment showed that although these teachers use music in a variety of ways in their classrooms, they are not specifically using music activities in their mathematics and literacy planning and teaching.

A handbook illustrating effective ways to use music activities as a strategy to teach literacy and mathematics skills was created for early childhood educators working with students with disabilities. Activities identified and described in detail were written explicitly to encourage early childhood teachers serving students with disabilities who do not feel comfortable using music in their classrooms, who do not view music as an important strategy for including all learners in active learning, and who feel they need to justify their use of music during mathematics and/or literacy lessons using suggested professional standards.
Fear of Losing One’s Self

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The theft of one’s identity can leave a path of destruction that is not only devastating to an individual’s sense of privacy, but also to one’s financial security. Many feel violated just as they would if their home had been burglarized after the discovery that someone has stolen their identity in order to commit illegal acts of theft. Identity theft can take on many different forms, but is generally classified in two categories: existing account fraud and new account fraud. Identity theft crimes are increasing from year to year even with public warnings. There are companies that offer the public guaranteed identity protection. Are these companies really selling protection or just false promises? As technology advances, is the private information of people’s lives ever really unattainable to those seeking the identity of others? In the United States, people use one number from birth to death that can identify them in any governmental database. A person’s social security number allows the government to keep track of certain data for criminal records, tax records, and even driving records. This is also the one item another person needs to take over some one else’s life. This paper will examine who the victims of identity theft normally are and why they are targeted, prevention methods: if the benefits outweigh the cost, and cost of victims and society.
Retarder; Secondary Braking system

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Dr. Ali Alavizadeh
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Retarder is an external brake frequently used in trucks. The purpose of the retarder is to assist in stopping the vehicle, controlling vehicle downhill speed on a steep grade, extending the life of the vehicle service brakes, and enhancing vehicle control. There are several retarder technologies currently available. Two major kinds are Hydraulic retarders and Electromagnetic retarders.

The hydraulic retarder:
Hydraulic retarders use the viscous drag forces between dynamic and static vanes in a fluid-filled chamber to achieve retardation. A simple retarder would use vanes attached to a transmission driveshaft between the clutch and road wheels. They can also be driven separately via gears off a driveshaft. The vanes would be enclosed in a static chamber with small clearances to the chamber's walls (which will also be vaned). When retardation is required, fluid (oil or water) is pumped into the chamber, and the viscous drag induced will slow down the vehicle. The working fluid will heat up, and will usually be circulated through a cooling system. The degree of retardation can be varied by adjusting the fill level of the chamber.

Electromagnetic retarders:
The electric retarder uses electromagnetic induction to provide retardation force. An electric retardation unit can be placed on an axle, transmission, or driveline and consists of a rotor attached to the axle, transmission, or driveline and a stator securely attached to the vehicle chassis. There are no contact surfaces between the rotor and stator, and no working fluid. When retardation is required, the electrical windings in the stator are powered up from the vehicle battery, producing magnetic fields alternating in polarity. This induces eddy currents in the rotor, which slows down the rotor, and hence the axle, transmission, or driveshaft, to which it is attached. The rotor is engineered to provide its own air-cooling, so no load is placed on the vehicle's cooling system, and the operation of the system is extremely quiet.
De-coating with High Speed Waterjets; key parameters and influence on substrate surface roughness.

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Paints are applied to surface to enhance corrosion resistance, improve appearance, or both. Often the coatings need to be removed either as part of the manufacturing operation or later in the life of the equipment to enable maintenance or repair. Waterjet stripping involves the use of water at pressure above 10,000 psi to mechanically remove coatings. High-pressure pumps force water through specially designed nozzles that direct the high-velocity stream to impinge upon the coated substrate. The kinetic energy of the waterjet physically erodes the coating to expose the underlying substrate surface. The effectiveness of waterjet stripping depends on a number of key parameters, including operating pressure, volumetric flow rate, nozzle diameter, stand-off distance, traverse rate and impact angle.

According to ISO 8502 (1995) “The performance of protective coatings of paint and related products applied to steel is significantly affected by the state of the steel surface immediately prior to painting”. One of the principal factors to influence this performance is the surface profile. Studies show that adhesion of a coating is improved by increasing the substrate surface roughness.

In this study, a series of tests were conducted for studying the effects of water pressure and stand-off distance on mass loss in paint stripping with the waterjet. Also the effect of paint stripping with the waterjet and gritblasting on the substrate surface roughness was investigated. Experiments on water pressure show that the mass loss will increase by increasing the water pressure. Also, it is shown that the mass loss will increase by increasing the stand-off distance until it reaches the optimal stand-off distance. Surface roughness measurements and three dimensional topography images show that waterjet does not decrease the roughness of substrate surface with compared to the decrease made in secondary gritblasting (overblasting).
Called to Witness: Ethnography of an Evangelical Christian Camp

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Evangelical Christian organizations have a vibrant presence in many American college campuses today. This paper provides an ethnographic–based study on a week-long training program organized by an evangelical campus ministry in a retreat camp. Building “witnessing communities” in college campuses is stated as the core goal of the program. Through participant observation, in-depth interviews, and analysis of printed material, I give an overview of the training program and discuss is meant to witness as a community. Given the diverse ethnic and denominational background of the students, I argue that having a shared vision of witnessing can help to ease some of the challenges brought by the multifaceted diversity. For instance, minor theological disagreements and the controversy of ethnic-specific ministry appear insignificant next to the “Great Commission” to spread the Gospel. Also, I examine the means used to motivate students to become better witnesses. The emphasis on informal, peer-to-peer influence manifests their conception of witnessing, which requires a Christian to build meaningful relationships with nonbelievers with the intention of demonstrating his/her faith, not merely the verbal act of evangelizing. The training camp can be characterized as a venue where consumers of religion are invited to deepen their commitment by becoming suppliers, yet the boundary between a religious consumer and a supplier is more subtle than it seems.
Incremental Update of Spatial Association Patterns

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As one of important spatial data mining tasks, spatial colocation pattern mining has been popularly studied in spatial data mining literature. We now explore the problem of computing colocation patterns on evolving spatial databases, like those in environmental monitoring, transportation or mobile application domains. The databases in such domains tend to be very dynamic, e.g., constantly updated with fresh data and removed data. Changes to the data can invalidate current colocation patterns or introduce new patterns. When large spatial database is updated, it is nontrivial to maintain colocation patterns current since spatial objects make neighbor relationships in continuous space. An algorithm for efficiently updating spatial colocation patterns has been developed. This work addresses the case that arises after a nontrivial number of new data points have been added to the spatial database. This work also addresses how this algorithm can be extended for the case that arises after a nontrivial number of new data points have been deleted from the spatial database. Our experimental results show that the proposed algorithm is effective in reducing the number of candidate event sets and efficient in the computation of updating colocation patterns.
“Extraction and Enrichment of a New Fullerene Molecule via Selective Fractionation of Soot Extracts”

Steven Zimmerman, Tim Byers
Dr. Steven Stevenson
Chemistry
Indiana University Purdue University Fort Wayne

Recently we have discovered a new fullerene molecule. Due to its extremely low yield (<0.05%) in the crude soot extract, isolation and characterization of this new structure has not yet been accomplished. Hence, the goal of this research is to develop new fractionation methods which would provide enriched samples (e.g., >10%) for subsequent separation science. In this presentation, we will discuss the utilization of dissolution kinetics and solubility differences between different types of fullerenes to improve the percent composition of our newly discovered molecule.