Apr 14th, 6:30 PM - 7:00 PM

Complete 2000 Program

TO RECOGNIZE THE RESEARCH PROJECTS
AND CREATIVE ENDEAVORS OF IWU STUDENTS

ELEVENTH ANNUAL

JOHN WESLEY POWELL • IWU

STUDENT RESEARCH CONFERENCE

April 14-15, 2000 • Center for Natural Sciences

http://www.iwu.edu/~jwprc/research.htm

Eleventh Annual

John Wesley Powell • IWU

Student Research Conference

Science Commons

Center for Natural Sciences

Friday, April 14, 2000

7:00 p.m. - 9:30 p.m.

Saturday, April 15, 2000

8:30 a.m. - 4:30 p.m.

Official Program

SCHEDULE OF EVENTS

Friday, April 14, 2000

5:30 p.m.	Phi Kappa Phi Banquet (by invitation)	
7:00 p.m.	Student Compositions	Evelyn Chapel
8:00 p.m.	Student Art Show and Reception	Merwin Gallery

Saturday, April 15, 2000

8:30 a.m.	Continental Breakfast and Poster Setup	Science Commons
9:00 a.m.	Keynote Address - Prof. Mara Prentiss	Anderson Auditorium
10:00 a.m.	Poster Session A	Science Commons
11:00 a.m.	Oral Presentations - Concurrent Sessions	
	Session 1	Anderson Auditorium
	Session 2	Beckman Auditorium
	Session 3	CNS Room E103
12:30 p.m.	Luncheon	Main Lounge
2:00 p.m.	Poster Session B	Science Commons
3:00 p.m.	Oral Presentations - Concurrent Sessions	
	Session 4	Anderson Auditorium
	Session 5	Beckman Auditorium
4:30 p.m.	Presentation of Certificates and Phi Kappa Phi Awards	Anderson Auditorium

KEYNOTE SPEAKER

"MANIPULATING MATTER WITH FIELDS"

Dr. Mara Prentiss, Department of Physics, Harvard University

9:00 a.m. Anderson Auditorium (C101)

Mara Prentiss was born in Cleveland, Ohio on February 9, 1959. She attended Wellesley College for three years, receiving a BA in 1980, with triple major in Physics, Math, and Philosophy. She graduated with high honors, as well as honors in Physics and Math and was selected to Sigma Xi and Phi Beta Kappa and won the Marjorie Wallace Simpson prize in Mathematics. She did her graduate work at MIT under Professor S. Ezekiel, working on a variety of theoretical and experimental projects in optics and atomic physics. Her thesis project was the first observation of channeling in optical standing waves, a process that has lead to many important developments including optical crystals and atom lithography. She was elected to Sigma Xi at MIT and graduated in 1986, when she became a Member of Technical Staff at Bell Laboratories.

While at Bell, she directed the experiment that demonstrated the first Magneto Optical Trap. She also demonstrated the first atom trapping from an uncooled gas, developed a new method of slowing and cooling atomic beams, made the first observation of the force due to Doppleron resonances, and made the first observation of three dimensional confinement in optical standing waves. As she was leaving Bell she realized that standing wave fields could be used to focus atoms into parallel arrays of narrow lines. This idea created the new field of atom lithography. She continued working on the experimental realization of this idea after moving to Harvard in 1991. The successful experimental result was first submitted at the end of 1991.

Since she has been at Harvard she has continued to expand the field of atom lithography. This effort has been greatly aided by the creation of the US Consortium for Light Force Dynamics, a collaboration which has included groups from Harvard, NIST Gaithersburg, the University of Colorado, Colorado State University, and the Institute for Theoretical Atomic and Molecular Physics, and AT&T Bell Laboratories. She directs the collaboration, which has demonstrated that atomic lithography can deposit parallel arrays of lines narrower than 50 nm. Direct Deposition atom lithography has been done in Na, Al, and Cr. In addition, the collaboration has recently developed a resist for neutral atoms based on Self-Assembled monolayers, which has allowed atom lithography to be extended to metastable noble gases, as well as alkali's and has permitted patterns to be transferred into Si. the collaboration has also done pioneering theoretical work on the cooling and trapping of neutral atoms. The collaboration is fabricating novel optical devices including adaptive polymer optics and single mode polymer waveguides, as well using light pressure force to make self-assembling optical devices. One such technique has already received a patent. In addition, she has received three teaching prizes while at Harvard, and she supervised the thesis research for which Arthur Chu was awarded the Apker Prize by the American Physical Society. Finally, she serves on the following committees: JASON, Mentor for the Defense Science Study Group and the Committee on Atomic, Molecular, and Optical Physics of APS.

STUDENT PARTICIPANTS

RECITAL OF STUDENT COMPOSITIONS
FRIDAY, APRIL 14, 7-8:00 P.M., EVELYN CHAPEL

"For Eric" by Sean Parsons

Dr. Carren Moham approached me late in the first semester with a project to compose a piece of music to be written for and dedicated to her close friend and accompanist, Eric Bowman. She presented me with the text, which had been written by another close friend of hers and of Eric's, Sean Walker. After some time of "living" with the text, I began to formulate ideas of how to set the text to music, eventually arriving with the piece that became "For Eric". At Dr. Moham's request, the music was to be set so that it fell into a voice range for herself, a mezzo soprano, and Eric, a tenor. It is to be performed by soprano with piano accompaniment, with both being equally important to the other in a musical sense.

"Prism" by Steve Winfield

This piece was for me an opportunity to express musically certain visual images. The title, which came about after the music was completed, was chosen because it fit those images most closely. The composition of this music presented a chance to explore some of the unique possibilities of writing for the string quartet, and in creating the textures and tone colors of this piece I chose to utilize several specific effects that can be produced on the instruments used. The music does not contain any real melody, but is instead made up of contrasting tone colors and a specific tonal language through which a continuous rhythmic motion is developed. This rhythmic motion stops only briefly between the first and second sections, of which the piece has three. The first introduces the colors, tonalities, and rhythmic drive that are found throughout the piece. The second continues the development of the rhythmic motion in a contrasting legato style. The final section continues the development of the musical material and brings the music to its climax, after which there is a short coda.

"Catharsis" by Phaidon Tsourkas

"Catharsis" is about creating rules and breaking them. The piece consists of three waves of sound. The first wave establishes a tonal center (C minor) and a pulse at the beginning, but it begins to call its own stability into question as the sound develops. The two following waves continue this trend until it is no longer possible for the established rules (as applied by the first wave) of rhythm and harmony to apply. The piece mirrors the scientific quest for knowledge since it is only by expanding our understanding beyond the rules that we've established that we can reach new levels of understanding.

EXHIBITION HONORS
SCHOOL OF ART
FRIDAY, APRIL 14, 8-9:30 P.M., MERWIN GALLERY

Students Presenters:

Dan Giese

Anna Reed

Eric Snowden

Sarah Studnicki

Refreshments will be served

ORAL PRESENTATIONS - SESSION 1
11:00 - 12:30
ANDERSON AUDITORIUM (C101)
CHAIR: CHRISTINE PACYK

1.1	Matthew Boyd
1.2	Elizabeth Dierbeck
1.3	Kristina Harlan
1.4	Rae Marotta
1.5	Anita Saha

ORAL PRESENTATIONS - SESSION 2
11:00 - 12:30
BECKMAN AUDITORIUM (C102)
CHAIR: JOHN (WES) DYKE IV

2.1	Joy-Denise Moore
2.2	Jason Lewis
2.3	Ginte Sabaliauskaite
2.4	Alva Winfrey

ORAL PRESENTATIONS - SESSION 3
11:00 - 12:30
CENTER FOR NATURAL SCIENCES (E103)
CHAIR: STEVEN TYMONKO

3.1	Anders Floor
3.2	Robert Grabowski
3.3	Alexandra Latham
3.4	Susanna Widicus
3.5	Mark Wieland

ORAL PRESENTATIONS - SESSION 4
3:00 - 4:30
ANDERSON AUDITORIUM (C101)
CHAIR: RAE MAROTTA

4.1	Christine Pacyk
4.2	Kyle Painter
4.3	Bethany VonBehren
4.4	Kathryn Weber

ORAL PRESENTATIONS - SESSION 5
3:00 - 4:30
BECKMAN AUDITORIUM (C102)
CHAIR: ESTEBAN LIZANO

5.1	Elizabeth Jansen
5.2	Nathan Taulbee
5.3	Kathryn Vojack
5.4	Alison Whittington

Note: Student's name is underlined, faculty advisor designated with *

Presentations are 15-20 minutes in length. If time permits, there will be a question-and-answer period for all presenters following the final presentation.

Oral Presentation 1.1

VSE LUCHSHE DETIAM: ALL THE BEST FOR THE CHILDREN SOVIET IDEOLOGY THROUGH SOVIET CHILDREN'S CARTOONS

Matthew Boyd and Marina Balina*
Department of Modern and Classical Languages and Literature
Illinois Wesleyan University

In order to create the new Soviet utopian society, the authors of the Russian Revolution and those who came after were faced with the task of engineering a new and stable set of values. Through the art form of Socialist Realism, Soviet artists and writers set out to accomplish this goal on a grand scale. Children's animation was one genre resorted to heavily in imbuing the Soviet youth with the proper ideological values. Utilizing the formulaic structure of fairy tales, Soviet animation was able to deliver simple messages regarding the ideological "right" and "wrong" of the Soviet state. This paper explores the development of this trend and examines the occurrence of ideology in several cartoons.

Oral Presentation 1.2

LOG BY LOG: BUILDING ABRAHAM LINCOLN IN AMERICAN YOUTH CONSCIOUSNESS

Liz Dierbeck and Robert Bray*
Department of English, Illinois Wesleyan University

"What passes for identity in America is a series of myths about one's heroic ancestors." - James Baldwin

More books have been written about Abraham Lincoln than about any other American, and the books keep coming. Lincoln has become our country's Charlemagne, our King Arthur. Biographers attempt to give their readers an overview of Lincoln's character and accomplishments, but if we compress fifty-six years into a manageable volume, nuances of his character and details of his life are necessarily lost. How accurately, then, can a historical figure be portrayed in biography? Books, plays, toys, poems, and reenactments remind each generation that we have not yet fully unraveled the complex nature of Lincoln and his life. And yet, even in his complexity, we allow Lincoln to speak for us.

The issue of historical correctness sharpens into focus when we discuss biographies written for young readers. If an author paints a portrait of a venerated historical figure with a brush that glosses over or omits events from the subject's life, can the work truly be representative of that life? In an era when free speech and "the people's right to know" are often wielded for political ends, how much good is done when children see their role models as less-than-legendary?

I contend that Lincoln is best remembered in his complexity: as a fallible, but great, human being. Lincoln's image plays such a vital role in our national folklore that to alter his saintly character at all, especially in the venue of juvenile biography, would be to significantly change the way Americans think about their heroes and themselves. Biography is often intended to be "inspirational literature," and this is especially true in books written for children. If we warmly embrace our imperfect leaders in the venue of historical biography, then we will be able to teach children that imperfection is not only a part of life, it is a part of history and a part of the writing of history.

Oral Presentation 1.3

FOREIGN LANGUAGE TEXTBOOKS IN THE CLASSROOM: BRIDGING THE GAP BETWEEN SECOND LANGUAGE ACQUISITION THEORY AND PEDAGOGY

Kristina Harlan and Christina Isabelli*
Departments of Hispanic Studies and Educational Studies
Illinois Wesleyan University

Second language acquisition (SLA) research encompasses various theories of language learning in which the theoretical perspectives sometimes are not connected to SLA methods used by instructors in the classroom. This paper discusses several theories of SLA in an effort to better understand their connection to pedagogy. Foreign language (FL) pedagogy accounts for various methodological approaches the most common being grammatical translation, direct instruction, audio-lingual, and communicative. These distinctive methodologies have produced a variety of FL textbooks which focus on one or several methodologies.

The following research examines a selection of textbooks in which the methodologies in beginning language learning are analyzed and evaluated. By looking at how such activities are used in the classroom, we can attempt to see the connection between topics in SLA theory and these implementations seen in the textbooks. It will be shown how linguistic concepts are presented as well as how particular strategies are supplemented with activities created by teachers, reflecting current SLA research.

In addition, the views of instructors are considered in this study in an effort to bring together theory and pedagogy. Their thoughts and ideas regarding the effectiveness of certain methods and activities are explored in detail through a series of clinical interviews. My survey should prove to help instructors decide what should be included in choosing the best FL textbook to help second language learners develop in proficiency. It will serve to bridge the gap between theory and pedagogical practice which often is ignored.

Oral Presentation 1.4

THE POWER OF PERCEPTION AND ORIGIN MYTH: RE-RECONSIDERING THE ORIGINS OF THE ARTHURIAN LEGEND

Rae Marie Marotta and Dan Terkla*
Department of English, Illinois Wesleyan University

Any quest to discover a historical identity for Arthur, King of the Britains, must combat the romantic and mythical images that accompany the Arthurian literary and historical traditions. Scholars such as O.J. Padel, Geoffrey Ashe, Leslie Alcock, C. Scott Littleton, and Linda A. Malcor have used etymology, geography and archeology to gather evidence for the existence of a historical Arthur. However, decades of scholarly research have only resulted in fragile claims for a historical Arthur, but these attempts are valuable for they reveal a crucial assumption implicit in the question, "Who was the historical prototype for the Arthur that became the legendary King of the Britains?"

By assuming there was a "who," scholars presuppose Arthurs origins are mortal. Given scholars inability to construct a convincing argument for a historical prototype, it is time to consider that they have been asking the wrong question. Before one can assume there was a "who," there must be evidence that Arthurs origins cannot be legendary. Thus, a new question must first be answered: "Was the prototype for a historical and subsequently mythical Arthur derived from legend?" This question addresses the possibility that Arthurs beginnings were first legendary and that his historicity may be contrived by political and social motivations.

This study answers this new question, provides convincing evidence for Arthurs legendary origins, and concludes that, indeed, scholars have been attempting to answer the wrong question. As a legendary figure historicized, Arthur has helped fulfill the Britons past and present need for a heroic national and racial identity.

Oral Presentation 1.5

EARLY HISTORY OF THE VIOLIN IN SPAIN

Anita Saha and Carolyn Nadeau*
Department of Hispanic Studies, Illinois Wesleyan University

In 1238, the Spanish Christians captured the principal Moorish city in the south of Spain. Even under Christian rule the Moors were able to maintain their rich culture, including the use of their finely crafted instruments. The most popular instrument of the time was the rabab, which was modified to produce other stringed instruments during the 14th and 15th centuries in Spain. The rabab, different forms of the vihuela, and the viol of Valencia were all stringed predecessors of the modern violin variously produced through Medieval Times and through the 17th century.

The word rabab refers to a group of stringed instruments, but my interest is in the rabab popular in the region of Aragon, Spain in the 14th and 15th centuries. Another instrument of the time, the vihuela, is recognized as a "pure" Spanish instrument invented and produced principally in Aragon during the 15th century. There are two types: the vihuela de mano and the vihuela de arco. The former is bowed, while the latter is a plucked instrument. The viol of Valencia is a closer representation of the modern violin, although it has many unique characteristics. Its popularity and modification of design became more sophisticated in Italy, however, the instrument proved less popular than the rabab and vihuela in Spain.

There is no doubt the coexistence of the Moors and the Christians in the 14th and 15th centuries had a profound effect on the production of stringed instruments. Experts generally disagree in determining how the instruments influenced one another. However, by comparing the basic features of these instruments, it becomes evident that the rabab, vihuela and viol existed as earlier versions of the modern violin.

Oral Presentation 2.1

THE PERFORMANCE PRACTICE OF NEGRO SPIRITUALS ON THE CONCERT STAGE

Joy-Denise Moore and Carren Moham*
School of Music, Illinois Wesleyan University

Since the dawn of time, people have had experiences which they have either misinterpreted what they saw or heard or they refused to give credit to the people that created it. This phenomenon is evident in the history of Negro Spirituals. Before the 1960's, people of color did not receive credit for anything they invented, discovered, accomplished or artistically created. People of color were considered only good for manual labor. Starting with the origins of Spirituals there has been misconceptions on almost every aspect of their performance.

Since there are many misconceptions on the performance of spirituals, it is important to acknowledge these misconceptions and offer guidelines or suggestions into a more authentic performance. Originally, slaves learned spirituals by an oral tradition. Since this time has past, contemporary performers have to learn spirituals using a score. These scores were, at one time, committed to paper by someone like Harry T. Burleigh, who learned spirituals through the oral tradition and learned to compose music. Misconceptions can include many aspects of performance. For example, performers believed that Spirituals should be sung with proper English diction because they are in English. Spirituals are sung in English, but the diction was slightly different because they were sung by slaves who did not know proper English diction. Also, many performers do not fully understand what they are singing. They perform every song the same way even though these songs have specific functions, meanings, and nuances. This misconception highlights the belief that spirituals are only religious music meant to praise God because the text comes from mainly the Old Testament of the Bible. Performers also have misconceptions about the improvisation of spirituals, both rhythmic and melodic. Rhythmic improvisation includes, but is not limited to, foot stomping, hand clapping, and swing rhythms. While melodic improvisation deals with only the augmentation of the vocal line, the use melisma, slides, dynamics, etc.

Though there are many aspects of the performance practice of spirituals, this paper will only focus on two of these, the diction and interpretation. Using examples of specific spirituals, the song and text types, purpose and performance of spirituals will be discussed.

Oral Presentation 2.2

FACTORS THAT DETERMINE FOREIGN DIRECT INVESTMENT IN LESSER DEVELOPED COUNTRIES

Jason Lewis and Michael Seeborg*
Department of Economics, Illinois Wesleyan University

Net private capital flows to developing countries have dramatically increased in the past 15 years with much of the investment coming in the form of long-term, foreign direct investment. Because of the unique characteristics of this type of growth-enhanced investment, developing countries desire to attract and retain foreign direct investment (FDI). As a result, the lesser-developed country (LDC) has an incentive to strengthen areas and aspects of the economy or government that are heavily scrutinized by the firm when considering a possible long-term investment.

This study inends to measure the magnitude and the direction of suspected determinants that heavily influence a firm's decision to invest in FDI in a LDC. By utilizing the World Bank's World Development Data from 1997 in an OLS regression model, this study demonstrates the nature of key determinants of FDI, thus providing LDCs with the necessary information to make policy changes in order to maximize FDI.

Oral Presentation 2.3

PRIVATIZATION IN LITHUANIA: GENERAL ENVIRONMENT AND CASE STUDIES

Ginte Sabaliauskaite and Michael Seeborg*
Department of Business Administration, Illinois Wesleyan University

The purpose of this paper is to analyze the privatization of three large corporations in Lithuania: an oil refinery (Mazeikiai Oil), telecommunications company (Telecom), and a stevedoring company (Klasco). It is argued that successful privatization depends on the following four conditions: competitiveness in international markets, method of privatization, corruption issues, and the role of IMF. These conditions are used in to analyze the success of privatization of the three firms.

Understanding the process of privatization in Lithuania is very important because future profits, future employment, future investments in the infrastructure and future tax contributions to the government of these firms depend on it.

Oral Presentation 2.4

DOES PUBLIC HOUSING CAUSE POVERTY AND ISOLATION: AN EXAMINATION OF THE EFFECTS OF PUBLIC HOUSING ON CAUSING POVERTY AND FLIGHT OF THE MIDDLE CLASS

Alva Winfrey and James Sikora*
Departments of Sociology and Economics, Illinois Wesleyan University

Where to place public housing has been a perplexing and uncomfortable issue for many years. Even though politicians and realtors thought that it was better to place public housing in areas in which it was needed, the result of that decision has caused more problems than solutions. Chicago, Illinois provides a prime example. As in most major cities, Chicago's public housing was placed in areas with dwindling job opportunities and overcrowding. This, in turn, has caused the areas large numbers of public housing units to become "breeding grounds" for poverty. Also, due to the migration of jobs and the increased populations brought by housing projects, middle class residents moved out of the areas in search of jobs and more space, taking businesses and other resources with them. These areas are then left with a concentration of poor who cannot support themselves socially or economically due to lack of resources.

Using U.S. Census data from 1950-1990 for six Chicago neighborhoods, the author will give an overview of social and economic characteristics in each area before, during, and after the completion of public housing. By examining changes in racial composition, population, class, and income in these areas, the effects of public housing on resident, and neighborhood status will be analyzed. In addition, these factors will be used to examine why the middle class migrate from areas that contain large amounts of public housing.

Oral Presentation 3.1

LASALLE'S INVARIANCE PRINCIPLE ON MEASURE CHAINS

Anders Floor and Zahia Drici*
Department of Mathematics, Illinois Wesleyan University

In the difference calculus, we are concerned with purely discrete cases. In the differential calculus, we are concerned with purely continuous cases. The separation and separate development of these two calculuses in conceptually disunified, inelegant, and involves much additional effort. Drs. Bernd Aulbach and Stefan Hilger developed a calculus on measure chains which includes the difference and differential calculuses as special cases. Measure chains are a certain kind of subset of the real line.

Lasalle's Invariance Principle is a result on stability. It is an extension of Liapunov's theorem. Lasalle has established his Principle in both the continuous and the discrete cases.

I will prove Lasalle's Invariance Principle in the context of the measure chain calculus. This demonstration will represent an extension of the Principle and will show the conceptual power of the measure chain calculus.

Oral Presentation 3.2

EFFECT OF NATURAL BARRIERS IN A MARINE RESERVE ON QUEEN CONCH, *STROMBUS GIGAS*, "SPILLOVER" TO SURROUNDING FISHED AREAS, EAST HARBOUR LOBSTER AND CONCH RESERVE, TURKS AND CAICOS ISLANDS, BRITISH WEST INDIES

Robert C. Grabowski and Alex Tewfik*
Department of Biology, Illinois Wesleyan University
School for Field Studies, Caicos Islands, British West Indies*

The functions of Marine Protected Areas (MPA's) are to preserve the habitat, natural community structure and genetic diversity of the area. With respect to the fishery, MPA's are believed to increase larval input and adult density by spillover into a fished area. The purpose of this study was to determine the distribution of queen conch, *Strombus gigas L.*, within the East Harbour Lobster and Conch Reserve (EHLCR), specifically addressing spillover of adult conch into the adjacent fished areas. The specific objectives of the study were to collect habitat and conch density data for the reserve and surrounding areas.

With this information, recommendations were to be made regarding the alteration of the reserve to enhance the fishing grounds. A total of 23 sites were surveyed using both snorkel and SCUBA divers. A total of 1,361 conch were found in 70 belt transects covering a total area of 42,300 m^2. Data from this study was combined with data from previous seasons to provide a more accurate representation of the reserve and fished area.

The combined data determined that adult conch outside the reserve (149 conch/ha) was lower than adults inside (575 conch/ha) and both juveniles inside (414 conch/ha) and outside the reserve (483 conch/ha). High density values were obtained for two areas, one within the reserve and one outside. Overall conch densities decreased outward from these core areas. Habitat data concluded that the core areas had prime habitat of algal and seagrass plain, whereas most of the reserve and its boundaries had poor habitat of sand plain or gorgonian/sponge plain. Density and habitat data support that spillover from the core in the reserve is limited. To increase the effectiveness of the reserve, recommendations were made to extend the park boundaries by 2 km to cover the core area currently located outside the reserve. This extension would protect a large spawning stock, creating the benefits of both increased adult spillover and larval dispersal to the fished area.

Oral Presentation 3.3
(Also see Poster 28)

BROWN -HEADED COWBIRD BROOD PARASITISM IN BISON-GRAZED AND UNGRAZED TALLGRASS PRAIRIE IN NORTHEASTERN KANSAS

Alexandra S. Latham and Jack F. Cully*, Department of Biological Sciences, Kansas State University, and Sheryl Swartz Soukup*, Department of Biology, Illinois Wesleyan University

The Brown-headed Cowbird (Molothrus ater) has long been associated with bison (Bos bison) in North America on the Great Plains. As a result, we anticipated that cowbirds would be more successful breeding in the presence of bison than in their absence. We predicted that several common ground-nesting avian species, Dickcissels (Spiza americana), Grasshopper Sparrows (Ammodramus savannarum), and Eastern Meadowlarks (Sturnella magna), would suffer higher frequencies of brood parasitism in bison-grazed habitat than in ungrazed habitat on Konza Prairie Research Natural Area in notheastern Kansas. The frequency of cowbird parasitism for all species combined was significantly higher (0.69) in bison-grazed than in ungrazed habitat (0.44) ($p = 0.044$, $(2 = 4.061$, $df = 1$). These results are consistent with our suggestion that bison-grazed habitat may be a more optimal site for cowbird brood parasitism than ungrazed habitat. We pose two principal explanations for the higher frequency of parasitism observed in the bison-grazed area. First, cowbirds may be able to forage more efficiently in the bison-grazed area, indirectly inflating parasitism frequencies by conferring a variety of energetic and nutritional advantages upon the females. Second, the cowbirds' abilities to find and parasitize nests may be enhanced by the shorter, less dense grass characteristic of grazed habitat. Further studies investigating the conservation implications of this phenomenon are merited since cowbird brood parasitism usually reduces reproductive success of host species, and has had a dramatic negative impact on population of several hosts, driving them to near extinction.

Oral Presentation 3.4

CHEMICAL TECHNIQUES FOR THE ISOLATION OF ELEMENTAL CARBON FROM SEDIMENTS

Susanna Widicus and Wendy S. Wolbach* and Rebecca Roesner* and Benjamin Nelson*
Department of Chemistry, Illinois Wesleyan University
Department of Chemistry, DePaul University

Sedimentary rock samples have been analyzed for the presence of elemental carbon in the form of soot from three geologic events associated with meteorite impacts: the Cretaceous-Tertiary (KT) boundary (65 Ma old), the Sudbury Impact Structure, Canada (1800 Ma old), and the Gardnos Impact Structure, Norway (400 ñ 900 Ma old). Sudbury and Gardnos samples were similar in bulk composition (carbonates, silicates) to those from the KT boundary. Therefore, it was assumed that traditional KT boundary chemical techniques for the isolation of carbon from sedimentary rocks would be effective. These techniques include acid dissolution of carbonates with HCl followed by treatment with HF/HCl to remove silicates. Elemental carbon is then separated from kerogen (resistant organic material) using acidic dichromate oxidation under controlled temperature conditions and duration. Soot is recognized and quantified by particle size analysis using a scanning electron microscope (SEM).

Though effective on the Sudbury samples, it was discovered that these chemical methods were less effective on the Gardnos samples. Significant quantities of fine-grained acid-resistant minerals remained in the Gardnos samples after extensive demineralization. Likewise, large amounts of kerogen remained after oxidation. The presence of these components led to difficulties in SEM analysis and identification of possible soot in these samples. While the problems with Gardnos samples were ultimately rectified, they have brought into question the general applicability of the chemical techniques used to isolate and identify elemental carbon in sedimentary rocks. Ongoing studies are being conducted to develop and broaden such techniques so as to be useful for samples of varying ages and compositions. To begin this task, twenty-four carbonaceous shale samples were obtained from The Field Museum of Natural History in Chicago. These shales range from Pre-Cambrian to Carboniferous in age and come from a variety of locations in North America. The carbon composition of these samples ranges from 0.0008 percent to 75.385 percent by mass. A systematic analysis of traditional KT boundary demineralization and oxidation techniques is being performed on each sample to determine the applicability of reactants and conditions for elemental carbon isolation. These results will be correlated with sample and kerogen type. Once this has been established, the results should be generally applicable to any carbon-containing sedimentary rock in which organic geochemists wish to separate land-derived elemental carbon from organic carbon of marine provenance.

Oral Presentation 3.5

A SURVEY OF ORGANOCHLORINE PESTICIDE CONTAMINATION IN A COSTA RICAN CONSERVATION AREA

Mark Wieland and R. Given Harper* and Jeffrey A. Frick*
Departments of Biology and Chemistry, Illinois Wesleyan University

Amphibians, turtles, rodents, and birds collected from a tropical conservation area in northwestern Costa Rica, where pesticides have not been directly applied, were analyzed for organochlorine (OC) pesticide contamination. Six of thirty-nine amphibians (three of eight species), three of six turtles (two species), one of eight rodents (one species), and nine of twenty-five birds (four species) contained OCs ranging from 2.77 ng/g to 277.70 ng/g in individual organisms. The most frequently detected compound (in thirteen organisms) was p,p'-DDE. Heptachlor, delta-BHC, dieldrin, endosulfan II, and p,pí-DDD were found in four or more organisms, while eight other OCs were found in one, two, or three organisms. The average body mass of contaminated amphibians was 156.40 g, compared to 56.89 g for uncontaminated amphibians, suggesting that increased body mass is indicative of greater susceptibility to contamination. The presence of OCs in taxa from the conservation area indicates the likelihood of long-distance transport of pesticides through the atmosphere. These contaminants may affect interactions between organisms in the tropical conservation area.

Oral Presentation 4.1

A PROXIMITY OF WORDS: INFLUENCE AND INTERPLAY IN THE WORKS OF RAYMOND CARVER AND TESS GALLAGHER

Christine Pacyk and James Plath*
Department of English, Illinois Wesleyan University

In the literary world we find countless examples of people drawn together by the common thread of a love for words. In many cases, these friendships blossomed into more intimate relationships. While studies have been done about such literary couples, Raymond Carver and Tess Gallagher, one of the greatest and perhaps most inspirational literary couple, has been virtually ignored. Although their relationship was cut short by Carver's death in 1988, it nonetheless resulted in some of Carver and Gallagher's most celebrated writing. In countless interviews and essays, each recognized the other as one who understood the other's vision, and respected the other's respective writing space. Each has admitted to the role the other played in his/her life, recognizing the other as his/her own best critic, but Carver also acknowledged Gallagher as a source of stability when his life was complicated by divorce and the after effects of alcoholism. In fact, it was under Gallagher's influence that Carver began writing after a two-year lapse due to the volatility of his personal life. Most telling of writing's centrality to their relationship, however, is what comes across in the writing itself. Shortly after they met, each began experimenting in the other's genre. Carver began experimenting more and more with poetry, while Gallagher began writing fiction for the first time. While this obvious "swapping" of genres demonstrates one influence each had on the other, an examination of Carver's and Gallagher's respective fiction most clearly illustrates how they drew upon one another's strengths and adapted them in their works.

Oral Presentation 4.2

CHAUCER'S CONSTRUCTIVE ECCLESIASTICAL CRITICISM

Kyle Painter and Dan Terkla*
Department of English, Illinois Wesleyan University

In his Canterbury Tales, Geoffrey Chaucer shoots critical arrow at several institutions that deserve to be attacked in some form. This criticism was extended to all levels of the medieval Church. Chaucerís ìnegativeî portrayal of religious in the Tales has led some scholars to suggest that he was a proto-Reformationist, a predecessor to Luther or Calvin who wanted to discard the entire Church and start over. It is true that he pointed out the faults within the Church and criticized its members, but he also saw that it was salvageable through internal reform. Many scholars have emphasized the similarities between Chaucer and the heretical Lollards, leading to the labeling of Chaucer as a Lollard. But as other scholars indicate, Chaucerís resemblance to the Lollards does not mean that Chaucer supported their heretical stance. I will attempt to show that Chaucer supported the Church and so wanted to reform it from the inside. His portraits of clergy reveal people who are not living up to the standards of the Church, with the implication that these standards are worth trying to attain. Chaucer also creates an impeccable Parson, who as the one religious who is true to God and the Church is seen as the perfect example for all to follow.

Oral Presentation 4.3

BACH AS A MODERNIST?

Bethany VonBehren and Joy H. Calico*
School of Music, Illinois Wesleyan University

J. S. Bach (1685-1750), the brilliant Baroque composer and organist, was known to his contemporaries as a conservative composer. Modern scholars also recognize Bach as the last gasp of the Baroque, and mark his death as the end of the period. As the lighter, pre-classical *galant* style of composition gradually came into vogue, Bach staunchly defended and continued to write dense counterpoint and fugues characteristic of high Baroque. There is little reason to question his prominent position in music history as a traditionalist wary of change.

In this light, Bach's composition of the cello suites around 1720 is surprising. The cello had only recently appeared in Germany (earliest sources say around 1680 in Viennese orchestral playing), and was still evolving: the number of strings ranged from three to five and tuning had yet to be standardized. It was introduced as a basso continuo instrument constructed for the sole purpose of balancing the new, louder sound of the violin. Before the advent of the violin, the viola da gamba, a lower stringed instrument with roughly the same range as a cello, was sufficient for ensemble playing. In Bach's time, however, both instruments were used in orchestral and chamber music. With its softer, more palatable tone, the viola da gamba was treated as a solo instrument while the cello was confined to mere continuo. To demonstrate the contrast between these two instruments, my presentation will include a brief exhibition on both. A work written for solo cello, and unaccompanied cello at that, would have seemed very avant-garde to other musicians of the time. Bach completely stepped out of character with the composition of the cello suites, assuming the role of the forward- looking modernist and anticipating the classical preference for the cello over the viola da gamba.

Oral Presentation 4.4

THE CHIVALRIC EQUILIBRIUM: THE GAWAIN CHARACTER IN *YVAIN*; OR, THE KNIGHT WITH THE LION AND SIR GAWAIN AND THE GREEN

Kathryn L. Weber and Dan Terkla*
Department of English, Illinois Wesleyan University

Many treatises and poems have been written on medieval chivalry. In the romances, poets take some artistic liberties and, often, well-known characters may or may not retain the same qualities from text to text. Two romances in particular illustrate this change in Gawain, a well-known medieval character, especially well. Readers will notice that Gawain's characteristics are portrayed differently in Chretien DeTroyes' *Yvain; or, the Knight with the Lion* and in *Sir Gawain and the Green Knight*.

The greatest inconsistency occurs among the honorable qualities that all good knights are expected to have, specifically courtesy and prowess. These differences can be accounted for in two ways. Initially, both poets have taken artistic liberties in deciding whether Gawain will be a primary or secondary character. Second, textual evidence and background information prove that in *Yvain* the military aspect of chivalry is emphasized, while in *Sir Gwain and the Green Knight* the courtly aspect of chivalry is emphasized.

In the two texts, the approaches that each Gawain takes, whether militaristic or courtly, serves as a narrative device in how the poem will result. In *Yvain*, Gawain's aggressiveness allows for Yvain's heroic nature to emerge, and in *Sir Gawain*, Gawain's passivity allows change to occur in the main character. Reading these two romances comparatively suggests that some sort of balance between militant and courtly chivalry must be reached. The questioning Gawain undergoes points out the ethical problems underlying his actions and his lack of balance in both *Yvain; or, the Knight with the Lion* and in *Sir Gawain and the Green Knight*. Medieval romances were instructive in nature and thus, a variety of romances must be considered in order for readers to develop an ideal form of chivalry.

Oral Presentation 5.1

RELATIONAL AGGRESSION IN U.S. AND INDONESIAN CHILDREN AND ADOLESCENTS: GENDER, DEVELOPMENTAL, AND CULTURAL COMPARISONS

Elizabeth A. Jansen and Doran French*
Department of Psychology, Illinois Wesleyan University

Previous studies of aggression in childhood have found that boys, as a group, are more aggressive than girls. The majority of these studies, however, focus only on physical aggression. Recently several studies have been conducted that differentiate relational aggression from physical aggression. Relational aggression involves harming others through the purposeful damage to their peer relationships (i.e., spreading rumors or ostracizing a peer from a group activity). Several studies have found sex differences in relational aggression, as well as physical aggression. The present study explores gender, developmental, and cultural differences and similarities in relational aggression in US and Indonesian children and adolescents' free descriptions of disliked peers. Instances of physical and verbal aggression were also coded. As hypothesized, the results of logistic regressions indicated that males were more likely than females to describe physical aggressive behavior, while females were more likely than males to describe relationally aggressive behavior. These results were found across cultures and age groups. This study extends the research on relational aggression by utilizing a new methodology for cross-cultural research on relational aggression.

Oral Presentation 5.2

ECONOMIC INFLUENCES ON THE STOCK MARKET

Nathan Taulbee and Carolyn Stumph*
Department of Economics, Illinois Wesleyan University

This paper examines the relationship between a number of economic factors and the stock market. Using financial and economic theory, this paper assesses how some economic factors impact the S&P 500 as well as the stock prices of various industries. Specifically, how do unemployment rates, real GDP, and the Fisher effect (the one-for-one relation between nominal interest rates and expected inflation) impact the overall market as well as cyclical, defensive, interest-sensitive, and growth stocks? Generalized difference regressions will serve as the methodology to assess these relationships. Conclusions from this study will assist investors in their portfolio decision-making.

Oral Presentation 5.3

BENEFITS BY GENDER: DETERMINANTS OF WELFARE ACCESSIBILITY FOR MIGRANT WOMEN IN WESTERN EUROPE

Kathryn Vojack and Kathleen Montgomery*
Political Science Department, Illinois Wesleyan University

According to statistical data, there are dissimilarities between the ease of welfare accessibility for migrant men and migrant women within European nations. Literature links several determinants, such as percent GDP spent on welfare, size of immigrant population, level of Catholic Church involvement, leftism of country, percent of women in the workforce, and public attitudes of immigrant population, welfare system and feminism, to be correlated with the level of welfare accessibility. Data correlations, however, reveal the independent variables of percent women in the workforce and public attitudes towards feminism to be significantly associated with level of welfare accessibility for migrant women. The significance of these variables suggests welfare accessibility for migrant women may have a stronger link to their gender instead of structural issues, such as immigrant population or wealth of a nation.

Oral Presentation 5.4

A REPLICATION STUDY OF THE EFFECTS OF TEST LANGUAGE AND MATHEMATICAL SKILLS ASSESSED ON THE SCORES OF BILINGUAL HISPANIC STUDENTS

Alison Whittington and Christina Isabelli*
Hispanic Studies Department, Illinois Wesleyan University

In 1983, Gilberto Cuevas and Maria Llabre researched the effects of test language and mathematical skills assessed on the scores of bilingual Hispanic students. This study investigated the extent to which the language of standardized tests influenced the performance of bilingual students of differing levels of English proficiency. Two versions, Spanish and English, of the same Comprehensive Test of Basic Skills were administered to 408 bilingual Hispanic students in fourth and fifth grade, and the students were asked to complete both tests. Cuevas and Llabre found that the students performed better on the English version of this test than on the Spanish version.

For this study, I have tried to replicate Llabre and Cuevas' work. This replication study was guided primarily by the following research question: to what extent does the language of the test influence the mathematical performance of bilingual students? My methodology followed closely that of Cuevas and Llabre, however, a few adaptations were made. First, the students I worked with were slightly older than the ones in the original study (sixth, seventh and eighth grade), and the tests were altered accordingly. Additionally, my student sample was limited to approximately thirty students. The third, and perhaps most influential adaptation to the study was that the students in the replication study all received at least some mathematics instruction in Spanish. In the original study, most of the students had only received mathematics instruction in English.

While this was a replication study, I did not anticipate my results mirroring those of Cuevas and Llabre. I did not expect the students in my study to perform significantly higher in English than in Spanish as the students in the original study did. I hypothesized that the exposure these students have had to mathematical instruction and vocabulary in the Spanish language would raise their Spanish language performance to or above the level of their English language performance.

POSTER SESSION A

10:00 - 11:00 a.m.

Odd-Numbered Posters

POSTER SESSION B

2:00 - 3:00 p.m.

Even-Numbered Posters

Note: Student's name is underlined, faculty advisor designated with *

During each poster session the author will be present to discuss her or his research with conference attendees, and answer questions.

Poster Presentation 1

POSITIVE AND NEGATIVE PEACE CONCEPTS IN YOUNG AMERICAN ADULTS

Diana Alame and Peter Verbeek*
Department of Psychology, Illinois Wesleyan University

Recent history of the United States includes numerous examples of periods of tension and conflict followed by a temporary calm. The end of the Cold War by no means marked the end of hostilities among nations, including the U.S. What concepts of peace do young American adults of this pseudo-peaceful twenty-first century hold?

Galtung, a pioneering peace researcher, argued that there are two possible ways one can conceptualize peace. One way would be to think of peace as merely the absence of violence, termed "negative peace." The alternate approach is in recognizing it as a state of equilibrium maintained by proactive prevention of potential conflicts. Galtung described this as "peace by peaceful means," and specifically termed it as "positive peace." Given these two types, it would be reasonable to assume that the idea of positive peace would be prevalent in members of a nation that enjoys a leadership status within the world community.

Research has confirmed that during development the understanding of war consistently precedes any substantial understanding of peace. It is only during late adolescence that thoughts of positive peace become evident. Unfortunately, little or no studies have dealt with young adults' conceptualization of peace. In our study, we intend to rectify this gap in developmental literature. The survey administered encompasses various aspects of positive and negative peace. Respondents were men and women from Illinois Wesleyan University and Wellesley College.

Poster Presentation 2

EFFECTS OF STRUCTURED WORK SYSTEMS ON TASK PERFORMANCE IN CHILDREN WITH AUTISM

Kari Beth Adkins and Linda Kunce*
Department of Psychology, Illinois Wesleyan University

The present study looks at the effectiveness of work systems in three children clinically diagnosed with autism, using a single-subject, alternating treatments with no baseline design. The characteristics of autism that impact learning are reviewed, and the rationale for visual cueing and organization, as components of work systems, are discussed. Individual work systems will be developed for each child, and the effects of these systems on on-task behavior, productivity and independence will be studied. It is hypothesized that implementation of work systems will increase on-task performance, independence and productivity in these three children with autism.

Poster Presentation 3

LONELINESS AND SELF-ESTEEM AT DIFFERENT LEVELS OF THE SELF

Kiley L. Bednar and John Ernst*
Department of Psychology, Illinois Wesleyan University

In an extension of previous research done by Hawkley, et al., loneliness is proposed to be multi-dimensional with three unique dimensions: isolation, connectedness, and belongingness. Isolation is hypothesized to be a feeling of being alone. Connectedness is having satisfactory one-on-one relationships. Belongingness is engaging in group-centered activity. These levels are hypothesized to be correlated with three unique aspects of the self: personal, relational, and collective. The personal self consists of specific attributes and traits, such as academic ability and athleticism. The relational self is derived from one-on-one intimate relationships with others, like identifying oneself as a boyfriend or girlfriend. The collective self consists of a person's membership in a social group and the value that the person places on that group. Similarly, Brewer (1996) proposes that self-esteem is experienced differently at each level of the self. Personal self-esteem is how a person feels based on their individual traits and characteristics. Relational self-esteem is based on a person's perceptions of exhibiting appropriate behavior in a one-on-one relationship. Collective self-esteem is how one evaluates his or her participation in a group and how others evaluate the group as well. We propose that loneliness and self-esteem are experienced differently at each of these levels of self (personal, relational, and collective) and that there is a stronger relationship between loneliness and self-esteem within each level relative to between levels. Dimensions of loneliness and self-esteem were examined by having male and female undergraduates (ages 18-21) complete the Loneliness Dimension Scale (which measures isolation, connectedness, and belongingness) the Collective Self-Esteem Scale, (a measure of collective self-esteem) the Rosenberg Self-Esteem Scale (a personal self-esteem measure), and the Relational Self-Esteem Scale (a measure of relational self-esteem).

Poster Presentation 4

CLONING THE *bchZ* GENE FROM *CHLOROFLEXUS AURANTIACUS*

Kristi L. Berger and David W. Bollivar*
Department of Biology, Illinois Wesleyan University

Chloroflexus aurantiacus is a filamentous photosynthetic bacterium that was first isolated from Japanese hot springs and moves by gliding without the aide of flagella or cilia. Characterized as a green non-sulfur bacterium, *C. aurantiacus* has an interesting evolutionary position in that it shares similarities with both green sulfur and purple non-sulfur bacteria, two different classifications containing photosynthetic bacteria. Therefore, *C. aurantiacus* may be a key organism to study the early processes of photosynthesis and its evolution.

This bacterium has in its chemical composition various photosynthetic pigments used for capturing light energy. The main pigments include bacteriochlorophylls *a* and *c*, which are synthesized depending on light and oxygen conditions of the environment. The bacteriochlorophyll biosynthetic pathway in photosynthetic bacteria is catalyzed by various enzymes encoded by genes organized in a region of the genome called the photosynthesis gene cluster. One group of genes in the cluster is *bchX*, *bchY*, and *bchZ*. These genes code for components of a chlorin reductase which catalyzes the reaction converting chlorophyllide *a* to 2-desacetyl-2-vinyl bacteriochlorophillide.

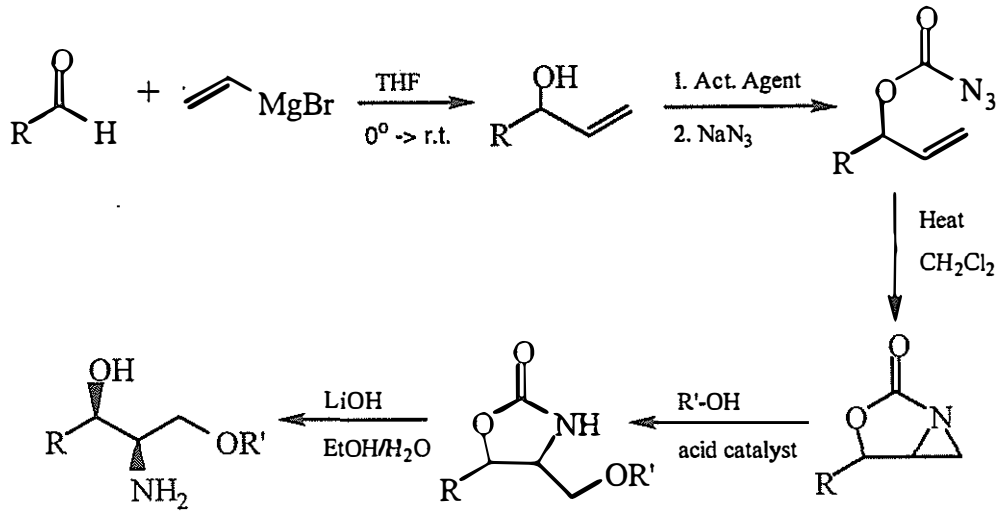
The objective of the research was to clone the *bchZ* gene from *C. aurantiacus* by molecular genetic techniques for further study. In general, a gene can be cloned by inserting it into another organism, like that of *Escherichia coli*, such that the gene will be replicated every time the cell divides, thereby creating multiple copies. Because the *bchZ* sequence in *C. aurantiacus* is unknown, polymerase chain reaction (PCR) primers consisting of short oligonucleotides were synthesized based on consensus sequences of the *bchZ* gene from green sulfur and purple non-sulfur bacteria. The PCR primers were used to amplify a small region of the *bchZ* gene which was then ligated into a plasmid vector. The ligated plasmid was used to transform competent *E. coli*. Blue and white screening of colonies and restriction digests indicated whether insert of the amplified portion of *bchZ* actually occurred. DNA sequencing was then used to determine if the cloned insert was indeed *bchZ*.

Poster Presentation 5

THE SYNTHESIS OF VICINAL AMINO ALCOHOLS THROUGH A BICYCLIC AZIRIDINE INTERMEDIATE

Nathan Bobofchak and Jeff Frick*
Department of Chemistry, Illinois Wesleyan University

The vicinal amino alcohol functionality can be found in many biologically important compounds, some of which included enzyme inhibitors and sphingolipids. We wish to report our efforts on the synthesis of vicinal amino alcohols through a bicyclic aziridine intermediate. The bicyclic aziridine is prepared in three steps from an aldehyde and vinyl magnesium bromide. Opening of the aziridine with methanol leads to the formation of an oxazolidinone, which can be hydrolyzed to the vicinal amino alcohol. Aziridine opening reactions, using a variety of Lewis acid catalysts, have been studied in order to establish optimal conditions.



Poster Presentation 6

PRESCHOOL CHILDREN'S CHOICES FOR PEACE

Jillayne E. Bose and Peter Verbeek*
Department of Psychology, Illinois Wesleyan University

Preschool children show peacemaking and peacekeeping behaviors when studied in observations. However, few studies have questioned preschoolers about these behaviors. To what extent do preschoolers understand peaceful actions and will choose peacekeeping or peacemaking over conflict? Studying preschoolers on these issues is important with regard to our overall understanding of the development of peace concepts. Recent research suggests that young children commonly understand peace in terms of relationships. One problem with testing preschool children on their understanding of interpersonal peace is that they may not be able to express their thoughts and feelings about this as well as older children. In this study we measured preschoolers' choices for peace by using a story task that was less dependent on their varying verbal skills. The stories consisted of choices for either a peacekeeping and peacemaking action or an action leading to conflict. The stories represented social situations common to most preschool children. Eighteen children enrolled in a local Head Start program and 35 from a local Montessori preschool were interviewed. The following specific hypotheses were tested. We predicted that older preschoolers would make proportionally more choices for peace than the younger children in our sample. We also predicted that the children would be more likely to make choices for peace in the scenarios that involved familiar rather than unfamiliar peers. The effect of the specific learning environments (Head Start vs. Montessori) on the children's choices for peace was also explored.

Poster Presentation 7

STUDIES TOWARD THE SYNTHESIS OF AN ORGANOPHOSPHORUS ANALOG OF ACETYLCHOLINE

Christopher R. Butler and Jeff Frick*
Department of Chemistry, Illinois Wesleyan University

Acetylcholine is an important neurotransmitter in the human body, stimulating the synapse of cardiac, smooth, and skeletal muscles. In order to better understand this enzyme and the stereochemistry of phosphorylation, we have proposed the synthesis of a conformationally constrained organophosphorus analog (1) of acetylcholine(2), in hopes that this compound would act as an inhibitor of acetylcholinesterase. The inhibition/activation kinetics can often give insights to reaction mechanisms and preferences of the enzyme for various substrates. Studies this year have focused on two main steps of the synthesis, the phosphorylation of the alcohol and deprotection of the amino-group.

Poster Presentation 8

LIBRARIANS OF THE 21ST CENTURY

Michele M. Carroll and Rebecca Gearhart*
Department of Sociology and Anthropology, Illinois Wesleyan University

This photo-ethnographic research project focuses on the librarians of the Bloomington Public Library. The library is often considered to be an outmoded source of information. Librarians are commonly viewed as nothing more than the protectors and organizers of books. The Internet and World Wide Web are considered superior sources of information. However, the "information highway" is vast, and the validity of the information it provides is difficult to confirm. Librarians – experts in deciphering credible sources of information- are actually under-appreciated resources for utilizing these new forms of reference.

A major part of my research included observation of and interviews with several librarians at Bloomington Public Library. I talked with them to identify what they believe their role is within the community. We collaborated in creating photographs to facilitate a more accurate understanding of what the public library and librarians offer to the greater community.

Through these photographs and their corresponding captions, I have tried to illustrate that librarians are far from obsolete. Rather, librarians use the Internet among a myriad of other reference tools to empower all members of the community in navigating the expanding world of knowledge.

Poster Presentation 9

THE INVOLVEMENT OF OXABICYCLOBUTONIUM IONS IN REACTIONS OF EPOXYCARBINYL SUBSTRATES: A MECHANISTIC STUDY

Rebecca S. Centko and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

The solvolysis of epoxycarbinyl substrates **1** has been the subject of several mechanistic studies. In spite of these investigations, it has not been established whether these solvolyses reactions proceed with anchimeric assistance from the epoxide oxygen and involve an oxabicyclobutonium ion intermediate or whether unassisted ionization occurs to generate an epoxycarbinyl ion. Conflicting data in the literature suggest that the ability of the epoxide oxygen to provide anchimeric assistance. is dependant upon structural and electronic features of the epoxycarbinyl substrate in question. The aim of this project is to study the nucleophilic substitution reactions of tetrahydrofurfuryl and tetrahydropyranyl sulfonates **2a** and **2b** to probe the involvement of ions similar to the oxabicyclobutonium ion. The rates of solvolyses of cyclopentylmethyl tosylate and tetrahydrofuranomethyl tosylate have been compared to determine if the oxygen lends anchimeric assistance to the leaving group in the solvolyses reactions. This research has led to an increased understanding of the mechanism of epoxycarbinyl substrate reactions and to possible new and improved synthetic methodology.

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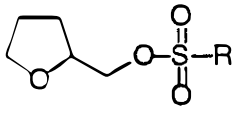

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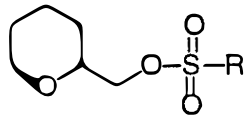


2b

Poster Presentation 10

HOLOGRAPHIC OPTICAL TWEEZERS

Matthew T. Dearing and Gabriel C. Spalding*

Holographic Optical Tweezer arrays offer a new means of directing the assembly of nanoparticles into configurable structures. Previously, a generalized Lorentz-Mie scattering theory has been used to model *single* (non-holographic) optical traps. Here, we develop a simpler and more intuitive approach to examine the trapping potential as a function of particle size, the polarizability of the particle material as compared to that of the surrounding medium, the power of the laser used to trap the particles, and the angular divergence of the optics used for promoting assembly. For this calculation we incorporate an approximate form for the energy density of the laser beam - one that is appropriate both within and outside of the Rayleigh limit. We believe that our conclusions remain viable in the intermediate case, where the particles to be trapped have dimensions on the order of the wavelength of visible light; this regime is of particular interest in applications involving assembly of photonic bandgap materials and other photonically-active structures. As the first researchers to imbue computer-generated holograms with substance, we have produced the first complete implementation of the Holodeck: a laser beam which is passed through our computer-generated holograms forms a tailored array of "tractor beams" which causes nanoparticles to assemble into the desired form. We are also the first to address the key question regarding application of holographic optical tweezer arrays, namely the *number* of particles that can be simultaneously incorporated and manipulated.

Poster Presentation 11

THE EFFECTS OF THETA RESET IN THE 4 HZ RANGE ON ENHANCING THE ENCODING OF INCOMING INFORMATION

Alexander Dimov and Joseph Williams*
Department of Psychology, Illinois Wesleyan University

The theta rhythm is a characteristic, 4-12 Hz EEG pattern that is found in numerous brain areas, including the hippocampus (HPC), the entorhinal cortex (EC) and the anterior cingulate (AC). The theta rhythm is important for working memory, as disruptions of the theta rhythm have been correlated with impairments in working memory. However, the precise mechanism by which the theta rhythm is involved in mnemonic processing is still unclear. One proposed mechanism is through a resetting of the theta rhythm in which ongoing theta becomes phase-locked to incoming sensory stimuli. Theta reset may allow the HPC to be in a maximum state of depolarization when sensory input arrives from the EC, ultimately enhancing the encoding of incoming information. The current study examined resetting by utilizing a spatial working memory task comprised of two components: a sample (encoding) and a choice (retrieval) phase. Rats were tested in an operant chamber with three levers on the front panel with a light located above each lever. In the sample phase, a light appeared over either the left or right lever. After a delay period, the center light was illuminated indicating the start of the choice phase in which the rat was required to press the lever opposite the sample light. The results obtained on the reset of lower frequency theta (about 4Hz) in the HPC, EC and AC were congruent with previous conclusions about theta reset in the 7Hz range. Resetting to the sample light, choice light and/or motor responses was found in all areas, with the reset being highly predicative of correct task performance.

Poster Presentation 12

SOCIAL AND EMOTIONAL LIFE OF STUDENTS

Kelly E. Ellis and John M. Ernst*
Department of Psychology, Illinois Wesleyan University

In an extension of previous research by Hawkley, et al. (1999), development of a new measure of loneliness designed to assess multiple types of loneliness was examined. Hawkley, et al. (1999) examined the factor structure of the UCLA-R Loneliness Scale (1980) and found evidence suggesting three types of loneliness: isolation (feeling separate from others), connectedness (feeling in tune with others), and belongingness (feeling a part of a group). A series of items designed to compliment the UCLA-R Loneliness Scale and believed to tap the three different dimensions of loneliness was developed. These items were incorporated into a new 45-item scale called the Loneliness Dimension Scale. This scale was given to 396 male and female undergraduates in the general psychology research pools at Illinois Wesleyan University and Ohio State University. Initial factor analyses of the Loneliness Dimension Scale show that the items tap three dimensions of loneliness, which we have labeled similarity/separation, social support/companionship, and group activities.

Poster Presentation 13

BEHAVIORAL CONTRAST: A NEW SOLUTION TO AN OLD PROBLEM?

Sara J. Estle and Karin A. Beaumont and James D. Dougan*
Department of Psychology, Illinois Wesleyan University

Reynolds (1961) discovered that when the rate of reinforcement in one component of a multiple schedule changed, the response rate in the other, constant component changed in the opposite direction. He labeled this effect behavioral contrast. At least four major theories have been proposed to account for behavioral contrast: additivity theory (Gamzu & Schwartz, 1973), competition theory (Ettinger & Staddon, 1982; Hinson & Staddon, 1978), matching theory (Herrnstein, 1970; Williams, 1983), and most recently, habituation theory (McSweeney & Weatherly, 1998).

The effects of component presentation on behavioral contrast were examined in rats. The additivity, competition, and matching theories do not make direct predictions about the effects (if any) of component presentation. Habituation theory, however, does make a prediction regarding component presentation: conditions providing randomly alternating multiple schedule components should produce more robust contrast than conditions providing strict alternation of components. Each rat was exposed to a series of six multiple variable-interval schedules, divided into two three-schedule series. Each series consisted of a standard contrast design (baseline phase, contrast phase, and baseline recovery phase). The presentation of multiple schedule components within these three phases varied as a function of condition. In condition one, rats were presented with the traditional strict alternation of multiple schedule components. In condition two, rats were exposed to randomly alternating multiple schedule components.

Component presentation did not have a significant effect on behavioral contrast. Robust contrast was observed in both conditions, at both VI 15 and VI 30 baseline reinforcement rates. These results fail to support the predictions made by habituation theory, although not to the extent that habituation theory should be dismissed as a possible explanation of behavioral contrast. Further research is needed to determine the applicability of habituation theory to behavioral contrast.

Poster Presentation 14

AN EMPIRICAL INVESTIGATION OF THE DETERMINANTS OF FERTILITY

Michelle Ewert and Teddy Amoloza*
Department of International Studies, Illinois Wesleyan University

As sociologists and economists evaluate the demographic trends of the past century, they note that although the global population has grown rapidly, total fertility rates are falling worldwide. Scholars theorize that the fall in fertility rates is due to a variety of social and economic factors. After reviewing major demographic works, I chose five variables which are believed to have a significant impact on fertility: female illiteracy, female secondary education, female labor force participation, urbanization and per capita GNP. Using World Bank and United Nations data for fifty-six countries, I ran linear regressions for 1970, 1980 and 1990 to determine the significance of each variable in each year. Having determined the significance of the variables in my model, I will research specific studies targeting the individual variables or programs implemented which aim to reduce fertility indirectly by directly affecting these other factors.

Poster Presentation 15

THE ROLE OF THE bchE GENE PRODUCT IN BACTERIOCHLOROPHYLL a SYNTHESIS

Parie Garg and David Bollivar*
Department of Biology, Illinois Wesleyan University

Bacterial photosynthesis is different from eukaryotic photosynthesis in that it employs different pigments. Although very similar to the chlorophyll pigments used by modern plants and other higher order organisms, bacterial chlorophyll is biochemically different and is synthesized using a different pathway. The biochemical pathway for bacteriochlorophyll a synthesis is being studied extensively, but not much is known about the specific step catalyzed by the product of the bchE gene.

The purpose of this research project is to create a successful expression vector for the bchE gene product by inserting a recombinant plasmid into *Rhodobacter capsulatus*. The activity of the bchE gene product will be studied in vitro, using this organism. This will give us insight into the function of the enzyme produced and will also give us a better understanding of the role of the bchE gene product in bacteriochlorophyll a synthesis.

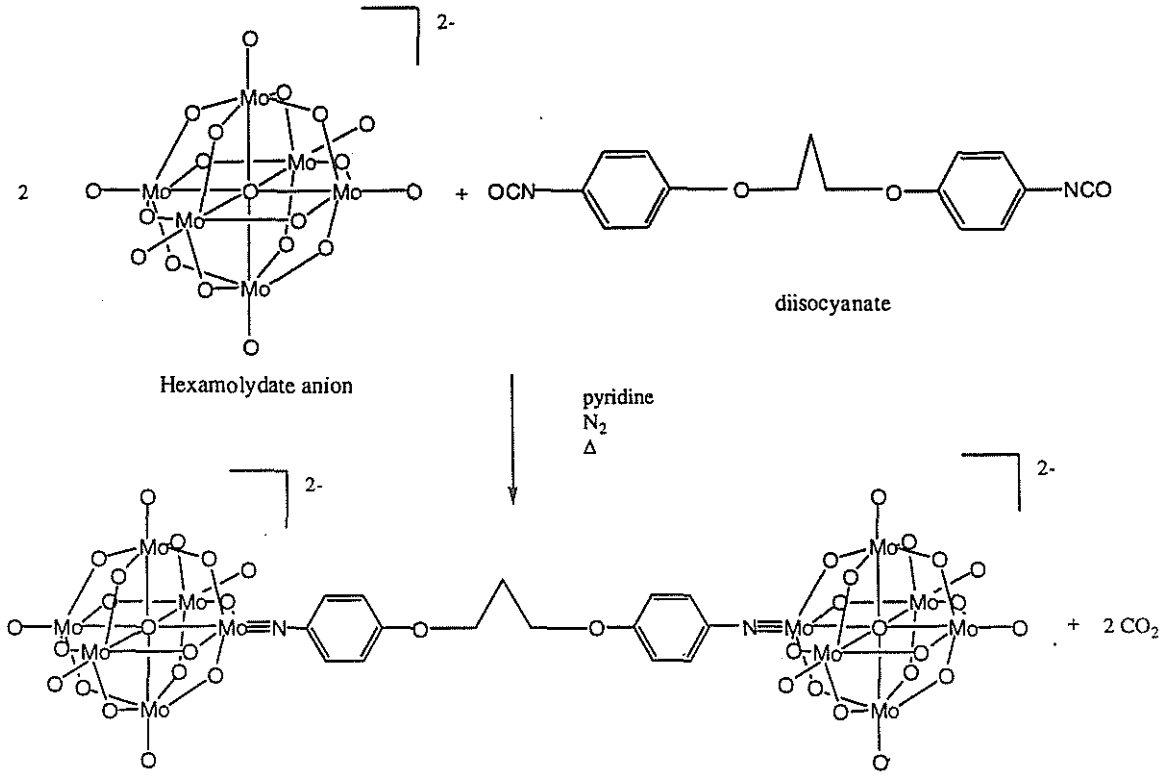
Poster Presentation 16

SYNTHESIS OF DIFUNCTIONAL ISOCYANATES AND SUBSEQUENT REACTION WITH THE HEXAMOLYBDATE ANION

Delara Godrej and Rebecca Roesner*
Department of Chemistry, Illinois Wesleyan University

The attachment of organic molecules to polyoxometalates has led to the development of a variety of interesting compounds. Modification of the organic substituents attached to polyoxometalates may enable the specific targeting of biological macromolecules within diseased cells. Molecules of this type are already being used as selective markers for conventional electron microscopy and have been shown to exhibit anti-viral activity. These compounds are also expected to have utility as oxidation catalysts and anti-tumoral agents.

Our research involves the synthesis and characterization of the polyoxometalate complex $[Bu_4N]_4[(Mo_5O_{18})Mo\_N\text{-}Z\text{-}N\_Mo(Mo_5O_{18})]$ where Z = $-(C_6H_4)O(CH_2)_3O(C_6H_4)$. The synthesis of the difunctional isocyanate linker $OCN\text{-}(C_6H_4)O(CH_2)_3O(C_6H_4)\text{-}NCO$ has recently been achieved. Subsequent plans include reacting the diisocyanate with two equivalents of n-butylammonium hexamolybdate to obtain the target molecule.



Poster Presentation 17

COLONY MOVEMENT IN THE FRESHWATER BRYOZOAN LOPHOPODELLA CARTERI

Robert Grabowski and Susie Balser*
Department of Biology, Illinois Wesleyan University

Lophopodella carteri is a member of the Phylum Bryozoa that forms clumped massive colonies in freshwater habitats throughout the world. Every member of the colony is linked by a common body cavity called a coelom. Previous researchers have documented locomotion in colonies of L. carteri and other members of the bryozoan Class Phylactolaemata. I am testing hypotheses relating to the stimulus of locomotion and the mechanism of colony movement. The rate of motion is variable but ranges from 0-0.5 cm/day. Since L. carteri is generally found in shaded habitats, I am testing for a phototaxic behavior in the colonies. Video microscopy of moving colonies has revealed that body wall contraction is coincident with colony locomotion. I am testing the hypothesis that locomotion in L. carteri involves alternate contraction of circular and longitudinal muscles in the body wall that act upon the common coelom and periodic attachment of adhesive glands to the substratum. To evaluate this hypothesis, length and width measurements of moving colonies are recorded to determine the extent and frequency of body wall contractions. Further microscopy procedures are utilized to record the presence of body wall muscles and to locate adhesive glands.

Poster Presentation 18

ATTACHING ORGANIC LIGANDS TO THE KEGGIN ION

Jacqui Hoffman and Rebecca Roesner*
Department of Chemistry, Illinois Wesleyan University

Polyoxometalates are early transition metal-oxygen cluster compounds. Such complexes are known to be valuable catalysts, analytical reagents, and electron mircoscopy stains. Another potentially important application of heteropoly species is in clinical medicine. Several polytungstates have significant antiviral and antitumoral activity. The Keggin anion, $XM_{12}O_{40}^{-n}$, shown in figure 1, is among the most biologically active polyoxometalates.

By attaching organic molecules to the surface of this cluster, it may be possible to

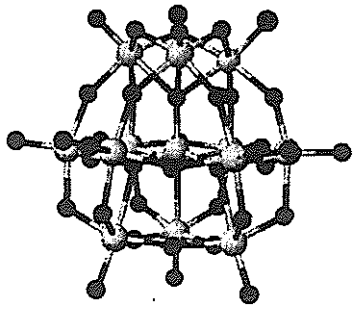


Figure 1

develop drugs which "seek out" diseased cells. Before this can be accomplished, however, fundamental techniques for forming polyoxometalate-carbon bonds must be developed.

The first molecule that we synthesized was a lacunary Keggin ion. A lacunary ion has one W-O group missing resulting in a vacancy in an otherwise symmetric molecule. The structure was confirmed by ^{31}PNMR, FT-IR and UV analysis. A carboxylate functional group was then attached to the lacunary ion by inserting a rhodium atom bearing a $-CH_2COOH$ ligand. The color change from white to orange (indicative of rhodium) signified successful substitution of the vacancy. The product was analyzed by ^{1}HNMR and FT-IR. A ^{31}PNMR spectrum was also obtained which showed the expected chemical shift. In the next and final step, we attempted to convert the carboxylate group to an amide through an anhydride intermediate.

Poster Presentation 19

THE MOZART EFFECT: CAN RATS DISCRIMINATE BETWEEN CLASSICAL AND MODERN MUSIC?

Elizabeth Huber and James D. Dougan*
Department of Psychology, Illinois Wesleyan University

The popular media have made much of something that they dubbed the "Mozart effect." College students who were exposed to Mozart performed spatial reasoning tasks better than students who were exposed to Philip Glass or silence. More recently, it has been suggested that exposure to Mozart also increased maze learning in rats. The present study further examined animal's response to the musical stimuli used in the Mozart experiments. Rats pressed bars for food in the presence of Mozart's "Sonata in D" or Philip Glass' "Music with Changing Parts." Preliminary results suggest that rats respond faster during Glass. This may be the result of a generalized arousal effect. Theoretical implications are unclear at present, pending further data collection.

Poster Presentation 20

EFFECTS OF A SIMULATED PREDATOR ON FREE OPERANT RESPONDING

Alisa Ittner and K. Emily Brahmstedt and James D. Dougan*
Department of Psychology, Illinois Wesleyan University

The present experiment investigated whether the scent of a predator would alter responding of rats in a Skinner box. Six rats were trained to press a bar for food, and then pressed the bar in both the presence and absence of predator scent (red fox urine). The effect was measured by the latency of the first response and by the total responses in the session. Data were averaged across the six rats for each session. The results indicated that there was an effect on the bar pressing. There was a longer latency to first response compared to baseline, although the latency decreased over time, indicating habituation. This increased latency to first response is attributed to species-specific defense reactions, which are the rat's innate reaction to a new stimulus (Bolles, 1970). The habituation suggests a reduction in fear responses over time. Future research will need to address additional dimensions of the phenomenon.

Poster Presentation 21

THE DIAGONAL ARGUMENT REVISITED

Sunil Jagwani, David Janashvili and Melvyn Jeter*
Mathematics and Computer Science Department, Illinois Wesleyan University

Recently a somewhat odd proof came up in the Techniques of Mathematical Proofs class: we had to show that the set of all real numbers from 0 to 1 is infinite. The diagonal argument proof of this theorem, instead of being accepted as usual, gave rise to another problem. It is usually taken for granted that one irrational number is greater than another, but, at the moment we did not have an algorithm of determining whether it is true or not. We did find such algorithm, but it was based on the fact that a subset of natural numbers necessarily has a least element. The proof of this theorem, in turn, gave a rise to another one. To complete the whole argument, we had to show that given a subset S of natural numbers with the following properties: 1) 1 is in S, 2) for any n in natural numbers, n* is (where n*={1, 2, ..., n}) a subset of S implies that n+1 is in S, would mean that S= the set of all natural numbers. Having shown this last result, we can now say that the set of all real numbers form 0 to 1 is infinite.

Poster Presentation 22

THE INTEGRATION OF CAPITAL MARKETS: AN EXAMINATION OF MACROECONOMIC SHOCKS AND THEIR EFFECTS ON NATIONAL STOCK MARKET COMOVEMENTS

Kristopher Kaneta and Carolyn Stumph*
Department of Economics, Illinois Wesleyan University

Traditionally, international investors seek to determine whether international capital markets are integrated or segmented. That is, do similar assets yield similar risk-adjusted returns, or significantly different returns given certain informational and capital flow barriers? With this in mind, this research chooses to focus on the rapidly developing financial markets of Southeast Asia and determine the degree to which international stock market movements may be correlated with each other. Through panel data and OLS regression analysis, the research will show an increasing correlation between these capital markets over time, and the significant impact certain macroeconomic variables may have on capital markets. Included in the analysis are the effects of capital flow barriers, economic development, exchange rate regimes, and discount rate differentials.

Poster Presentation 23

INFORMATIONAL ASYMMETRIES AND THE DEMAND FOR IPOs: AN EXPLANATION OF UNDERPRICING

Peter Karlis and Carolyn Stumph*
Department of Economics, Illinois Wesleyan University

There exists large informational asymmetries in the stock market, particularly in the primary market where initial public offerings are made. This paper examines the large initial gains observed in a previous study and explains them using game theory. The process of bringing an IPO to the market involves the issuing firm, the investment bank and the investors. This paper will discuss the strategic relationships that exist between these entities and why each either accepts a smaller gain or demands a risk premium based on the level of uncertainty they face. Accompanying the economic theories discussing these relationships are case studies displaying examples of underpricing in the process of bringing an initial public offering to the market.

Poster Presentation 24

CONFORMATIONS OF A COCAINE METABOLITE

Douglas Kasper and David N. Bailey*
Department of Chemistry, Illinois Wesleyan University

Benzoylecognine, the principle metabolite of cocaine, is the target molecule of choice for detecting illicit use of cocaine. Benzoylecognine is not organic solvent soluble because the molecule is a charged species, therefore cannot be easily extracted from aqueous urine. There are three different species of Benoylecognine: a positively charged (protonated) species, a negatively charged (deprotonated) species, and the zwitterion ion (containing both positive and negative charges) species.

The shape of each species has been determined using the Computer Animated Chemistry program (C.A.Che) and the most stable conformation found. The next step is to attempt to design another molecule with opposite charges and an inverse shape that will 'dock' with BE to form an uncharged ion pair. Upon docking the two molecules, the charge of Benzoylecognine will be hidden in the interior of the newly-formed ion pair. This ion pair has an overall charge of zero and should, therefore, mimic a non-polar molecule. The ion–pair should also be organic solvent-soluble. This allows extraction of the ion pair from urine using an organic solvent. The Benzoylecognine will then be analyzed by High Pressure Liquid Chromatography (HPLC) to determine its concentration.

Poster Presentation 25

PREFERENCE FOR NATURAL THINGS IN PRESCHOOLERS

Beth Keller and Peter Verbeek*
Department of Psychology, Illinois Welseyan University

Biophilia is a term coined by biologist E. O. Wilson to label his hypothesis that human beings have an innate affinity toward the natural world. Aspects of biophilia that have been researched to test Wilson's hypothesis include psychological-, aesthetic-, and spiritual correlates as well as the effect of technological advances on the expression of biophilia. Most of this research has been conducted with adults, but a few recent studies have focused on aspects of biophilia in school-age children and adolescents. The present study investigated aspects of biophilia in early development. Fifteen children enrolled in an urban preschool, and 27 children from a rural preschool, were shown a picture book containing paired images depicting natural things and their non-natural counterparts.

The preschoolers were asked which picture of each pair they preferred andtheir preferences were noted. Two specific hypotheses were tested. First, it was predicted that the children in this study would show a preference for natural things and as such display some degree of biophilia. The second hypothesis predicted that due to their generally greater exposure to subsistence derived from natural things, children from a rural environment would make a proportionally greater number of biophilic choices than children from an urban area.

Poster Presentation 26

DETERMINANTS OF ECONOMIC GROWTH IN EAST ASIA

Elizabeth Kowalski and Illaria Ossella*
Department of Economics, Illinois Wesleyan University

Economic growth in East Asia over the past 20 years has reached unparalleled rates. Many countries and numerous economists have unsuccessfully tried to determine what factors have contributed to this growth in an attempt to mimic it in other developing countries. On one hand, theory suggests that private markets along with increased human and physical capital can account for most of the growth in East Asia. However, others argue that government intervention and distortion are the driving force for growth. Somewhere in the middle lies the market friendly theory which suggests that government policy has been structured in the best way to encourage such goals as privatization and strong labor markets. Using OLS regression analysis and panel data, this paper will look at the effects of outward orientation, government intervention and macroeconomic stability on economic growth rates in East Asia. By examining only a few key variables, we can determine which ones have the greatest impact on growth. It is anticipated that a combination of many factors and a view most closely linked to the market friendly theory has led to the economic success in East

Poster Presentation 27

ALCOHOL EFFECTS ON HIPPOCAMPAL, ENTORHINAL, AND PREFRONTAL THETA EEG RHYTHMS

Larry Kociolek and Joseph Williams*
Department of Psychology, Illinois Wesleyan University

Alcohol elicits an impairment of spatial working memory comparable to lesions of the hippocampus, suggesting that alcohol may impair working memory by either directly affecting the hippocampus or by targeting areas that project to the hippocampus. In the hippocampus, a distinct EEG rhythm, found occurring in the 4-12 Hz range, is believed to serve an active role in learning and memory. This 4-12 Hz oscillation is known as theta rhythm. Currently, it is believed that alcohol specifically targets the medial septal area (MSA), the pacemaker of hippocampal theta rhythm, by inducing GABAergic inhibition of the MSA, which causes an overall reduction of theta power in the hippocampus. This reduction of theta power results in mnemonic deficits during the encoding, retrieval, and response phases of a working memory task. However, it is currently unknown if alcohol reduces theta power in the entorhinal cortex, which could impair the encoding of sensory information, and/or theta power in the prefrontal cortex, namely the anterior cingulate, which could impair both the retrieval of information and motor responses in working memory tasks.

This project examines the effects of alcohol on theta power in the hippocampus, entorhinal cortex, and anterior cingulate in rats in a spatial working memory task following systemic injection of various concentrations of alcohol. From these results, it will be determined if alcohol acts solely upon the MSA and hippocampus or if its effects on theta are more widespread.

Poster Presentation 28
(Also see Oral Presentation 3.3)

BROWN -HEADED COWBIRD BROOD PARASITISM IN BISON-GRAZED AND UNGRAZED TALLGRASS PRAIRIE IN NORTHEASTERN KANSAS

Alexandra S. Latham and Jack F. Cully*, Department of Biological Sciences, Kansas State University, and Sheryl Swartz Soukup*, Department of Biology, Illinois Wesleyan University

The Brown-headed Cowbird (Molothrus ater) has long been associated with bison (Bos bison) in North America on the Great Plains. As a result, we anticipated that cowbirds would be more successful breeding in the presence of bison than in their absence. We predicted that several common ground-nesting avian species, Dickcissels (Spiza americana), Grasshopper Sparrows (Ammodramus savannarum), and Eastern Meadowlarks (Sturnella magna), would suffer higher frequencies of brood parasitism in bison-grazed habitat than in ungrazed habitat on Konza Prairie Research Natural Area in notheastern Kansas. The frequency of cowbird parasitism for all species combined was significantly higher (0.69) in bison-grazed than in ungrazed habitat (0.44) ($p = 0.044$, $(2 = 4.061$, $df = 1$). These results are consistent with our suggestion that bison-grazed habitat may be a more optimal site for cowbird brood parasitism than ungrazed habitat. We pose two principal explanations for the higher frequency of parasitism observed in the bison-grazed area. First, cowbirds may be able to forage more efficiently in the bison-grazed area, indirectly inflating parasitism frequencies by conferring a variety of energetic and nutritional advantages upon the females. Second, the cowbirds' abilities to find and parasitize nests may be enhanced by the shorter, less dense grass characteristic of grazed habitat. Further studies investigating the conservation implications of this phenomenon are merited since cowbird brood parasitism usually reduces reproductive success of host species, and has had a dramatic negative impact on population of several hosts, driving them to near extinction.

Poster Presentation 29

IDENTIFICATION OF LRF1 AND LRF2 MUTANTS IN ARABIDOPSIS

Neva Laurie and Loni Walker*
Department of Biology, Illinois Wesleyan University

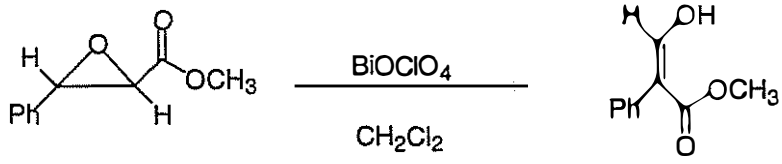
Arabidopsis is a model system for research in plant genetics. It is a typical dicot with a relatively short life cycle and has a small, compact genome with little noncoding DNA. Because these characteristics make it so appealing for research, much of its genome has been mapped, resulting in a database of known genes with unknown functions. The purpose of this experiment is to determine a function for two of these genes, LRF1 and LRF2. These genes are suspected to code for F-box proteins, which are believed to provide specificity in marking proteins for degradation through the ubiquitin pathway. This function often acts as a control mechanism in hormone signaling pathways, and sequence similarity to known genes suggests this is a likely mode of action for LRF1 and LRF2. This experiment employs reverse genetic techniques to identify plants which have had these genes mutated, causing production of a nonfunctional protein.

Poster Presentation 30

BISMUTHYL (III) PERCHLORATE PROMOTED REARRANGEMENT OF ACYL SUBSTITUTED EPOXIDES

Nicholas M. Leonard and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

Acyl substituted epoxides are readily available and can be easily rearranged to form carbonyl compounds. The formation of substituted carbonyl groups is especially significant in organic synthesis, and is possible through use of bismuthyl(III) perchlorate, $BiOClO_4$. This reagent is relatively non-toxic, inexpensive, and insensitive to air, which makes its use more practical then some standard reagents such as $BF_3.Et_2O$ and $InCl_3$. The results of rearrangement of acyl substituted epoxides with $BiOClO_4$ will be presented



Poster Presentation 31

MICROSOFT VERSUS NETSCAPE: A CASE STUDY OF GAMES BUSINESSES PLAY

Esteban Lizano and Margaret Chapman* and Carolyn Stumph*
Department of Economics, Illinois Wesleyan University

Game theory is a formalized way of analyzing interactions between rational players in hopes of "solving" the game, or finding a solution that optimizes outcomes for both players given each others strategies. This framework is used to analyze the interactions and strategies of the two main providers of Internet Browsing Software, i.e. Microsoft (Internet Explorer) and Netscape (Netscape Navigator.) Since both of these firms price their product close to zero, and given that marginal costs approach zero, they are using competitive short run pricing. Focusing on pricing to study strategic behavior ignores that both firms must price to cover sunk costs over the long run and that revenue proceeding from sale of the product is not the main source to cover this cost. Therefore, pricing of the software itself is not the essential element in the players' strategies. This game will therefore be constructed and solved as a dynamic repeated game, using market share and research and development expenditure as the principal strategic variables to study the behavior of both firms from 1993 to the present.

Poster Presentation 32

THE ROLE OF THE LATERAL SEPTUM IN THE MODULATION OF HIPPOCAMPAL THETA AND LEARNING AND MEMORY PROCESSES

Kristina McDonald and Joseph Williams*
Department of Psychology, Illinois Wesleyan University

The theta EEG rhythm, a regular 4-12 Hz oscillation present in the hippocampus, plays an important role in learning and memory. It has been proposed that the hippocampus (HPC), lateral septal area (LS), and the medial septal area (MS) are connected in a tri-synaptic feedback loop, which modulates the theta rhythm. Numerous studies have examined the relationship between the HPC and MS in regards to theta modulation. However, comparatively little is known about the role of the LS in hippocampal theta and in learning and memory processes. Research has shown that fibers descend from the HPC to the LS and from there to the MS. The MS in turn projects back to the HPC. The present experiment utilized a spatial working memory task to assess whether disruption of LS processing would affect HPC theta and/or working memory performance. Saline and two doses of kynurenate (2.5 and 5 g), a glutamatergic antagonist, were injected into the LS of all rats on separate testing days, to determine if reversible lesions of the LS produced deficits in task performance. Infusions of kynurenate into the LS significantly impaired working memory performance and lowered theta power. A significant positive correlation was found between theta power and task performance. Overall, the data showed that inhibition of the LS lowered theta power and caused a deficit in performance on a working memory task, indicating that the LS plays a significant role in the modulation of HPC theta.

Poster Presentation 33

A TEST OF THE ENVIRONMENTAL KUZNETS CURVE FOR LOCAL AND GLOBAL POLLUTANTS

Robin Meers and Robert Leekley*
Department of Economics, Illinois Wesleyan University

It is suggested that there is an inverted-U relationship between the level of pollution and the income of a country. That is, as the income of a country increases, there is first an initial increase in pollution and then a decrease as the desired level of environmental quality increases. This is known as the Environmental Kuznets Curve and its validity is debated among environmental economists.

The purpose of this paper is to test the hypothesis of the Environmental Kuznets Curve using OLS regression analysis. It examines the local pollutants particulate matter and sulfur dioxide and the global pollutant carbon dioxide. It is anticipated that the local pollutants follow the theoretically predicted U more closely than the global pollutants.

Poster Presentation 34

SYNTHESIS OF BIS(HEXAMOLYBDATE) COMPLEXES COVALENTLY BRIDGED BY ORGANOIMIDO LIGANDS

Jeremie D. Moll and Rebecca Roesner*
Department of Chemistry, Illinois Wesleyan University

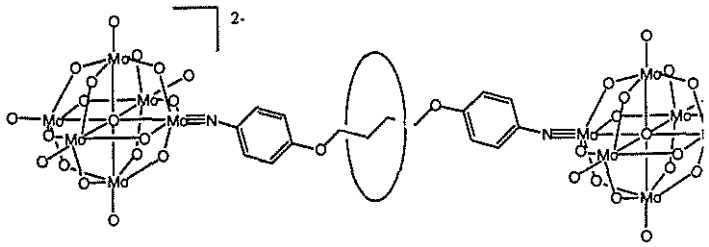
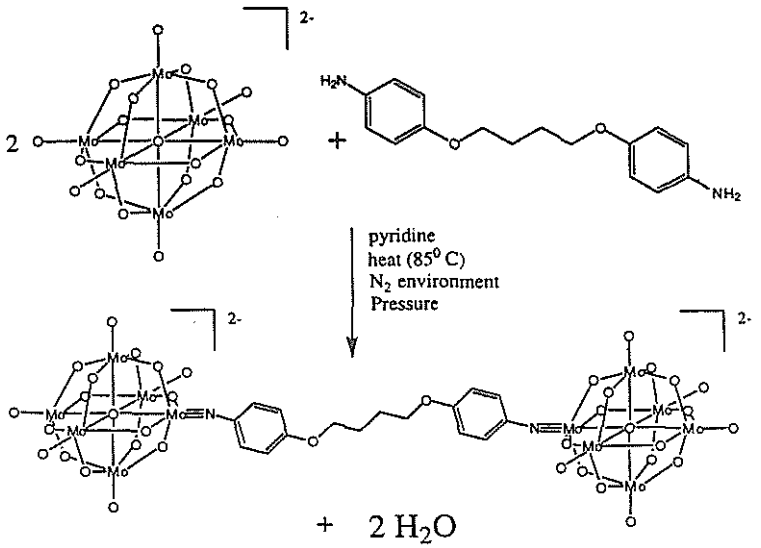


Figure 1

Rotaxanes are supermolecular structures composed of linear molecules threaded through macrocyclic molecular rings and held in place by the addition of large blocking groups to prevent dethreading (**Figure 1**). Polyoxometalates, such as hexamolybdate ions, are extremely large, highly symmetric clusters that can be used as the blocking groups for rotaxane preparation. Our intent has been to synthesize a Bis(Hexamolybdate) complex to serve as the dumbbell for our rotaxane through the use of difunctional amine linkers. Our current goal is to purify the synthesized complex (**Figure 2**) and then repeat the procedure with the macrocyclic molecule in place.

Figure 2



Poster Presentation 35

EXPERIMENTAL CONSIDERATIONS IN MEASURING THE THERMAL CONDUCTIVITY OF $SrTiO_3$

Tadvana G.Narayanan and Ileana G.Rau and Gabriel C Spalding*
Department of Physics, Illinois Wesleyan University

The temperature dependence of the thermal conductivity of $SrTiO_3$ has been previously measured down to 1.5 K. In order to extend such measurements to lower temperatures, where quantum effects may become clearer, the first stage of our experiment has involved the design and construction of a He-3 cryostat capable of cooling various samples (*e.g.*, Strontium Titanate and other quantum paraelectrics) to temperatures close to absolute zero (~ 0.5 K). Our design involves He-3, vacuum pumps, pressure gauges, and valving manifold systems, along with an insertable sample stick and outer dewar. Moreover, for thermal conductivity measurements we must take into consideration all the other materials that are thermally linked to our sample: resistors, wires, epoxies, copper blocks. We will describe the experimental considerations, based on the heat and electronic transport properties, that have guided us in choosing the materials that are in contact with the $SrTiO_3$ samples.

Poster Presentation 36

APPLYING VAN DER PAUW'S TECHNIQUE TO THERMAL CONDUCTIVITY

Mark Ordonez and Ileana Rau and Gabe Spalding*
Department of Physics, Illinois Wesleyan University

When measuring electrical resistance, two leads (an input and an output) may be used so long as the resistance of the sample is large compared to that of the leads and the contacts, and as long as thermoelectric voltages are negligible in comparison to the signal of interest. However, multi-lead configurations can often provide further information. For example, a method due to van der Pauw can be used to extract the intrinsic electrical resistivity of a material even from samples having non-trivial geometry (where current flow is non-homogeneous).

Formally, there is a great similarity between electronic and heat transport. In 1999 researchers at the University of Freiburg, Germany took advantage of this similarity, and applied the van der Pauw technique to measurements of thermal conductivity. Because such a method provides a more detailed mapping of the thermal conductivity, we intend to explore the use of the van der Pauw technique to map out the intrinsic anisotropies in the thermal conductivity of a single crystal sample.

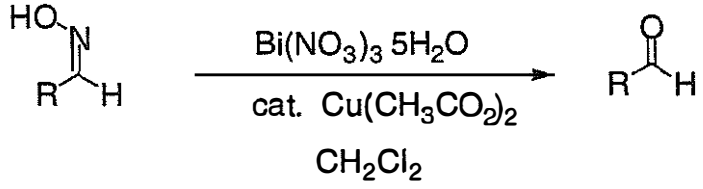
Moreover, by exploring the thermal conductivity of $SrTiO_3$ samples at very low temperatures (down to ~ 0.5 K), it may be possible to help explain some of the peculiar quantum effects seen in this material.

Poster Presentation 37

NEW REAGENTS FOR ORGANIC SYNTHESIS DEPROTECTION OF OXIMES WITH BISMUTH NITRATE

Bryce A. Nattier and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

The protection of functional groups is an important aspect of synthetic organic chemistry. Oximes are frequently used to protect both aldehydes and ketones. Since oximes can be made from non carbonyl compounds, their conversion to aldehydes and ketones constitutes a useful synthesis of the latter. The standard method of deoximation involves the use of strong acids and often results in low yields. We wish to report that bismuth(III) nitrate pentahydrate deprotects oximes to carbonyl compounds in high yields. The advantages of using this reagent are low cost and low toxicity.



Poster Presentation 38

THE EFFECTS OF ALCOHOL ON THE AMYGDALA

Michael Bowgren, Heather Hunnell, Kate Palmer, Matthew Roberts
and Joseph Williams,*
Department of Psychology, Illinois Wesleyan University

Alcohol is a widely abused substance that results in a great deal of detrimental effects on society, resulting in about 5% of all deaths in the US. The overall cost of alcohol abuse in the US (including cost of treatment, loss of productivity, crimes and accidents associated with alcohol) has reached $85.8 billion dollars. Given the social and economic ramifications associated with alcohol abuse, numerous studies have focused on the neuropsychological effects of alcohol. It has become clear that even low to moderate levels of alcohol can result in cognitive impairments, including deficits in emotional processing. For instance, alcohol has been shown to disrupt fear conditioning to an auditory tone that has been associated with an aversive stimulus. · The most likely target of alcohol's disruption of affective (emotional) processing is a temporal lobe structure called the amygdala, which is essential for the processing of both positive and negative affective information. However, little research has been conducted to determine whether the direct action of alcohol in the amygdala results in cognitive impairments. The purpose of this experiment is to determine if alcohol's ability to disrupt the processing of emotional/affective information is due primarily to alcohol's actions in the amygdala. This will be accomplished by training rats on a behavioral task measuring memory for different levels of sweetness. After learning the task, alcohol will be infused directly to the amygdala to determine whether alcohol significantly impairs behavioral performance.

Poster Presentation 39

ARE THERE DIFFERENCES IN NUTRIENT ASSIMILATION AMONG CELL-LINEAGES OF SEA URCHIN EMBRYOS?

Ketaki K. Patel and William Jaeckle*
Department of Biology, Illinois Wesleyan University

Embryos of the sea urchins *Arbacia punctulata* and *Lytechinus variegatus* were used to test the hypothesis that differences exist among specific cell-lineages in the ability to assimilate nutrients from seawater. Embryos at different developmental stages (from unfertilized eggs to prism stage larvae) were incubated in a seawater solution of the iron-containing protein ferritin (2 mg/ml) for fixed time periods. Following each incubation period, specimens were fixed in neutral buffered formalin. To detect the presence of iron (from ferritin) in cells, experimental specimens and individuals not exposed to ferritin (controls) were incubated in a 3:2 mixture of 1% HCl and 2% Potassium ferrocyanide. The formation of a blue reaction product revealed those cells containing iron. Results indicate that the ability to assimilate nutrients is detectable between the 8-cell stage and a multicellular pre-blastula stage; and, assimilation is uniform among different cell-lineages.

Poster Presentation 40

DETERMINATION OF pK VALUES FOR THE IONIC PAIRING OF BENZOYLECOGNINE

William G. Polacek and David N. Bailey*
Department of Chemistry, Illinois Wesleyan University

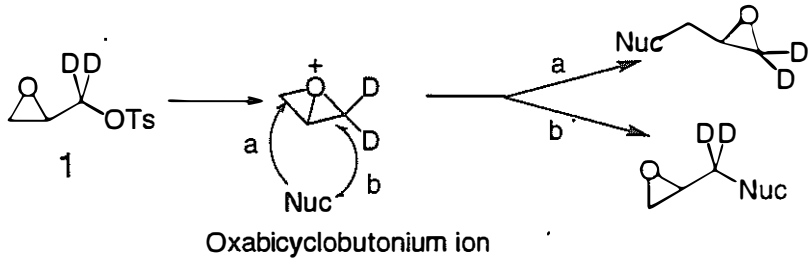
Benzoylecognine is the most abundant metabolite of cocaine in the human body. In forensic science, analysis of benzoylecognine in urine, using gas chromatography/mass spectroscopy, is used to identify cocaine abuse. GC/MS requires derivatization of benzoylecognine samples, which is costly. Liquid chromatography is a cheaper and faster way of quantifying, since derivatization is not needed. However, the benzoylecognine ion has both a positive and a negative charge, with a net charge of zero. This makes benzoylecognine extremely water soluble and difficult to extract from urine into a non-polar solvent. This research concentrates on finding the best environment to isolate benzoylecognine as a charged molecule. By experimentally obtaining the pK_a values for benzoylecognine, the ideal pH can be obtained for isolating benzoylecognine in a negatively charged form. This information can be used to complex benzoylecognine with a bulky positive counter ion. The ion-pair can then be extracted into an organic solvent for quantification by liquid chromatography.

Poster Presentation 41

INVOLVEMENT OF OXABICYCLOBUTONIUM IONS IN NUCLEOPHILIC DISPLACEMENT REACTIONS OF GLYCIDYL HALIDES AND SULFONATES

Mike S. Pulia and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

Epoxycarbinyl substrates **1** serve as useful chiral synthons and their solvolysis has been the subject of several mechanistic studies. Despite these studies, it has not been unequivocally established whether the solvolysis reactions proceed with anchimeric assistance from the epoxide oxygen and involve the intermediacy of an oxabicyclobutonium ion or whether unassisted ionization occurs to generate an epoxycarbinyl ion. The aim of this project is to synthesize deuterated glycidyl sulfonates and halides and study their nucleophilic displacement reactions. The progress to date will be presented.



Poster Presentation 42

AUSTRIAN ECONOMIC THEORY OF INFLATION AND THE BUSINESS CYCLE

David Rasho and Margaret Chapman*
Department of Economics, Illinois Wesleyan University

This paper intends to show that the extension of bank credit, while promoting economic growth in the short run, will eventually cause a recession or depression. Theories on inflation and business cycles proposed by Austrian economists, as well as an original extension of this theory, provide the foundation for this argument. Austrian economists maintain that bank credit holds the interest rate below its natural level, sending distorted market signals to entrepreneurs. Acting on these signals, businesses increase production and investment because more projects are now profitable. But because existing factors of production have not expanded, the economy cannot support this growth. Competition for scarce labor and capital will tighten these markets and cause their prices to rise. This unforeseen expense will force many projects to fail and an economic decline ensues as bankruptcies and abandonment wipe away these malinvestments. To end the business cycle and make possible continued economic growth, the extension of bank credit must be eliminated. Only the accumulation of capital, caused by undistorted market signals, can lead to lower interest rates and sustainable economic growth.

Poster Presentation 43

AN EMPIRICAL STUDY OF RECENT IPOs IN THE U.S. MARKETS

Kevin Kalus and Zhenhu Jin*
Business Administration Department, Illinois Wesleyan University

An Initial Public Offering occurs when a privately held company goes public by selling part of the ownership in exchange for new capital. Fueled by a continuing bull market, there have been more IPOs than ever before in the last three years. The purpose of this research project is to examine a sample of IPOs in the last six years to see the average initial, first day and six-month returns. We further investigate whether the returns are affected by the initial market capitalization, the size of the initial offer, the actual initial price vs. the proposed offer price, the year the IPO took place and the trade volume. Our sample includes a total of 200 IPOs with 100 Internet related firms and 100 Non-Internet related firms. This will enable us to study the differences and similarities between Internet and Non-Internet IPOs.

Poster Presentation 44

THE RELATIONSHIP BETWEEN SURFACE AREA AND BIOMASS IN THE JUVENILES OF 'ARBACIA PUNCTULATA' (ECHINODERMATA)

Matthew D. Schnabl and William Jaeckle*
Department of Biology, Illinois Wesleyan University

Abstract not available at time of publication.

Poster Presentation 45

AN ASSAY FOR THE ESTIMATION OF ORGANIC CONTENT IN UNKNOWN SAMPLES

William Schneider and William Jaeckle*
Department of Biology, Illinois Wesleyan University

Potassium dichromate, in an acidic solution will oxidize organic material. The reduction to chromate is associated with a color change, which can be measured as a change in absorbence using a spectrophotometer. The degree of change is linearly related to the total energy contained in a sample and this information can be used to predict the energy content of unknown samples. However, the slopes of these relationships are not identical for various compounds, and are significantly different for proteins and carbohydrates. It is hypothesized that these variations are due to differences in the reaction kinetics and that these differences can be used to predict the chemical composition of mixtures of proteins and carbohydrates.

Poster Presentation 46

IS BOTSWANA'S CURRENT DEVELOPMENT SUSTAINABLE?

Megan Scott and Robert Leekley*
Department of Economics, Illinois Wesleyan University

Botswana is a landlocked country located in the heart of Sub-Sahara Africa. In 1966, the country achieved independence, the population density was low and Botswana was one of the poorest countries in the world with a subsistence agriculture based economy. An economic "boom" occurred from the discovery of diamonds in 1967 after a search of twelve years. This placed Botswana as one of the leading suppliers of diamonds in the world. Today, as one of Africaís few success stories, Botswana is predicted to be the second fastest growing economy in the world with a growth rate of seven percent in the past four years.

The supply of diamonds is the basis for Botswana's economic success. While the supply may last for many years ultimately it is finite. Taking this into account there is a question of whether Botswana is living sustainably or if the economic boom will be short lived. The sustainability criterion suggests that at a minimum, future generations should be no worse off than current generations. In the case of Botswana's mineral-based economy, sustainability is determined by the maintenance of economic and environmental standards during the depletion and through the extinction of the finite mineral supply.

Botswana is experiencing many environmental problems that may not be solved by the discovery of diamonds and they are compromising Botswana's sustainability. The country is currently experiencing problems such as shortages of water, drought, desertification, overpopulation and poverty. All of these problems threaten the sustainability of Botswana's economy, leading to the question of whether future generations will be able to live as the present generations are with the current depletion of the diamond supply and the damage that is being done to the environment.

Poster Presentation 47

GYPSY PERSECUTION DURING THE GOLDEN AGE OF SPAIN

Leila Setork and Carolyn Nadeau*
Department of Hispanic Studies, Illinois Wesleyan University

The Gypsies of Spain's Golden Age suffered a persecution unknown to any other race in Spanish history. Entering Spain in the mid-fifteenth century, the Gypsies lived in isolated communities governed by strict, self-devised Gypsy laws devised to preserve racial unity and loyalty. The Gypsies lived undisturbed until 1499, a year which marked the beginning of anti-Gypsy laws devised by the Spaniards. While the Gypsy laws fought to maintain their unity and survival as a race, the Spanish laws aimed at destroying Gypsy harmony and culture.

The struggle continued until the end of the eighteenth century, when Spanish king Carlos III initiated a series of laws that marked the decline of Gypsy persecution in Spain. By the end of nineteenth century, the Gypsies integrated with the Andalucian culture in Spain, and the era of Gypsy persecution during the Golden Age came to a close.

Poster Presentation 48

PHILIP II AND HIS PROBLEMS WITH THE NETHERLANDS

Marta Siaba and Carolyn Nadeau*
Department of Hispanic Studies, Illinois Wesleyan University

When Philip II inherited the Spanish Empire from his father, Charles V, the empire was at the height of its power with territory covering parts of the Americas, Naples, Sicily, Milan, the Netherlands, the Philippines and other Caribbean islands. Spain lost most of its possessions and worldly status, and in particular Spain lost control of the majority of the Netherlands due to some errors in Philip's decisions during his reign.

One of Philip's most detrimental problems was his lack of communication with the Netherlands. Because of his refusal to learn other languages besides Spanish, he was unable to comprehend either the Dutch or the French which was spoken in the Netherlands. Thus, Philip had to rely on interpreters to relay his messages to the provinces.

Another problem was the long traveling time between Spain and the provinces in which messages were often slow in coming and often too late to have much of an impact on the governance of the provinces. Therefore, the king's sphere of influence was limited to appointing governors to rule for him in the provinces. Philip also did not like to travel much and therefore never visited the Netherlands during his reign. This lack of communication and presence in the Netherlands proved to be one of the main reasons why Spain lost control of the Netherlands.

The main problem was Philip's strict adherence to the Catholic faith and his concern over religion in the Netherlands. The Dutch were considered to be religious liberals. Philip saw this as a sign of possible rebellion by the Dutch as well as a clear dispersion from the true Catholic religion.

All these problems led to the eventual rebellion of the Netherlands against Spanish rule. Under Philip II's rule, Spain lost the lower half of the Netherlands with the rest of the provinces to shortly follow. If Philip II was a man more conscious of his faults and more sensitive to the different ways of life of the Dutch, perhaps history would have taken a different course.

Poster Presentation 49

EXPLAINING ENVIRONMENTALISM AMONG THE RURAL INDIGENOUS POOR IN THE DEVELOPING WORLD: IS POST-MATERIALISM INVOLVED?

Amelia Taylor and Abigail Jahiel* and Kathleen Montgomery*
Department of Political Science, Illinois Wesleyan University

This project questions the applicability of Ronald Inglehart's dominant theory of post-materialism to environmentalism in the developing world. My research focuses on rural indigenous groups that are actively fighting for environmental protection. However, these rural indigenous people do not fit the criteria that Ronald Inglehart theorizes that one must fit into in order to be an environmentalist. He argues that environmentalism develops in a society when high levels of affluence and education are achieved. In other words, only those who have their basic material needs met have the luxury of concerning themselves with issues like environmentalism.

Case studies of poor rural indigenous groups are utilized in order to question this theory. I argue that these communities have a different relationship with the environment, and that this relationship cannot hope to be explained by a theory that centers around the urbanized West. This is due in part to their dependence on a healthy environment for survival. However, I also argue that their concern for the environment goes further than simple "materialism." These groups have strong cultural and religious ties to the land, which are not considered by Inglehart's theory. These values are demonstrated through the struggles these groups are facing by outside forces whose interests will harm the quality of their environment.

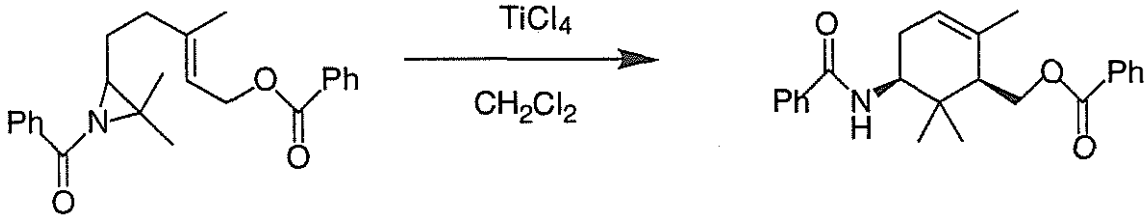
This qualitative analysis includes case studies of three different groups. They include: the Penan people of Malaysia who are fighting to save their land from loggers, the Greenbelt movement of Kenya in which rural women have started a local tree planting campaign to protect their troubled environment, and the Kayapo people of Brazil who are fighting to save their lands from mineral extractors and logging interests.

Poster Presentation 50

LEWIS ACID CATALYZED CYCLIZATION OF AZIRIDINES

Steven A. Tymonko and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

Rearrangement reactions resulting in the formation of new carbon-carbon bonds are important tools in organic synthesis. These reactions have been well documented for compounds such as epoxy olefins, yet similar rearrangements with aziridines have been largely unexplored. We wish to report the successful rearrangement of benzoyl aziridines catalyzed by titanium (IV) chloride.



Poster Presentation 51

PSYCHOSOCIAL EFFECTS OF A PARENT-CHILD COMMUNICATION ACTIVITY ON SIBLINGS OF CHILDREN WITH AUTISM

Caryn Terril and Linda J. Kunce*
Department of Psychology, Illinois Wesleyan University

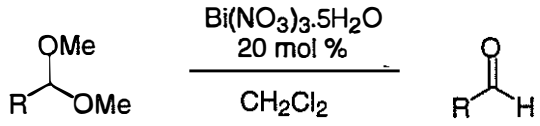
In this project, I attempted to decrease the worries of siblings of children with autism through a parent-child communication activity. In addition, the quality of parent-child relationship and the accuracy of the parent's perception of the child's worries were explored. Participants were recruited through school districts and support groups serving families of children with autism. The siblings of children with autism ranged from six years old to thirteen years old. Half the child-parent pairs were randomly assigned to the treatment group, which completed a workbook activity designed to enable the siblings to talk about their autism-related worries with their parents. The other child-parent pairs were assigned to a placebo-control group in which children and their parents played games together.

Poster Presentation 52

FACILE DEPROTECTION OF ACETALS USING BISMUTH NITRATE

Laura C. Wieland and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

Protection of aldehydes and ketones as acetals and their subsequent deprotection is an important step in many synthetic schemes. We wish to report that bismuth (III) nitrate pentahydrate is an effective reagent for the deprotection of conjugated acetals. Bismuth compounds are relatively inexpensive and non-toxic, and thus useful in organic synthesis.



Poster Presentation 53

DETERMINING THE pK_a OF BENZOYLECOGNINE

David Wong and David N. Bailey*
Department of Chemistry, Illinois Wesleyan University

The most abundant cocaine metabolite found in the human body is benzoylecognine. To recognize cocaine abuse, gas chromatography/mass spectroscopy is currently used to analyze urine for benzoylecognine. However, GC/MS requires benzoylecognine to be derivitized before analysis, which is expensive. Derivitization is not needed when analyzing by liquid chromatography and therefore is cheaper. Benzoylecognine however is a zwitterion and possesses both a positive charge and a negative charge. This makes benzoylecognine highly soluble in water, making it difficult to extract into a non-polar solvent. Much of this research focuses on the determination of the pK_a of benzoylecognine in order to isolate it as a singly charged molecule. One of the pK_as is determined to be 2.47. Once benzoylecognine is in its positively charged form, it can be complexed with a large negative counter ion. This ion pair can then be extracted into an organic solvent analyzed using liquid chromatography.

Poster Presentation 54

COMPUTER VISION – OBJECT RECOGNITION

Michael Zalokar and Lionel Shapiro*
Mathematics and Computer Science Department, Illinois Wesleyan University

One of the growing fields in computer science is that of Artificial Intelligence or AI. Many theories have evolved to make a computer intelligent and so far no one has succeeded. One of these methods used by the Shelley Project in the past has been to use neural networks, which is the backbone of the GNU Neural Network Visulizer (GNNV). GNNV uses a neural network to try to identify objects, like faces, in the field of view.

A different method, and the focus of this research, is to identify objects in the image. These objects could be squares, circles or even blobs. One advantage over Neural networks for this method is that as the programmer you know exactly what it knows. Instead, the problems are of the form. "How do I tell it what a circle is?" or "How do I have it determine what is noise that should be ignored?"

The goal of this project is to create a program capable of taking in an image from a digital camera and identifying the tic-tac-toe game. This is inspired from past work done for the Shelley Project which included playing tic-tac-toe (without the vision component) and the Shelley Integrated Environment (SIE). Because of the flexibility of working within the SIE, the present project will readily adapt to different board games, with minimal structural reworking.

Poster Presentation 55

TEMPORAL DIFFERENCES IN THETA RESET

Nicholas J. Brazis and Joseph Williams*
Department of Psychology, Illinois Wesleyan University

Neurons within the hippocampus (HPC), entorhinal cortex (EC), and anterior cingulate (AC) display a characteristic 4 - 12 Hz frequency EEG pattern called the theta rhythm. Experimental disruptions of this theta rhythm are correlated with deficits in cognitive processing. Hence, theta may contribute to learning and memory. One proposed mechanism suggests theta resets by stopping and restarting again, phase-locking itself to incoming sensory input. This reset may allow cells to be in a maximal state of firing when sensory information arrives, thereby strengthening synapses and, hence, cognitive processing. Previous studies from this lab have shown that theta reset occurs in the HPC, EC and AC and that theta reset is highly predictive of correct working memory. However, the neural mechanism behind theta reset is still unclear. Theoretically, the HPC, EC, and AC theta rhythm is generated via projections from the medial septal area (MSA), which contains neurons that fire in a rhythmically bursting pattern. Inhibition of these neurons precedes theta reset in the HPC. It has been hypothesized that if MSA generates theta in the EC and the AC as well as the HPC, then reset of the EC and AC should occur at the same time as HPC reset. This study looks at temporal differences in theta reset in the HPC, EC, and AC.

Poster Presentation 56

VENTURE CAPITAL IN THE UNITED STATES

Sunil Jagwani and Michael Seeborg*
Department of Economics, Illinois Wesleyan University

Venture Capital has proven to be of great importance in the formation and development of new products, companies and markets. Hitherto, very little research has been devoted to finding ways to encourage this relatively nascent industry. This paper provides a structural framework to understand the workings of the venture capital market. It looks at certain exogenous factors to determine their influence on the supply and demand of venture capital. Based on the findings, it makes suggestions to predict and boost venture capital activity using these factors.

Particular attention has been paid to the Capital Gains Tax. Theoretically, the tax can affect both the entrepreneurs and Venture Capitalists. The paper develops an empirical model to estimate the differential in the disincentive resulting from capital gains taxation between these two groups.