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2002

TO RECOGNIZE THE
RESEARCH PROJECTS

&

CREATIVE
ENDEAVORS
OF IWU STUDENTS



TWELFTH ANNUAL
JOHN WESLEY POWELL • IWU
STUDENT RESEARCH
CONFERENCE

April 20-21, 2001 • Center for Natural Sciences

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

Twelfth Annual

John Wesley Powell • IWU

Student Research Conference

Science Commons

Center for Natural Sciences

Friday, April 20, 2001

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

Saturday, April 21, 2001

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

Official Program



ACKNOWLEDGEMENTS

This conference could not have been a success without the contributions of the Conference Faculty Advisory Committee, whose members were (alphabetically) Joy Calico, Carren Moham, Ram Mohan, Mike Seeborg, and Dan Terkla.

Many thanks to Pat Neustel, who did all the work putting this program booklet together, as well as making all the arrangements.

SCHEDULE OF EVENTS

Friday, April 20, 2001

7:00 p.m.	Musicians in Concert and Discussion	Evelyn Chapel
8:00 p.m.	School of Art Honors Exhibition and Reception	Merwin Gallery

Saturday, April 21, 2001

8:30 a.m.	Continental Breakfast and Poster Setup	Science Commons
9:00 a.m.	Keynote Address – Prof. Eric Pallant	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
	Luncheon Address – Prof. Robert Bray	
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
5:00 p.m.	Phi Kappa Phi Banquet (by invitation)	Main Lounge

KEYNOTE SPEAKER

"THERE'S MORE TO RECYCLING THAN NUMBER TWO PLASTICS"

Dr. Eric Pallant, Professor of Environmental Science, Allegheny College

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

Professor Pallant received his B.A. from Wesleyan University in Connecticut, an M.F.S. from Yale University, and a Ph.D. from Cornell University. Since 1997 he has been Director of the Center for Economic and Environmental Development (CEED) at Allegheny College in Meadville, PA. Professor Pallant helped to create the Center, and is responsible for fundraising, budgeting, and administration of nine projects, 14 directors, and 247 community partners. The Center's mission is to enhance the quality of life in western Pennsylvania by supporting a comprehensive approach to education for sustainability. The Center promotes sustainable forestry, agriculture, energy, land use, curriculum, and industrial practices. It works with artists and planners to create a sustainable vision for the future.

He has been a consultant to numerous colleges focussed on creation and evaluation of major programs in Environmental Science and Studies. These consultancies have included Washington and Jefferson College, Franklin and Marshall University, Randolph Macon College, Albion College, St. Olaf College, Colorado College, Ithaca College, Scranton University, Whitehead College, University of Redlands, Western State College, UNC-Asheville, Purdue University-Calumet, and Marietta College.

Professor Pallant has also led a research team that prepared agricultural, forest development, and preservation plans for the Amazon village of Campana Cocha, Ecuador. He has also engaged in land use planning with the Nature Conservancy in Mt. Kisco, NY; the Regional Water Authority, in New Haven, CT; the Roxbury Land Trust in Roxbury, CT; and B..Marson, Architect, NY, NY.. He served as an Advisor to the President's Council on Sustainable Development.

Among his publications are "Atrazine suppression of fine root growth in corn;" "Earthworm response to 10 weeks of incubation in a pot with acid mine spoil, sewage sludge, and lime;" "Sewage sludge on acid mine spoils: grasses produce more than legumes;" "Applications of molluscan microgrowth analysis to geoarchaeology;" "Surface soil acidification under red pine and Norway spruce;" "Gap frequencies in lowland rain forest sites on contrasting soils in Amazonian Ecuador;" "Effect of forest vegetation on spatial variability of surface mineral soil pH, soluble aluminum, and carbon;" and "Spatial variability of pH and organic matter in forest plantations."

LUNCHEON SPEAKER

“OUR LIVING HISTORY”

Dr. Robert C. Bray, R. Forrest Colwell Professor of American Literature

Approximately 1:15 p.m. Memorial Center Main Lounge

Professor Bray has been a member of the Illinois Wesleyan University faculty since 1970. He received a bachelor's degree from Kansas State College (Pittsburg), and an MA and PhD from the University of Chicago. Professor Bray's interests as a teacher concern 19th century American literature; American painting and literature; midwestern literature; and the literature of Illinois.

His books include *Diary of a Common Soldier in the American Revolution* (with Paul Bushnell, IWU history department); *A Reader's Guide to Illinois Literature* (editor in chief and contributor); and *Rediscoveries*. Among many other subjects Professor Bray has published articles on Mark Twain, Robert Herrick, Francis Grierson, and Peter Cartwright. Cartwright, a Methodist circuit rider of the 19th century and one of the founders of Illinois Wesleyan University, has been a special interest of Professor Bray's. A biography of Cartwright is under contract with the University of Illinois Press.

Professor Bray has served on the Association of Departments of English Executive Committee, the Read Illinois Advisory Committee which he chaired for five years, the Board of Directors of the Illinois Humanities Council, and the Advisory Board of the Illinois State Historical Society, among many other professional activities.

Most recently, Professor Bray has undertaken an oral history of Illinois Wesleyan University, which will be the subject of his remarks today. This afternoon, a presentation by Liz Dierbeck and Erika Rozinek will elaborate on some of the work done to date on this project.

STUDENT PARTICIPANTS

Andrews, Brad	P1	O'Roark, Jacelyn	O3.1
Banerjee, Pritam	O4.5	Palmer, Kate	P4
Baxi, Kosha N.	O2.3	Payne, Brian J.	P15
Bhatia, Kaushik	P14	Pelz, Katie	P16
Branson, Kimberly	P2	Price, Sean	P7
Burrow, Kara	P3	Rabon, Michelle	P17
Buss, Elizabeth	P4	Ray, Rebecca	O5.5
Carlson, Anna	P10	Reynen, Scott	O3.2
Chapman, Terrence	O5.1	Rozinek, Erika	O4.1
Curran, Paul	P1	Sacho, Elizabeth	P18
Denoma, Jill	P5	Schnabl, Matt	P19
Dierbeck, Liz	O4.1	Schoenbeck, Bethany	P20
Dziallo, Rachel	O4.2	Setork, Leila	P21
Freiberg, Derek	P6	Sheets, Steven	P22
Glaurdic, Josip	O5.2	Skalski, Nicole	P23
Hammer, Diana	O2.1	Smetana, Alexander	P18
Highland, Matthew	P7	Stoesser, Karla	O3.3
Hoffman, Angela	O2.2	Stone, Michelle	O1.5
Hoffman, Jacqui	P8	Sweeney, Alison	P17, P24, P25
Ittner, Alisa	P9	Taylor, M. Bradley	O2.4, P12
Keller, Kristin	O4.3	Thakrar, Anu	P26
Kostiuk, Ted	P10	Tillman, Ebony	P17
Kwainoe, Samuel	O1.1	Twanow, Casey D.	P27
Lalich, Nicole	O5.3	Tymonko, Steven	P28
Lange, Alicia	P11	Wan, Yuet Wen	O1.4
Laurie, Alexander J.	P12	Wansley, Joshua	O3.4
Lawton, Allison	P13	Waters, Jeremy	P3
Leonard, Nicholas	P14	Wieland, Laura	P29
Lewis, Elizabeth	O4.4	Zerth, Herb	P6, P30
Lizano, Esteban	O1.2	Zhang, Yi Linda	P31
Mertz, Brian	O5.4		
Moores, Mike	P7		
Munday, Amber	O1.3		

MOVING FROM THE UNKNOWN TO THE KNOWN: PREPARING TO PERFORM

Musicians in Concert and Discussion

FRIDAY, APRIL 20, 7 - 8 P.M., EVELYN CHAPEL

Making music is a creative process that requires both composers and performers. In 2000, The John Wesley Powell Research Conference featured three student composers from the School of Music who presented original works and talked about their compositional processes. This year, we are pleased to present student musicians who will play or sing and then talk about the process whereby they prepare a work for public performance.

Polished musicians make performance look easy, but the road from selecting repertoire to playing or singing it in public can be long and arduous. How and why does one choose music, plan a recital program, learn a particular opera role, practice alone, rehearse with others, translate, memorize, interpret, and/or seek advice? To make live music out of what is notated in the score, these performers must make creative decisions at every turn. Tonight they will recreate that process of preparation, discussing the practical, stylistic, and pedagogical factors that inform choices en route to their ultimate goal: the best possible music-making experience.

from Two Pieces, Opus 9

Alexander Scriabin (1872-1915)

Alicia Levin, piano

from Opus 18, no. 4
Movement I

Ludwig van Beethoven (1770-1827)

First-year String Quartet

Ben Weber, violin

Emily Meyer, violin

Jacquie Lueken, viola

Ed Stevens, cello

Trois Poèmes de Louise Lalanne

Francois Poulenc (1899-1963)

Le Présent

Chanson

Hier

Erin Tchoukaleff, soprano

Maxie Scifres, piano

The Offering

When I wake, I will offer thee all the light, gay and fancy free.
Golden tresses only take for a prize
And the glance of my eyes when I wake!
I will offer thee all the stir that I hear,
When morning is begun with the sung.
As from the fountain the waters murmur very near!
Ah then, when night is come and day is over,
My soul be it full of tears, will lull it to sleep.
These cover my hands with kisses,
And take my heart in safety with thine own to keep!

A Song

Flowers of myrtle I come stealing for one afar.
Many an herb is fit for healing. Tra la la!
Wild woodbine grows for fickle maids.
Hey nonny no! Gather each blossom ere it fades as we go!
But the ivy is the symbol of weeping.
Mortals misled! Leave it on the grave,
Safe in the keeping of the dead!

The Past

The past is like a ragged gown
which now I blush to own.
Faded, and yet a memory so strange,
With the fashions that change.
One time I knew the convent days,
Deserted now it stays.
Ah then, I was by grief overtaken
When love in me did waken.
The past, it holds a wayward heart
To one I gave in part.
Shadows and things forgot come creeping,
As I sit sadly weeping.

**EXHIBITION HONORS
SCHOOL OF ART
FRIDAY, APRIL 20, 8 - 9:30 P.M., MERWIN GALLERY**

Student Presenter: Thomas Grimes

Artist's Statement:

My drawings reflect the dynamics of human relationships, be they intimate, familial, social, or spiritual. Though I once tried to calculate each artwork before beginning, I now use my tools to respond quickly and immediately to thoughts or emotions about human interactions. The act of making art, for me, is an act of responding both to ideas and to the visual elements left on the paper. I let my work change and grow as I progress with it, often starting with formal and emotional questions and working toward surprising answers.

Refreshments will be served

ORAL PRESENTATIONS - SESSION 1

11:00 - 12:30

ANDERSON AUDITORIUM (C101)

CHAIR: John Dyke, IV(Wes)

- | | |
|-----|----------------|
| 1.1 | Samuel Kwainoe |
| 1.2 | Esteban Lizano |
| 1.3 | Amber Munday |
| 1.4 | Yuet Wen Wan |
| 1.5 | Michelle Stone |

ORAL PRESENTATIONS - SESSION 2

11:00 - 12:30

BECKMAN AUDITORIUM (C102)

CHAIR: Herbert Zerth

- | | |
|-----|----------------|
| 2.1 | Diana Hammer |
| 2.2 | Angela Hoffman |
| 2.3 | Kosha Baxi |
| 2.4 | Bradley Taylor |

ORAL PRESENTATIONS - SESSION 3

11:00 - 12:30

CENTER FOR NATURAL SCIENCES (E103)

CHAIR: Jessica Montgomerie

- | | |
|-----|-----------------|
| 3.1 | Jacelyn O'Roark |
| 3.2 | Scott Reynen |
| 3.3 | Karla Stoesser |
| 3.4 | Joshua Wansley |

ORAL PRESENTATIONS - SESSION 4

3:00 - 4:30

ANDERSON AUDITORIUM (C101)

CHAIR: Kathryn Weber

- | | |
|-----|-----------------|
| 4.1 | Liz Dierbeck |
| 4.2 | Rachel Dziallo |
| 4.3 | Kristin Keller |
| 4.4 | Elizabeth Lewis |
| 4.5 | Pritam Banerjee |

ORAL PRESENTATIONS - SESSION 5

3:00 - 4:30

BECKMAN AUDITORIUM (C102)

CHAIR: Laura Wieland

- | | |
|-----|------------------|
| 5.1 | Terrence Chapman |
| 5.2 | Josip Glaurdic |
| 5.3 | Nicole Lalich |
| 5.4 | Brian Mertz |
| 5.5 | Rebecca Ray |

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

WILL NEW IMMIGRANTS SURVIVE? NOW YOU KNOW THE REST...

Samuel Kwainoe and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

Currently, the United States is experiencing an unprecedented wave of immigration. Undoubtedly, this presents questions of how immigrants fare after their arrival in the United States. Historically, immigrants to the United States started out initially with lower wages but with time they were able to catch up to natives and eventually overtake them. However, some observers think that things may be changing for the worse for new immigrants. George Borjas, for example, argues that recent decreases in demand for less skilled workers has put many immigrants at a disadvantage. He predicts that the wages of less skilled immigrant will no longer converge quickly to the levels of native workers and may even remain below native wages through out the life of the immigrant. The purpose of this paper is to use the National Longitudinal Survey of Youth (NLSY) to follow the earnings history of a unique sample of young natives and immigrants from 1986 to 1998. This paper will test the hypothesis by Borjas that the wages of less educated, recent immigrants do not converge to the wage level of natives. In addition, it uses multiple regression analysis to determine if factors like education and language do affect immigrant wages.

Oral Presentation 1.2

**OPTIMIZING ALLOCATION OF RESOURCES:
CHILE AND THE SOLOW GROWTH MODEL**

Esteban Lizano and Ilaria Ossella-Durbal*

Department of Economics, Illinois Wesleyan University

Despite economics' touting of the existence of a magic hand, economies at the macroeconomic level seldom operate without intervention. National governments constantly employ whatever fiscal and monetary policies they have at their disposition to achieve their own short term, sometimes even political, goals. Economic growth is typically the first goal pursued by policymakers, but governments can have other pressing issues, such as unemployment or inflation, would cause them to deviate from the all important goal of growth. Governments have limited resources that are channeled to the factors of production, such as human capital, physical capital and labor, according to their goals. If a different, more efficient allocation of resources can cause an increase in the growth rate of even one-percent, then the cost of ignoring the optimal allocation of scarce resources is very high. The difference between four and five percent growth over a ten year span is almost fifteen percent; a number significant enough to warrant research in this area.

Using the Augmented Solow Model (ASM) developed by Mankiw (1992), this paper focuses on Chile to develop an accurate tool for normative policy making at the macro level that would maximize long-term growth by optimizing the allocation of resources. This study finds that the Chilean economy has flourished over the last quarter decade in part by achieving an optimal allocation of resources.

Oral Presentation 1.3

AFQT, THE BELL CURVE, AND FUTURE EARNING POTENTIAL

Amber Munday and Robert Leekley*

Department of Economics, Illinois Wesleyan University

“The average black and white differ in IQ at every level of socioeconomic status...” state Richard Herrnstein and Charles Murray in 1994’s controversial book, The Bell Curve (269). Implicit in this statement is the idea that blacks are genetically less intelligent than whites, and it is because of this, that the gap in black and white median incomes persists. Herrnstein and Murray believe that the portion of IQ, as measured by the Armed Forces Qualification Test (AFQT), that is influenced by environmental factors is virtually irrelevant. This is due to the fact that less intelligent people live in less desirable environments because of their lower earning potential.

My research provides a more optimistic conclusion regarding the future earnings potential of the youth of the disadvantaged. Regression analysis shows that AFQT scores are, in fact, dependent on neighborhood characteristics, especially measures of school quality. The data also show that poor neighborhood conditions affect whites as well as blacks. The resulting implications suggest that the racial divergence in AFQT scores, and the future earnings that they predict, could be the culminating result of the years of segregation of blacks into areas with poorer neighborhood conditions, rather than a function of some genetic difference. Policy implications of this research support the need to equalize public schools and other neighborhood conditions in order to provide equal opportunities for all.

Oral Presentation 1.4

**THE COST OF ACHIEVING INFLATION CONVERGENCE IN
MONETARY INTEGRATION:
A GLIMPSE AT INFLATION IN HIGH INFLATION COUNTRIES OF THE
EUROPEAN MONETARY UNION**

Yuet Wen Wan and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

The European Monetary Union established in 1992 was a part of an effort to bring economic integration to new levels by creating a common currency area for Europe – a monetary union that would abolish transaction costs of converting one European currency to another, as well as eliminating exchange rate variability and uncertainty among traders and investors. Since the formation of the European Monetary System in 1979, lowering inflation had become the main monetary policy priority. My research centers on the Philips Curve, which implies that decreasing inflation rates would always be coupled with increasing unemployment rates. This study uses the trends of inflation and unemployment in these countries to test the validity of the Philips Curve. Regression analysis found that inflation had a significant inverse relationship with unemployment. Further analysis found that the institutional effort towards disinflation during the implementation of the European Monetary System was a major cause of increasing unemployment in the 1980s –1990s.

Oral Presentation 1.5

**MILITARIZATION AND MISERY? A STUDY OF HIGH MILITARY
EXPENDITURE AND MINIMAL DEVELOPMENT IN INDIA**

Michelle Stone and Ilaria Ossella-Durbal*

Department of Economics, Illinois Wesleyan University

India has been noted to be a predominant military power in the region after large and consistent allocations to defense over time. Indian military expenditure has been a top priority of the government consistently, as seen by looking at Indian history.

Concurrently, India can not claim to have reached notable levels of economic and social development. Apart from India's high level of institutional development and its ability to sustain a consistent democracy, the level of development is stereotypical of a less-developed country. Despite a half-century push towards modernization and development, India fits quantitatively into the mold of a typically backward less-developed country in terms of "urbanization, industrialization, secularization, education, media consumption, and welfare."¹

The question at hand therefore is, has India, in the words of the Secretary of State, "divert[ed] resources at the expense of the needy, or through the indifference to the plight of the poor"? To answer this question sheds light on the goal of this paper, examining the effect of militarization on development in India. Therefore, by examining economic and social variables over the 1974 to 1995 period, this paper will determine the relationship between military expenditure on economic and social development in India.

¹ Hardgrave, Robert and Kochanek, Stanley. *India: Government and Politics in a Developing Nation*. Harcourt College Publishers. New York: 2000. Pg. 3.

Oral Presentation 2.1

**CHOOSING AMERICAN: THE ACCULTURATION EXPERIENCE
OF MEXICAN WOMEN IN THE U.S.**

Diana Hammer and James Sikora* and Teodora Amoloza*
Department of Sociology, Illinois Wesleyan University

As a society composed of multiple ethnic groups, the United States is a place where the processes of acculturation and assimilation are never-ending. Today, large numbers of Mexicans, in particular, are immigrating to the U.S. According to Gordon's assimilation model (1964), Anglo-American and Mexican-American ethnic groups will one day be indistinguishable. At the individual level, Gordon believes this process begins with acculturation as members of each group adjust to the differing customs of the other. Park (1928) and Stonequist (1935, 1937) agree that finding a compromise can be especially difficult for "marginal" individuals who have identities in both cultures. From standardized acculturation scales based on variables such as language ability, self-identity, and generational status, research shows that embracing bicultural heritage is a realistic way for immigrants to adjust to life in a new society.

This study explores the nature of the acculturation experience in three generations of ethnic Mexican women in Bloomington/Normal, Illinois. Based on a questionnaire adapted from the ARSMA-II (Cuéllar et al., 1995) and semi-structured conversations with twenty-one women, the researcher has seen that the above theorists' ideas do apply to the experiences of women in the sample. Of the variables investigated, generational status seems to be the most important factor affecting these women's acculturation. This is illustrated in three case studies, which show that marginal characteristics are most applicable to the woman of the 1.5 generation. Clearly, staying connected to Mexican heritage while living in the U.S. has helped all three women stay secure in their own identities and happy in the country they call home.

Oral Presentation 2.2

**AN ANALYSIS OF PERSONAL WRITING INCIDENCE AND FREQUENCY
AND ITS RELATION TO SELF-REPORTED SCORES OF
DEPRESSION AND LONELINESS**

Angela M. Hoffman and Vicki L. Magee*,
Department of Psychology, Illinois Wesleyan University

Conventional wisdom suggests that the release of one's emotions helps promote healthy development and contributes positively to mental health. One of the common methods used to release emotions is personal writing, such as journaling, diary keeping, or poetry writing. Though this practice of using personal writing to express and release emotion is thought to be highly prevalent, a dearth of empirical evidence exists to support such claims (Pennebaker, 1995; Magee, 1999). Therefore, this study sought to describe the incidence and frequency of personal writing among a college-aged population using sixty student respondents. Students were administered a questionnaire called the Personal Writing Questionnaire-Revised version (PWQ-R) that contained self-report questions regarding personal writing incidence, frequency, type, and motivation. A Depression and loneliness inventories were also included in the instrument.

Following analysis of the data collected from these questionnaires, we seek to support the following hypotheses. It was hypothesized that females will report greater incidence and frequency of personal writing when compared to males. Further, it was hypothesized that females will report greater use of personal writing across the lifespan. In an attempt to determine whether a relationship between personal writing and mental health status exists, the depression and loneliness inventories will also be used in analysis. The preliminary hypothesis states that we expect that increased self-disclosure, by means of personal writing, will correlate negatively with scores of depression and/or loneliness. That is, if one engages in personal writing, one is more likely to be less depressed or less lonely when compared to those who do not use personal writing.

Pennebaker, J. W. (Ed). (1995). Emotion, disclosure, and health. Washington, D.C.: American Psychological Association.

Magee, V. (1999). "Making up her own mind: A psychological study of the role of personal writing in adolescent girls' development." Unpublished dissertation, Harvard University, Cambridge, MA.

Oral Presentation 2.3

**SYSTEMATIC RELATIONSHIPS OF NATALID AND FURIPTERID BATS,
BASED ON HYOID MORPHOLOGY
(CHIROPTERA: NATALIDAE AND FURIPTERIDAE)**

Kosha Baxi and Thomas Griffiths*

Department of Biology, Illinois Wesleyan University

The musculature of the hyoid region of two species of bats (Order Chiroptera) from two separate families, Natalidae and Furipteridae, was examined via microscopic dissection. Different morphological characters were scored and then entered into the computer program PAUP (Phylogenetic Analysis Using Parsimony), along with characters of families previously examined by Griffiths. A cladogram was generated. The analysis revealed support for the placement of Natalidae and Furipteridae together within the Superfamily Nataloidea, along with the families Thyropteridae and Myzopodidae. This grouping of Myzopodidae is quite surprising from a geographical standpoint. Myzopodids are endemic only to Madagascar, while thyropterids, natalids and furipterids are found in Central America and northern South America. Thus, the placement of Myzopodidae with the other three geographically close families implies that all four of these families share an unknown common ancestor in Africa.

Oral Presentation 2.4

THE ZOOMIN' HOTs: DYNAMIC HOLOGRAPHIC OPTICAL TWEEZING

M. Bradley Taylor and Alexander J. Laurie and Gabriel C. Spalding*

Department of Physics, Illinois Wesleyan University

A new experimental technique, Holographic Optical Tweezing (H.O.T.), has been developed through a collaboration between our group at IWU and researchers at the University of Chicago.¹ Our addition of diffractive optics to earlier techniques for optical trapping significantly enhances the ability to control the assembly of biological cells or microscopic dielectric particles. In this new work, we describe original designs for optical systems using static holograms that nevertheless allow dynamic control over the number of traps in an assembly, their configuration/disorder (via spatial filtering), and even their spacings (via carefully designed zoom optics), as well as the strength of the traps (via the laser intensity). Although there are many possible applications for this new technology, as physicists our first interest is in exploring collective effects in optical binding, and in creating model systems that afford us many tunable parameters with which to explore many-body interactions. We are also interested in the onset of symmetry-breaking behavior (e.g., avalanches and the possibility of self-organized criticality, and the microscopic mechanisms underlying phase transitions in two and three dimensions).

¹Eric R. Dufresne, Gabriel C. Spalding, Matthew T. Dearing, Steven A. Sheets, David G. Grier, Review of Scientific Instruments 72, 1810 (2001).

Oral Presentation 3.1

**SECOND LANGUAGE ACQUISITION AND ITS PRACTICAL APPLICATION:
EVALUATING FRENCH TEXTBOOKS AT THE SECONDARY
SCHOOL LEVEL**

Jacelyn O'Roark and Scott Sheridan*

Department of Modern and Classical Languages and Literatures
Illinois Wesleyan University

In my research project, I look broadly at how tradition plays a part in the teaching of French at the secondary school level. Traditionally, many instructors of French focus on grammar, pronunciation, or reading French texts in the classroom. However, research from the last 20+ years suggests that more emphasis should be placed on speaking and exposure to culture and cultural differences. After looking at SLA (Second Language Acquisition) theories in order to familiarize myself with current beliefs about how languages are learned, I have studied various textbooks that exist on the market and that are in use today in the American school system. Based on my research, as well as on the ACTFL (American Council on the Teaching of Foreign Languages) "Standards for Foreign Language Learning", I have developed a tool for evaluating the ways in which textbooks address current trends in SLA research and proposed national guidelines.

Oral Presentation 3.2

HAND/ARM GESTURE AMONG JAPANESE AND AMERICAN FEMALE COLLEGE STUDENTS: A CROSS-CULTURAL COMPARISON

Scott Reynen and Hiroko Furo*
Japanese Department, Illinois Wesleyan University

This research examines the use of various forms of hand/arm gesture among American and Japanese college students for the purpose of determining which aspects of nonverbal behavior are universal. It has been noted that little research in nonverbal behavior has been conducted with a cross-cultural focus (See Kendon 1984) and this study is a step to correct this deficiency.

Eight video-taped conversations (four between Japanese female college students and four between American female college students) provided the data for this research. Five minutes of each conversation was analyzed and hand/arm movements were recorded and categorized into groups, based on their communicative purpose. The collected data was then compared for similarities and differences and the greatest differences were examined in greater detail.

The frequency of all types of hand/arm movement was found to be higher among American subjects (Americans: 6.45 per minute; Japanese: 5.55 per minute). This difference was generally attributed to a higher frequency in the category of "adaptive" movements among American subjects (Americans: 2.20 per minute; Japanese 1.54 per minute). Despite the generally higher frequency of all hand/arm movement among American subjects, the use of "emblem" gestures was actually less frequent among Americans than among Japanese (Americans: 0.30 per minute; Japanese: 0.40 per minute).

In addition to differences in the frequency of different types of gesture, the distribution of hand/arm gesture between the two subjects of each pair was found to be much more varied among Americans than among Japanese (Americans: 70.25%/29.75% average split; Japanese: 54.25%/45.75% average split). Even the most even distribution among the American pairs was less equal than the least even distribution among the Japanese pairs.

Each of the noted differences in Japanese and American use of gesture can be explained by commonly noted differences between American and Japanese societies. The more frequent use of emblematic gestures among Japanese subjects indicates a greater emphasis on shared traditions in Japanese society. The less frequent use of adaptive gestures among Japanese subjects indicates a greater emphasis on continuity and harmony within Japanese society, and particularly among Japanese women. Finally, the more evenly distributed gesture patterns among Japanese conversation partners indicates greater social equality within Japanese society.

The results of this research suggest that nonverbal behavior is not universal in its application. While certain aspects of nonverbal behavior are generally consistent among Japanese and American female college students, those aspects which vary can be attributed to the cultures in which the subjects learned to communicate. The same cultural factors which influence verbal communication can also be seen to influence nonverbal communication in a various ways.

Oral Presentation 3.3

**INTERTEXTUALITY IN THE WORKS OF ANNE HEBERT:
THE RELATIONSHIP BETWEEN POETIC VOICE, NARRATIVE
VOICE, AND FEMININE VOICE**

Karla Stoesser and Scott Sheridan*

Department of Modern and Classical Languages and Literatures / French
Illinois Wesleyan University

The works of Québécois writer Anne Hébert (1916-2000) present a fascinating look into the possibilities of literary intertextuality. The concept of intertextuality, which rejects the traditional notion that texts are finite creations, with stable meanings, is based upon the assumption that texts are by their very nature fragments, with tensions and ambiguities that cannot be resolved. Language is no longer perceived as a transparent medium of thought, and since closure in texts is not possible, no text is autonomous. Such is the case with Hébert's works, particularly the interplay between her poetry and her prose. In specific, poems from her 1953 collection LeTombeau des Rois play an important role in later works such as her 1982 novel Les Fous de Bassan. Hébert weaves a haunting tale of murder from the perspective of a young girl, Olivia, while directly using poetic verse published almost thirty years before. It is through the use of a poetic voice that Hébert is able to defy traditional norms of psychological realism and temporality, and arrives at a unique narrative voice that is collectively shared by many female characters in her works.

Oral Presentation 3.4

**IMAGINATIVE GEOGRAPHY AND THE PERCEPTION OF
THE OTHER IN RUSSIAN LITERATURE:
MIKHAIL LERMONTOV AND VLADIMIR MAKANIN**

Josh Wansley and Marina Balina*

Modern and Classical Languages and Literatures Department
Illinois Wesleyan University

This project endeavors to explore the historical perspective of the “other,” specifically the Caucasus, in Russia during two broad periods, the 19th century and the troubling episode of the more recent war in Chechnya. It proposes to compare and contrast the identification of the relationship with the other, as expressed through works of literature and contemporary journalistic accounts. Issues of “orientalism,” the Russian label for the Caucasus, will be explored with a foundation in Edward Said’s literary theory of “imaginative geography.” Said posits in “Orientalism Reconsidered” that “knowledge that is non-dominative and non-coercive can be produced in a setting that is deeply inscribed with the politics, the considerations, the positions and the strategies of power.”¹ Thus in encounters between Russia and the “Orient,” one must be especially privy to deep-seated power relations. Important also is the paradigmatic shift in the mind of the Russian protagonist between the other as alternatively an “object” or a “subject.” It is in the case of the latter that the “Oriental” assumes a human face, yet this shift does not always result in more civil relations. What is the nature of the Russian-Orient relations? Why do such encounters typically lead to disaster for the “Oriental”? Why is it necessary this be the upshot of their interactions and what, if anything, can mitigate the historical antipathy between these two adversaries? These are some of the questions this project intends raise and will endeavor to address.

¹ Said, Edward. “Orientalism Reconsidered” in Barker *et al.* *Literature, Politics, Theory: Papers from the Essex Conference, 1976-84* (Routledge, London 1986).

Oral Presentation 4.1

**VOICES OF OUR PAST:
ILLINOIS WESLEYAN AT THE MILLENNIUM**

Liz Dierbeck and Erika Rozinek and Robert Bray*

English and Anthropology Departments

Illinois Wesleyan University

The advent of the new millennium is a unique moment in Illinois Wesleyan's history. Our 150th year is a time for us honor our past, while we imagine our future. One of the best ways to accomplish this is to compile the stories that Illinois Wesleyan has to offer. The Oral History Project will help us to preserve the information that resides alive and well in the memories of former teachers and staff.

Our presentation will officially present the Illinois Wesleyan Sesquicentennial Oral History Project to the campus and the community. We have interviewed three people thus far, who represent alumni, faculty and administration: Professor E. Melba Johnson-Kirkpatrick, Professor R. Dwight Drexler, and Dr. Robert Eckley. Their memories of race relations, class traditions and antics, and the development of the university illustrate Illinois Wesleyan as a dynamic institution, always changing, always growing.

The events on IWU's campus often reflected what was going on in the larger world, such as during the Depression, World War II, the civil rights' movement, and the Vietnam war. Times have changed dramatically, but there are still invaluable lessons to be learned at the feet of the "masters," those who have gone before.

Oral Presentation 4.2

**CODE-SWITCHING IN THE HISPANIC COMMUNITY OF
BLOOMINGTON, ILLINOIS: A CASE STUDY**

Rachel Dziallo and Christina Isabelli*

Hispanic Studies Department, Illinois Wesleyan University

One aspect of sociolinguistics that has become more prevalent in recent years is code-switching. Code-switching is a linguistic phenomenon where bilingual speakers switch between both languages throughout a conversation, whether it be with words or whole phrases. Despite common assumptions, this lexical switching is due not to a lack of knowledge of one particular language. It instead proves to be a resource for bilingual speakers to better express their ideas. Such a study is important in the U.S. today, with the large influx of Hispanics settling in various parts of the country. Their usage of Spanish has been heavily influenced by their English-speaking surroundings. This is particularly evident in adolescents. Hispanic adolescents living in the U.S. often speak Spanish with their parents in their home setting and English with their peers in their school setting. They often code-switch in their daily conversations.

The purpose of this case study is to provide a descriptive view of one Mexican adolescent's code-switching patterns in various conversational settings. Several questions surrounding the principal informant's code-switching are considered, such as the base language in which each conversation takes place, the relationship the speaker has with the interlocutor and the reason for code-switching in each instance. Finally, this adolescent's attitude about belonging to a Hispanic culture and speaking the Spanish language also becomes a factor in this study. Language is directly related to one's notion of self-identity. Code-switching may therefore be a manifestation of the informant's concept of being Hispanic in U.S. society.

Oral Presentation 4.3

**COLUMBUS' FIRST JOURNEY TO THE WEST:
A BATTLE WITH CUSTOM**

Kristin Keller and Dan Terkla*

Department of English, Illinois Wesleyan University

As Michel de Montaigne's essays, "On Cannibals" and "On the Custom of Wearing Clothes," help us see, a person's customs often shape the way he views the world. By customs, I mean common, unquestioned cultural practices. In these essays, Montaigne explores the customs of cannibalism and nakedness, and he comes to the conclusion that a person should not judge the customs of others against his own customs. Michel de Montaigne's ideas came to mind while reading Christopher Columbus' journal from the voyage of 1492. I realized that many of Montaigne's ideas are directly related to Columbus' interactions with the western natives. Fifteenth-century medieval European culture, especially Spanish culture, played a large part in Christopher Columbus' August 1492 journey. Not only did this culture shape Columbus' motivations for traveling, but it also influenced his treatment of the natives he encountered there. Culture encompasses a large range of ideas, knowledge, and practices. Several important influences for Columbus were medieval maps, literature and sea stories. Not only did these sources provide Columbus with ideas of what he would find in Asia, but they also provided him with several motivations for traveling: exploration; trade with the Great Khan, the leader of India; and the spread of Christianity. Spanish customs had also engrained in his head two important beliefs: one, that Spanish culture was superior to all cultures and, two, that Christianity is superior to all other religions. All of Columbus' expectations and cultural beliefs ultimately influenced his way of thinking and his manner of interacting with the natives. Once Columbus reached what he believed to be Asia, he encountered natives from many different islands who went naked, were cannibals, and were not Christians. Columbus' Eurocentric reaction to the natives' customs is apparent in his journal entries, in which he constantly makes reference to attempts to make the natives look and act like Spaniards. Instead of judging the customs by pondering whether they were reasonable or not, Columbus passed judgment on the foreign customs by placing them in an inferior position to that of Spanish customs.

Oral Presentation 4.4

**THE HISTORY OF WESTERN LOANWORDS IN
THE JAPANESE LANGUAGE**

Elizabeth Lewis and Hiroko Furo*

Japanese Department, Illinois Wesleyan University

Previous studies indicate that loanwords have always played a prevalent role in the Japanese language. Recently, however these loanwords have appeared in more frequency than they had in the past. There are many explanations as to why this is. One explanation is the recent explosion of western culture into the Japanese society. Many of the loanwords seen today are found in advertisements. Other areas where loanwords seem to be prevalent are technology and sciences. Much of the Japanese knowledge of these two areas is of Western origin. Therefore, many of the words used in the areas have come from Western countries. I would like to show what part of speech the loanwords are most likely to be (i.e. are nouns more likely to be used than verbs) and in what type of context they can be found. I believe that my studies will show that the changing history of Japan has allowed for an increase in the number of loanwords and that the language itself and its grammatical structure allows for loanwords to be easily integrated into the Japanese lexicon. I believe that the type of loanwords that will appear most frequently will be nouns and that they appear mostly in the form of advertisements but also frequently appear under the context of specific discussions of technology and sciences.

Oral Presentation 4.5

**FACTORS INFLUENCING GROWTH OF EXPORTS OF MANUFACTURED
PRODUCTS IN SOUTH EAST ASIA: AN INVESTIGATION**

Pritam Banerjee and Illaria Durbal*

Department of Economics, Illinois Wesleyan University

This paper is an investigation into the possible causes of the development of manufacturing exports in South East Asian countries. Several studies in the 1970's and 1980's, and empirical work carried out by the UNCTAD have confirmed the fact that developing countries with higher share manufacturing exports tend to have higher rates of economic growth. The South East Asian countries have been particularly successful in pushing export growth in manufacturing and might hold important lessons for other developing countries. This paper postulates that the South East Asian success at promoting export of manufactures can be ascribed to six main factors. Two of these factors are population density and level of development, which are fixed in the medium run. The other four are subject to policy changes, and are variable in the medium run, they are; Openness of the economy, labour skills, Infrastructure and level of privatization. All these factors are hypothesized to be positively correlated to share of manufacturing exports. The results of my statistical research show that all the four policy variables have a direct and significant effect on the export of manufactures goods as hypothesized for four of the five countries under consideration.

Oral Presentation 5.1

**TOWARDS A PEACEFUL ARTICULATION OF GRIEVANCES:
EXAMINING RELATIONSHIPS BETWEEN SOCIAL CAPITAL AND VIOLENT
PARTICIPATION IN CONTEMPORARY LIBERAL DEMOCRACIES**

Terrence Chapman and Kathleen Montgomery*
Department of Political Science, Illinois Wesleyan University

Violent political action is a serious concern for contemporary democracies. There is growing documentation that citizens in general are becoming distrustful of government and frustrated with conventional politics. This frustration is only worsened by the prevalence of political violence. A growing body of literature suggests that high levels of social capital may foster successful democracy by promoting norms of interpersonal trust and generalized reciprocity. This paper examines the impact of trust and civic engagement on political violence in a two-part fashion. The first section analyzes the relationship between social capital and individual attitudes toward political violence, while the second section looks at occurrences of violence in the contemporary liberal democracies of Switzerland, Canada, Italy, and Spain. At the individual level, where social capital bridges traditional ethnic, religious, and familial cleavages, people are less likely to support political violence and where social capital reinforces primordial loyalties, people are more likely to support using violence for political means. At the aggregate level, countries characterized by active voluntary membership are less likely to experience acts of political violence, even in the face of contentious political issues.

Oral Presentation 5.2

**CROATIA'S LEAP TOWARD GENDER EQUALITY IN THE PARLIAMENT:
RULES VERSUS PLAYERS**

Josip Glaurdic and Kathleen Montgomery*

Department of Political Science, Illinois Wesleyan University

A number of political, socioeconomic, and cultural factors have been identified as having an effect on the level of parliamentary representation on women. Studies concentrating on the most prosperous longstanding democracies accentuate the importance of political factors, whereas most of the studies that include less developed nations suggest a more pronounced role for socioeconomic and/or cultural factors. Conclusions about the relevance of a particular group of factors become much less clear-cut when tested on a sample of nations such as the post-communist bloc, which does not clearly belong to either the most affluent longstanding democracies or the less developed nations. This study examines the effects of the political factors using what Lijphart calls the controlled comparison method in a single post-communist country: Croatia. Since Croatia represents a single cultural and developmental 'container,' changes in its levels of women's parliamentary representation must be attributed to some other factors. The conclusion of this study is that the immense increase in the proportion of female representatives in Croatia cannot be attributed to the changes in its electoral system. Rather, it can be ascribed partly to the ideology of the party in power and partly to the ability of women to, with the help of non-governmental organizations, form inter- and intra-party unions which have put significant pressures on all party leaderships to nominate more women to office.

Oral Presentation 5.3

**EXCLUSIVE SOCIETIES:
MINORITY ETHNIC GROUP SUPPORT FOR DEMOCRACY**

Nicole Lalich and Kathleen Montgomery*

Department of Political Science, Illinois Wesleyan University

The link between minority ethnic identification and support for democracy has been little explored in previous research. The opinions of minorities cannot be analyzed, however, without taking into consideration the inherent differences among minority groups. This paper tests the effects of minority status on attitudes toward democracy in two ways. First, aggregate analysis compares the minority and majority responses to a survey of popular attitudes in post-communist Europe and second, the characteristics of different minority communities are examined through a comparison of respondents from two very different minority groups: the Roma and the Russians in the Baltic states. In this study, statistical analysis discovers a positive relationship between simply being a member of a minority group and high levels of dissatisfaction with the institutions of democracy and regime performance. Survey data also reveals a linkage between a minority group's level of marginalization and its levels of support for democracy.

Oral Presentation 5.4

INFORMATION SUPERHIGHWAY OR INFORMATION OVERLOAD?

Brian Mertz and Greg Shaw*

Department of Political Science, Illinois Wesleyan University

This original research project seeks to further the understanding of the Internet as a viable campaign tool. It is a well documented fact that in addition to low voter turnout, a sizable portion of the American electorate is uninformed and uninterested in politics, even during election cycles. Many democratic theorists hope that the Internet will enable voters to make more informed and better decisions in campaigns. While many studies have been conducted to examine the actual web sites, no major empirical studies look at how well individuals learn from these information rich web sites. This study is a first step to fill that void.

Prior research in other forms of political learning leads to the hypotheses that the Internet will **not** facilitate greater widespread learning than traditional media, and those who do benefit from candidate web sites will be those who are already knowledgeable and interested in politics. Surveying nearly 200 IWU students, and analyzing their responses to different stimuli in the 2000 Presidential campaign between George W. Bush and Al Gore, these hypotheses were confirmed. The conclusions that emerge from this study support the aforementioned hypotheses. Candidate web sites provide far too much information for the casual visitor causing information overload. Voters simply become awash in a sea of online information with current cyber-campaigning procedures.

Oral Presentation 5.5

**LET US IN, LET US IN: A STUDY OF POST-COMMUNIST FEMALE
LEGISLATIVE REPRESENTATION**

Rebecca Ray and Kathleen Montgomery*

Department of Political Science, Illinois Wesleyan University

There is no dispute that women are grossly under-represented in the world's legislatures. However, there are several explanations for this under-representation and for the variation that exists between regions and between countries. The prevailing literature points to institutional, developmental, and cultural variables. This study uses the post-communist context in order to control for culture. Given the common experience of state socialism and the re-traditionalization of social values associated with a backlash against directive emancipation, culture cannot be the main factor in determining the wide variation in levels of female legislative representation in the new democracies of East-Central Europe. In testing for both institutional variations and levels of socio-economic development, this study suggests that, while institutions certainly matter, socio-economic development is also an important factor in explaining high levels of female legislative representation.

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

**MAGNETIC DOT AND ANTI-DOT ARRAY FABRICATION
VIA NANOSPHERE PHYSICAL MASKS**

Brad Andrews and Paul Curran and Gabriel C. Spalding*

Department of Physics, Illinois Wesleyan University

We discuss non-lithographic means of controlling the assembly of nanoparticles onto a substrate. Once assembled, the collection of particles serves as a physical mask, selectively protecting areas of the underlying substrate from a reactive plasma or from physical vapor deposition. Because the clear, line-of-sight channels between the masking particles are much smaller than the particles themselves, extremely fine features can be transferred to the substrate. This novel technique for nanopatterning is inexpensive, can work on curved surfaces, and over extremely large areas.

We also discuss the use of our method to produce arrays of magnetic dots on, or arrays of holes in, a superconducting thin film; here, these arrays serve to 'pin' otherwise mobile quantum vortices. Significantly, these 'pinscapes' can be large enough to be in the thermodynamic limit. Moreover, we can tune the degree of disorder in the array of pinning sites, as well as the strength, size, and lattice constant of the pinning centers.

We aim to investigate the collective behaviors that result from the competition between vortex-pinscape interactions and vortex-vortex interactions. Such tailored samples should allow us to explore a variety of phases of vortex matter, as well as the transitions between these phases.

Poster Presentation 2

WHAT IS A MYZOSTOMID AND WHO CARES ANYWAY?

Kimberly Branson and Elizabeth Balser*

Department of Biology, Illinois Wesleyan University

Myzostomids are a group of marine worms symbiotic with crinoids (relatives of sea stars) that have historically been included in the phylum Annelida, which also contains other marine worms, earthworms, and leeches. Recent work by Eeckhaut *et al.* (2000), however, suggests that these worms are not evolutionarily closely related to annelids. This hypothesis is based primarily on the dissimilarity of myzostomids genetic sequences to those of annelid species. Further, Eeckhaut (1997) excludes myzostomids from the Annelida because he believes that they lack a distinct cell-lined internal body cavity called a coelom—a defining characteristic of annelids. In contrast, a review of the classical literature on the morphology and development of myzostomids shows that these animals have a body cavity associated with the gonad that is lined by cells and that develops similarity to coelomic cavities in annelids. The work presented here reexamines the morphology of myzostomids with the intention of confirming the presence or absence of a coelom. Sections were taken from a myzostomid worm that had been prepared using standard methods (Balser and Ruppert, 1993) for light and electron microscopy. Morphological evidence of the presence of a coelomic cavity includes the presence of a cell layer lining a fluid-filled body cavity. This cellular lining consists of epithelial cells possessing an anterior hair-like projection called a cilium, cellular junctions interconnecting adjacent cells, and a connective tissue layer on which the cell rest. Photographic evidence will be presented to answer the question about the presence or absence of a coelom in myzostomids and relationship between myzostomids and annelids will be reevaluated.

Poster Presentation 3

**THE OVER-EXPRESSION OF *bchC* AND *bchF* GENES
IN RHODOBACTER CAPSULATUS**

Kara Burrow and Jeremy Waters and David Bollivar*
Illinois Wesleyan University

Rhodobacter capsulatus is a purple non-sulfur bacteria. The goal of this project was to create strains of R. capsulatus that over-express the protein products of two of its genes, *bchC* and *bchF*. These genes are thought to encode proteins that are involved in the production of bacteriochlorophyll a. The over-expression will allow for the isolation and characterization of the protein products. The project began by isolating genomic DNA from R. capsulatus strain SB1003 and amplifying the *bchC* and *bchF* genes by polymerase chain reaction. The PCR fragments were cloned and sequenced to confirm the identity of the fragment. They were ultimately placed in the vector pYCSFX. When mobilized into R. capsulatus, the plasmids that were created drove the expression of the BchC and BchF polypeptides under inducing conditions. The expression of the protein was confirmed by western blot analysis using an epitope tag created during plasmid construction.

Poster Presentation 4

ALCOHOL IMPAIRS MEMORY FOR REWARD VALUE

Elizabeth Buss and Kate Palmer and Joe Williams*

Department of Psychology, Illinois Wesleyan University

Previous studies have suggested that alcohol can impair emotional processing. One significant component of emotional processing that may be affected by alcohol is memory for reward value. To test this hypothesis, rats' memory for sugar content in food was assessed. The task involved two phases for each trial: a sample phase and a choice phase. The sample phase consisted of the rat retrieving a piece of cereal with either a positive or negative reward outcome depending on sugar content. During the choice phase, the positive stimulus was followed by a food reward placed in a second arm of a radial arm maze, which the rat learned to retrieve. No reward followed the negative stimulus and the rat learned to simply wait for the next trial. After learning the task, varying doses of alcohol and a saline control were injected systemically in each rat just prior to completing the task. Results were based on the difference of choice phase response time between positive and negative stimuli. A significant impairment in performance occurred after the 0.75 g/kg alcohol injection, suggesting that alcohol does negatively affect reward-based memory. Combined with the results from a previous study on the effects of amygdala lesions on the same task, the current results suggest that alcohol's impairment of reward value memory may be due to a disruption of amygdala functioning. Future studies will address this possibility.

Poster Presentation 5

**RELATIONAL AND OVERT AGGRESSION IN MIDDLE CHILDHOOD:
A COMPARISON OF HYPOTHETICAL AND REPORTED CONFLICTS**

Jill Denoma and Doran French*

Department of Psychology, Illinois Wesleyan University

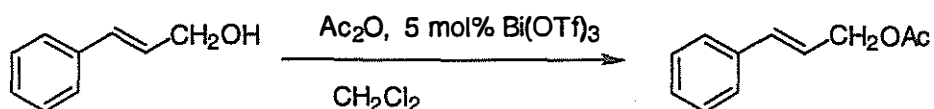
Following recent research patterns in childhood conflict, the current study examined individual differences and gender trends in conflict resolution styles. Relational and overt aggression were investigated in 32 fourth and fifth graders by use of a multi-method evaluation that included peer and teacher nominations, hypothetical conflict vignettes, and personal reported conflicts. Based on previous studies, it was hypothesized that girls will use relational aggression more often than boys, that boys will display overt aggression more often than girls, and that children of both sexes will report the use of prosocial resolution methods in hypothetical situations more often than they actually employ them in real-life conflicts. Initial data analysis suggests strong internal consistency across the relational and overt aggression scales, as well as among the measures used in this study.

Poster Presentation 6

**UTILITY OF BISMUTH REAGENTS IN ORGANIC
SYNTHESIS; BISMUTH TRIFLATE CATALYZED
ACYLATION OF ALCOHOLS**

Derek A. Freiberg and Herb M. Zerth and Ram S. Mohan*
Department of Chemistry, Illinois Wesleyan University

The conversion of alcohols to acetates is a common transformation in organic synthesis. We wish to report that bismuth triflate is an effective catalyst for the acylation of alcohols. Bismuth reagents are relatively non toxic and inexpensive and hence they are becoming increasingly popular as “Green Reagents” in organic synthesis.



Poster Presentation 7

DESIGN AND CONSTRUCTION OF A RADIOFREQUENCY PLASMA DEVICE

Matt Highland, Mike Moores, Sean Price and Jeremiah Williams*

Department of Physics, Illinois Wesleyan University

A plasma consists of ionized matter. Sometimes referred to as the fourth state of matter, most of the apparent universe exists in this plasma state. Consequently, there is an obvious desire to understand the underlying physics of plasmas.

To investigate this state of matter, we have begun construction of a radiofrequency plasma device. The external helicon source has been constructed and tested, creating a nitrogen plasma. Within a specified power range, a plasma has been qualitatively observed. In the future, this source will be connected to a larger vacuum chamber (58.5 cm in length, 35.5 cm in diameter), allowing us examine a number of basic plasma processes, such as wave propagation, in a variety of plasmas. In this poster, we present work that has been done in the design and construction of this plasma device and future plans for the device.

Poster Presentation 8

**SYNTHESIS AND DERIVITIZATION OF KEGGIN
TYPE POLYOXOMETALATES**

Jacqui Hoffman and Rebecca Roesner*

Department of Chemistry, Illinois Wesleyan University

Polyoxometalates are early-transition metal-oxygen clusters. The Keggin ion, $\text{XM}_{12}\text{O}_{40}^{n-}$ is one of the most useful polyoxometalates. The triangular arrays of oxygen atoms present on the surfaces of polyoxometalates are similar to the patterns seen on bulk metal oxide surfaces. Polyoxometalates are therefore excellent compounds for both homogeneous and heterogeneous catalysts.

The Keggin ion can be synthesized with a W-O group missing resulting in a vacancy in an otherwise symmetric molecule. Keggin-type polyoxometalates with mono-lacunary structures of formula $\text{XM}_{11}\text{O}_{39}^{n-}$, provide a rigid, hydrolytically stable, thermally robust, nonoxidizable framework that behaves as a pentadentate ligand. It is possible to attach organic ligands to the surface of this cluster by inserting another metal atom, one capable of forming a bond with carbon, into the vacancy. The organic ligand can then attach to biomolecules at specific sites. The polyoxometalate adds an appreciable amount of electron density to the biomolecule, thus polyoxometalates are useful in enhancing contrast in electron microscopy. It may also be possible to develop drugs, which "seek out" diseased cells. Before this can be accomplished fundamental techniques for forming polyoxometalate carbon bonds must be developed.

Mono-lacunary Keggin ions with $\text{X}=\text{P}, \text{Si}$ have been synthesized. The tungstophosphate ion has been characterized by ^{31}P NMR, FT-IR and UV analysis. A rhodium atom bearing a $-\text{CH}_2\text{COOH}$ functional group was then inserted into its vacancy. This compound was characterized by FT-IR, ^1H NMR, ^{31}P NMR. Attempts to convert the carboxylic acid functional group to an amide failed. Current efforts are aimed at the characterization of tungstosilicate ion. Attempts will then be made to insert $\text{Rh}-\text{CH}_2\text{COOH}$ into its vacancy and convert the carboxylic acid functional group to an amide.

Poster Presentation 9

OLFACTORY INFLUENCE ON CHOICE AND FORAGING BEHAVIOR

Alisa Ittner and James D. Dougan*

Department of Political Science, Illinois Wesleyan University

Previous studies in our lab have investigated the effects of a biologically significant olfactory stimulus (fox urine) on free-operant barpressing in rats. Both fox urine and a floral scent resulted in an increased latency to first response, although habituation occurred rapidly and the effect was gone by the fourth session of exposure. The present experiments use a more sensitive measure of behavior: choice on concurrent schedules. Rats were exposed to a series of concurrent VI schedules in the presence of fox urine and several control scents. The data are examined using a regression analysis of the generalized matching law (Baum, 1974). Of particular interest are changes in the sensitivity (undermatching) parameter, which should take on a value greater than 1.00 in the presence of a predator scent. The results have implication for both the matching law and for biologically-based learning theories.

Poster Presentation 10

**BEHAVIORAL CONTRAST IN RATS AT LOW LEVELS
OF REINFORCEMENT**

Theodore A. Kostiuk and Anna Carlson and James Dougan*

Department of Psychology, Illinois Wesleyan University

Contrast can be seen in a variety of situations throughout the animal and human worlds. Learning its intricacies can be helpful to us the business worlds by being able to see how people respond in to reinforcements in two simultaneous situations. Research has shown contrast low levels in larger animals and many birds. Experiments to show contrast at low levels in rats have been performed in the past, but have not been successful. This may have been due to the level of technology at he time and the experimental design. Our experiment took six HSD rats and exposed them to a contrast procedure at low levels of reinforcement using the new double-bar operant chambers. Our results suggest that these rats exhibited contrast, contrary to previous research. This could open up the possibilities of studying other animals with this new procedure, and maybe find out some information about how humans might respond in reinforcement situations.

Poster Presentation 11

THE PRICE OF PARENTHOOD: A STUDY OF THE FAMILY PAY GAP

Alicia Marie Lange and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

This paper uses data from the National Longitudinal Survey of Youth to study how different family decisions contribute to higher earnings for men than for women. Special attention is paid to why women with children earn less than women without children. Multiple regression models are used to show how family variables such as marriage, the presence of young children, and family size cause these pay differences. Even after considering the number of hours worked, the results suggest that family variables are important determinants of income. For example, the presence of a young child is shown to increase the earnings of married men and significantly decrease the earnings of married women. This result, and other results reported in this study, support the hypothesis that there is a significant family pay gap in earnings between men and women. In addition, a slight family pay gap among women with different family conditions was found to exist.

Poster Presentation 12

**MEDIUM-MEDIATED INTERACTIONS INVOLVING
SUSPENDED PARTICLES**

Alexander J. Laurie and M. Bradley Taylor and Gabriel C. Spalding*

Department of Physics, Illinois Wesleyan University

When two particles are entrained in a medium, there arise new, effective interactions between those particles, due to the perturbation of the surrounding medium. Our interest is in establishing a basic paradigm, via a highly visual fluidic model system which allows straightforward study, and in using this model system as a design test bed for new methods of exploiting such interactions.

While the motions of suspended particles involve complex hydrodynamics, the static interactions do not. Therefore, we have measured the force of attraction (ranging from milli-Newtons to micro-Newtons) between stationary, floating Cheerios as a function of their separation. A stiff wire fixed one Cheerio in place while a second Cheerio was pulled away by the needle of a D'Arsonval Galvanometer. By finding the Galvanometer current necessary to separate the Cheerios, the force of interaction was determined (a separate experiment involving hanging weights was performed to calibrate the Galvanometer as a force measuring device).

In the limit of small separations, the first method proved unwieldy. So, a reflective cantilever was used as an 'optical lever' to measure the force of interaction. One Cheerio was fixed, as before, while the other abutted a vertical cantilever. By measuring the equilibrium deflection the cantilever (via laser light reflected off of the cantilever surface), we were able to determine the force between Cheerios.

Poster Presentation 13

**SOCIOMETRIC STATUS AND AGGRESSION AS PREDICTORS OF
CONFLICT RESOLUTION STYLE IN CHILDREN**

Allison Lawton and Doran French*

Department of Psychology, Illinois Wesleyan University

This study attempted to clarify the link between global aggressive behavior, sociometric status, and aggressive conflict resolution style among children. Fourth and fifth grade boys and girls were interviewed about their peer conflict resolution styles using both hypothetical and actual conflict measures. Additionally, teachers and students filled out questionnaires regarding relational and overtly aggressive behaviors and sociometric status of the individual participants. Based on past research, it was expected that low sociometric status and global relational or overt aggressiveness would both be positively correlated with a relational or overtly aggressive conflict resolution style. Partial correlations should indicate that global aggressiveness, rather than low sociometric status, is a stronger predictor of an aggressive conflict resolution style. A second object of this research was to examine the extent to which peer and teacher ratings of aggressiveness were associated with self-ratings of aggressiveness on hypothetical and actual reported conflicts.

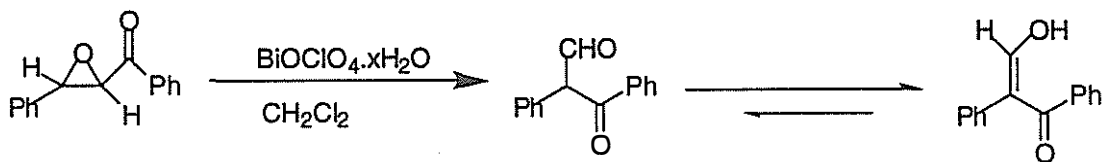
Poster Presentation 14

**BISMUTHYL PERCHLORATE PROMOTED REARRANGEMENT
OF EPOXIDES BEARING ELECTRON WITHDRAWING GROUPS**

Nicholas M. Leonard and Kaushik A. Bhatia and Ram S. Mohan*

Department of Chemistry, Illinois Wesleyan University

The rearrangement of epoxides bearing acyl groups constitutes a useful synthesis of β -keto aldehydes. We have discovered that bismuthyl perchlorate is an efficient reagent for this rearrangement. This reagent is relatively non-toxic, inexpensive, and insensitive to air, which makes it more attractive than some corrosive reagents such as $\text{BF}_3 \cdot \text{Et}_2\text{O}$. The results of this study will be presented.



Poster Presentation 15

**LIPID BIOCHEMISTRY IN HOUSE WREN EGG YOLK
AND POSSIBLE EFFECTS ON INCUBATION PERIOD**

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House Wrens (*Troglodytes aedon*) are distributed throughout North and South America. As has been observed in many avian species, populations of House Wrens in the tropics have longer egg incubation periods than populations in temperate regions. The purpose of this study was to characterize incubation periods of a temperate population of House Wrens and to conduct a preliminary chemical analysis of the yellow and white yolk layers of House Wren eggs. The eggs were collected from a breeding population in Central Illinois from June-August, 2000. Avian yolk is composed of yellow and white components, which are laid down in alternating layers around a core of white yolk called the latebra. White yolk is produced at night, while yellow yolk is produced during the day. Along with the temporal differences in formation, yellow and white yolk differ in their biochemical make-up in that yellow yolk is richer in high-energy lipids. The proportions of yellow and white yolk may differ in eggs from tropical and temperate populations of House Wrens, which may influence the rate of embryonic development and thus incubation periods.

There was a 90.0% hatching success from the artificial incubation of temperate House Wren eggs (n=30), which had a mean incubation period of 13.6 days_{0.2SD}. Studies of natural populations of House Wrens in temperate regions have found incubation periods of 12.2 days_{0.2SD}. The lipid components (triacylglycerol, phospholipid, free cholesterol, cholesterol ester and free fatty acid) of 30 unincubated eggs were analyzed. Extraction of the lipids from the yolks was conducted using a modification of the Folch method, followed by the separation of lipid components using preparatory TLC. This method produced a 93.4-96.0% lipid recovery rate with little variability (<6.0%) in replicate portions of the same yolk. Future work will involve incubating eggs from tropical House Wrens and conducting a chemical analysis of their yolks.

Poster Presentation 16

**THE PREPARATION OF MACROCYCLIC LIGANDS FOR USE IN THE
SYNTHESIS OF OXYGEN CARRIERS**

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Extensive research has been pursued in the area of developing synthetic oxygen carriers. There have been numerous successful molecules already synthesized, many of which are structurally and functionally similar to the active sites of hemoglobin and myoglobin, which occur naturally in blood. Hemoglobin serves as a model for these syntheses because of its natural oxygen transport ability. At the hemoglobin active site, dioxygen binds reversibly to an iron metal center in the oxygen rich environment of the lungs. The oxygen is then carried through the blood to areas in the body that are low in oxygen, such as the muscles. Synthetic forms of these molecules are of considerable interest for use in applications in dioxygen purification and enrichment, oxygen storage and transportation, and possibly even in production of synthetic blood. By designing these molecules with certain electron donating substituents, it is possible to control and adjust the redox potential of the metal center to alter its reactivity. This will dictate how well the oxygen is able to bind reversibly to the metal center. A delicate balance of the electronic properties of the metal is required for reversible dioxygen binding. If the potential on the metal is too positive, the dioxygen molecule fails to bind to the metal. On the other hand, if the potential is too negative, dioxygen will bind irreversibly. It is also important to design a molecule with adequately sized ligand substituents to eliminate autoxidation, which is a process in which the dioxygen binds to another metal center, producing a metal-oxygen-metal 'sandwich'. With all of this in mind, we have attempted to design macrocyclic ligands with sufficiently bulky and electron donating substituents. These macrocycles are a precursor to the final product of the oxygen carrier in that the metal has not yet been introduced.

Busch, D.H. et al. Inorg. Chem.
1994, 33, 910-923.

Poster Presentation 17

**THE INFLUENCE OF PASSIVE FLOW ON THE FEEDING CURRENT
OF SEA SQUIRTS (UROCHORDATA: CHORDATA).**

Michelle Rabon, Ebony Tillman, Alison Sweeney, and Elizabeth Balser*

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Many aquatic animals that feed on particles suspended in the water column employ a filter mechanism to capture food particles, such as algae or bacteria. This type of feeding method requires a filter and a water current to carry food particles across this filter. Animals can use energy to generate water flow through their filters; however, they can benefit greatly by taking advantage of any flow in the environment. The research presented here was designed to examine how an organism might utilize ambient current by altering its structure to promote passive (not requiring energy expenditure by the animal) water flow through feeding structures. A common marine filter feeder, a sea squirt, also called a tunicate, is thought to employ passive flow to augment its feeding current. Tunicates live with one end attached to the ocean floor and the other end pointed upward. The upper end supports an incurrent and excurrent opening. Each opening is located at the end of a tube called a siphon. Water flows into the incurrent siphon, across a filter that traps food particles, and out the excurrent siphon. A flow tank was constructed to generate laminar (non-turbulent) flow in order to examine the relationship between siphon characteristics and utilization of passive flow. A living tunicate and an artificial glass tunicate were placed in the flow and the rate of water movement, as indicated by dye movement, through the animal and the glass tunicate was measured. The particular structure of the siphons allows tunicates to take advantage of three different mechanisms involved in passive flow-- viscous entrainment, Bernoulli's Principle, and the Pitot Tube Effect. The position of siphons, length of siphons, and angle of the siphons relative to the laminar flow were manipulated to measure the potential contribution of Bernoulli's Principle and the Pitot Tube Effect to the flow through the organism. For the artificial tunicate, which has no ability to generate flow, a wide range of these structural parameters (listed above) resulted in passive flow through the tunicate. Further, an optimal position of the siphons, resulting in the greatest rate of passive flow, was determined. Similar results were observed in the living tunicate, which is capable of generating flow using tiny hair-like structures called cilia. However, the animal could also manipulate the position and diameter of the siphons presumably to achieve the optimal position to enhance passive flow through the feeding structures.

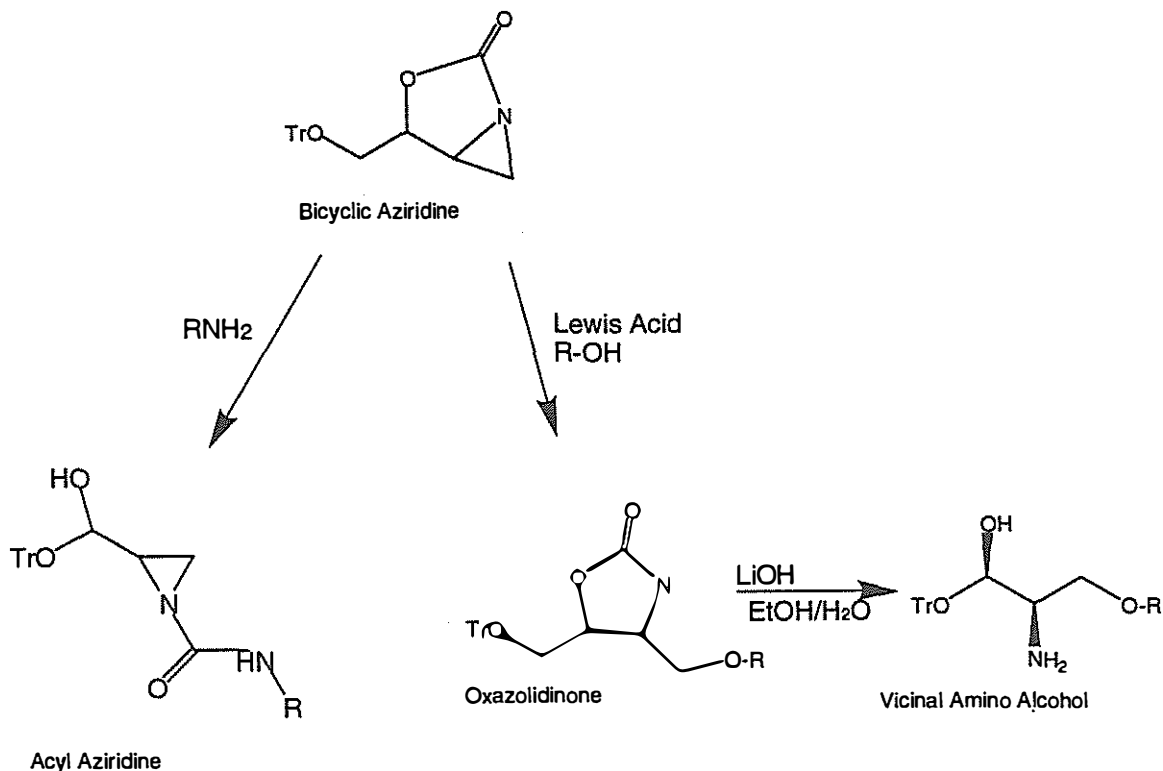
Poster Presentation 18

**SYNTHESIS OF VICINAL AMINO ALCOHOLS AND ACYL AZIRIDINES
FROM BICYCLIC AZIRIDINES**

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Vicinal amino alcohols are found in many biologically important molecules, including hydroxyamino acids. While there are many ways to synthesize these types of compounds, we present the synthesis via a bicyclic aziridine intermediate. The bicyclic aziridine is synthesized in 4 steps, starting with 2-butene- 1,4-diol. The bicyclic aziridine can be opened with an alcohol and a Lewis acid to form an oxazolidinone, intermediate which can be hydrolyzed to the amino alcohol. Alternatively, the bicyclic aziridine can be converted to an acyl aziridine by treatment with amines.



Poster Presentation 19

**TESTING THE EFFECTS OF FOOD DENSITY ON ECHINODERM LARVAL
GROWTH AND THE CORRELATION BETWEEN
JUVENILE BIOMASS AND SIZE**

Matthew Schnabl and William Jaeckle*

Department of Biology, Illinois Wesleyan University

I tested the hypothesis that juvenile size (surface area) accurately predicts juvenile organic content (biomass) in the sea urchin *Arbacia punctulata* (Echinodermata). Results of previous experiments with sea urchins suggest that juvenile size and survivorship are directly related to size of the eggs and free-swimming developmental stages (larvae) and the amount of available food (Emlet et al., 1987). To date, there is no published work that tests the hypothesis assumption that a larger juvenile possesses more biomass. If juvenile size does not predict juvenile biomass, then size per se may not be the critical factor predicting juvenile survivorship. Results of research presented last year revealed that when larvae were provided with an unlimited amount of food, juvenile size (surface area) significantly effects the amount of organic content, but there was not a predictive pattern between the two. I have extended this research project to evaluate the influence of a specific diet ration on juvenile size, biomass, and the correlation between these two variables. To date, after 10 weeks of continuous culturing, no larvae reared at the low food density (5×10^2 cells per ml) completed development to the juvenile stage. In contrast, 82 larvae in the high food treatment (5×10^3 cells per ml) successfully metamorphosed to become juvenile sea urchins. This experiment is ongoing and measurements of juvenile size, biomass, and their correlation are pending.

Poster Presentation 20

**PSYCHOSOCIAL EXPERIENCES OF COLLEGE STUDENTS WHO HAVE
SIBLINGS WITH ADHD**

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The daily lives of children may be altered in significant ways when they grow up with a sibling diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), and those experiences may have important consequences for the children's well-being and development. For example, Kendall (1999) found that typically developing siblings of children with ADHD had significantly more psychosocial difficulties than did siblings in a matched control group. Most researchers in this area have studied children; therefore, the current study was designed to assess the psychosocial experiences of young adults. Over 150 college students completed five questionnaires concerning their sibling relationships and their own psychosocial experiences. The specific variables of interest were: quality of sibling relationship, specific sibling-related worries, caregiving styles, depression, and general anxiety. It was hypothesized, with regard to their relationship, that siblings of individuals with ADHD would report less warmth and closeness, more conflict and caregiving, as well as more specific worries than would siblings of individuals without ADHD. It was also hypothesized that depression and anxiety would be elevated in siblings of individuals with ADHD in comparison to the controls.

Poster Presentation 21

**COGNITIVE AND PHYSIOLOGICAL PROCESSES UNDERLYING
WRITTEN DISCLOSURE**

Leila Setork and John Ernst*

Department of Psychology, Illinois Wesleyan University

The aim of this research is to examine the underlying cognitive processes as well as the physiological outcomes of disclosing traumatic events. Epstein (1973, 1991, 1994, 1998) has argued the existence of two fundamental modes of cognitive processing: A rational mode that involves higher brain functioning and is reason-oriented, and an experiential mode that involves lower brain functioning and is pleasure oriented. We examined the hypothesis that fact-based disclosure invokes rational processing while emotion-based disclosure invokes experiential processing by examining participants' behavior in a decision-making task following written disclosure. Moreover, based on previous findings suggesting that events involving high vs. low brain functioning involve different types of physiological activation (Tomaka, Blascovich, Kelsey, & Leitten, 1993), we proposed the following: First, emotion-based retelling will result in a uniform pattern of autonomic activity across subjects, marked by an increase in sympathetic activity coupled with a decrease in parasympathetic activity. Second, fact-based retelling will result in diverse sympathetic and parasympathetic activity between subjects, including an increase in sympathetic activity with no change in parasympathetic activity and a decrease in parasympathetic activity with no change in sympathetic activity. Sixty undergraduates at Illinois Wesleyan University wrote about a personally traumatic event from either a factual or emotional perspective for ten minutes and then participated in a decision-making task modeled after Epstein's ratio-bias paradigm. Impedance cardiography was employed to examine autonomic arousal (heart rate, blood pressure, respiratory sinus arrhythmia, and pre-ejection period) throughout the study. Participants' physiological responses, in combination with their performance in the ratio-bias paradigm, were used to indicate whether fact-based and emotion-based disclosure invoked the rational and experiential systems, respectively

Poster Presentation 22

INCURSION OF COLLOID INTO AN OPTICAL PINSCAPE

Steven A. Sheets(1), Gabriel C. Spalding*(1), Pamela T. Korda*(2),
and David G. Grier*(2)

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(2)Dept. of Physics, James Franck Institute, and Institute for Biophysical Dynamics
The University of Chicago

When subjected to an applied external field higher than some critical value, quantum vortices enter a type II superconductor, but spread out due to repulsive vortex-vortex interactions. Others in our lab¹ have recently begun to study the behavior of vortex matter in superconductors that have been patterned so as to contain an array of pinning centers. This patterning introduces a static 'landscape' of potential energy, and a *competition* between vortex-vortex interactions and vortex-*pinscape* interactions. While this problem has important technological implications, it is also an interesting system for the study of collective behaviors in many-body assemblies. Korda and Spalding have performed an experiment that serves as a classical analog of such interactions.

A holographic optical tweezing was used to create an *optical* pinscape for colloidal particles. By initiating a convection roll on the far side of their sample cell, they created an external influence that tends to drive the colloid into the pinscape. Here, we present an analysis of the optical potential and of the evolution of the colloid as it invades the optical pinscape. We also explore the similarities and differences between this experiment and the one involving quantum vortices.

¹Brad Andrews, Paul Curran, Gabriel C. Spalding, "Magnetic Dot and Anti-Dot Array Fabrication via Nanosphere Physical Masks," John Wesley Powell Research Conference, 2001

Poster Presentation 23

**EXPLAINING THE WAGE GAP BETWEEN CONTINGENT AND
NONCONTINGENT WORKERS**

Nicole Skalski, and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

An important labor market trend is the rapid increase of the contingent workforce. Contingent workers are the individuals who do not perceive themselves as having an explicit or implicit contract for continuing employment. Under this definition, it is estimated that 6 million workers are classified as contingent.

Researchers have discovered a pay gap between contingent and noncontingent workers. Hipple, in his 1998 study, argued that median earnings were \$266 per week for contingent workers, compared with \$444 of the noncontingents. The purpose of this project is to explore what causes this income differential by using the National Longitudinal Survey of Youth and multivariate regression analysis. It is hypothesized that this pay gap can be explained by differences between contingent and noncontingent workers such as hours worked, training received, occupation chosen, and discrimination

The principal finding suggests contingent workers have fewer opportunities for training and also do not realize the benefits of training compared with noncontingent workers.

Poster Presentation 24

**TRACE METALS AND INORGANIC NUTRIENTS IN THE EAST RIVER
AND LONG ISLAND SOUND: POSSIBLE BIOLOGICAL IMPACTS**

Alison Sweeney and Elizabeth Balser* and Sergio A. Sañudo-Wilhelmy*

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Marine Sciences Research Center, State University of New York

The East River receives a large volume of treated sewage and industrial effluent as a result of the heavy urbanization of the region. A suite of inorganic nutrients, trace metals, and chlorophyll a was measured along a 55 mile transect of the East River and Long Island Sound to determine relative levels of contamination from sewage and possible biological impact of this sewage. Anthropogenically influenced factors such as silver, nitrate/nitrite and phosphate were highest in the East River, while non-anthropogenically influenced factors such as copper and silicate were relatively constant throughout the transect, indicating a high level of sewage impact in the East River. Chlorophyll a concentrations, used as an indicator of total biomass, were low in the East River. These low chlorophyll concentrations could not be explained by nutrient limitation, water column stratification, or light limitation in the East River, suggesting a possible toxic effect of sewage on biomass in the East River.

Poster Presentation 25

**VASCULAR MORPHOLOGY AND RESPIRATORY PHYSIOLOGY OF THE
SEGMENTED MARINE WORM GLYCERA DIBRANCHIATA**

Alison Sweeney and Elizabeth Balser*

Department of Biology , Illinois Wesleyan University

Glycera dibranchiata is a common polychaete worm that, like other segmented worms, has a large fluid-filled body cavity, a coelom, which it uses as a hydrostatic skeleton and as a means of circulating hemoglobin-containing cells (hemocytes) for respiration. We have observed that, in addition to the hemocyte-filled coelomic system, *G. dibranchiata* also possesses a previously undescribed pumping vascular system. This vascular system lies on the dorsal and ventral surfaces of the gut, and communicates, in the vicinity of the worm's brain, with a space overlying the ventral nerve cord. This system of blood vessels also contains red pigment, which is suggestive of the presence of hemoglobin. The hemoglobin in the coelomic cells has been well characterized by other authors, but the presence or characteristics of hemoglobin in the vascular system has not previously been reported. Although, the coelomic hemoglobin of *G. dibranchiata* has been closely scrutinized by biochemists because of its unique properties, this information has not been integrated into an understanding of the organism's physiology. Mangum (1974) and Colacino (pers. com.) have proposed alternate hypotheses explaining the need for several hemoglobins of varying oxygen affinities, spatially arranged in an individual, as observed in *G. dibranchiata*. Mangum's hypothesis suggests that the spatial arrangement of different types of hemoglobin with increasing oxygen affinities towards the center of the organism provide a slow leak of oxygen to tissues during times of oxygen stress. Colacino (pers. com.) proposes that the proximity of a higher-affinity hemoglobin to the organism's nerve cord provides oxygen for quick bursts of nerve firing, regardless of oxygenation of the environment. Our work provides a morphological description of the vascular system of *G. dibranchiata*, preliminary characterization of the respiratory pigment in the vascular system, and tests hypotheses describing the role of various respiratory pigments in the overall ecology of *G. dibranchiata*.

Poster Presentation 26

**FRENCH - ALGERIAN AID RELATIONS:
THE REALITY OF GOVERNMENT VS. NON-GOVERNMENT EFFORTS**

Anu Thakrar and Michael Weis* and William Munro*
International Studies Department, Illinois Wesleyan University

This article gives a brief historical overview of the France and Algerian colonial relationship in order to assess the need for aid in Algeria due to internal post-colonial trauma and recent political strife, as well as economic and political relations with its former colonizer. It explores further the aid relations between the two countries, concluding that much of this aid was and still is economically motivated and carries with it several advantages to the donor country/institution. The paper cites specific problems regarding French government aid policy and effectiveness with regards to Algeria, which results in less efficient and effective development programs than otherwise possible.

Illustrating several problems caused by government-sponsored aid, it becomes necessary to investigate alternative methods of providing aid. One such alternative that has gained momentum in recent years is the emerging role played by Non-governmental organizations (NGOs) in Algeria. The Nobel Prize Winning French-based NGO, Médecins Sans Frontières (MSF/Doctors Without Borders) that works in Algeria to aid in health and human rights is used as an example to assess the performance and accountability, sustainability, autonomy, democratization and participation of this sector of civil society as a whole. Finally, the article also takes into account public opinion of French foreign aid, illustrating the popular view that aid should be placed outside the hands of the government due to corruption and ineffectiveness, along with lack of knowledge of local needs.

Poster Presentation 27

**PATTERNS AND PATHWAYS OF NUTRIENT CIRCULATION
IN LARVAL SEA URCHINS**

Casey Twanow and William Jaeckle*

Department of Biology, Illinois Wesleyan University

Within the body of a larval sea urchin, a juvenile that will eventually mature into an adult develops. Each juvenile depends on the "host" larva for nutrients necessary to support growth and development. Patterns of nutrient circulation in the larvae, and of nutrient delivery to the juvenile are poorly understood. Ruppert and Balser (1986) propose the existence of a kidney in larvae of starfish (a sister group to sea urchins), functioning in excretion and possibly circulation of nutrients. The kidney is composed of a coelomic cavity (the left axocoel) where filtration of the body's blastocoelic fluid occurs, a pore canal where selective resorption occurs, and an external opening or hydropore. We tested the proposed function of the kidney complex by tracking the distribution of an iron-containing protein, ferritin, in the body of sea urchin larvae. Larvae of *Lytechinus variegatus* and *Arbacia punctulata* were incubated in ferritin for known periods of time. After incubation, ferritin was detected in the larval digestive system, in free cells in the body cavity (mesenchyme cells), in the developing juvenile, in the axocoel, and in the pore canal-hydropore complex. These results suggest that fluid is filtered from the blastocoel into the axocoel, circulated within the connected coeloms, and excreted through the hydropore. This fluid flow may serve as a mechanism for circulation within the body cavity, and provides a route for nutrient delivery to the developing juvenile. We observed high concentrations of ferritin particles in the pore canal and hydropore relative to other larval structures. This supports the occurrence of selective resorption by pore canal cells, hypothesized by Ruppert and Balser (1986), and gives evidence for a kidney and circulatory system in larval sea urchins.

Poster Presentation 28

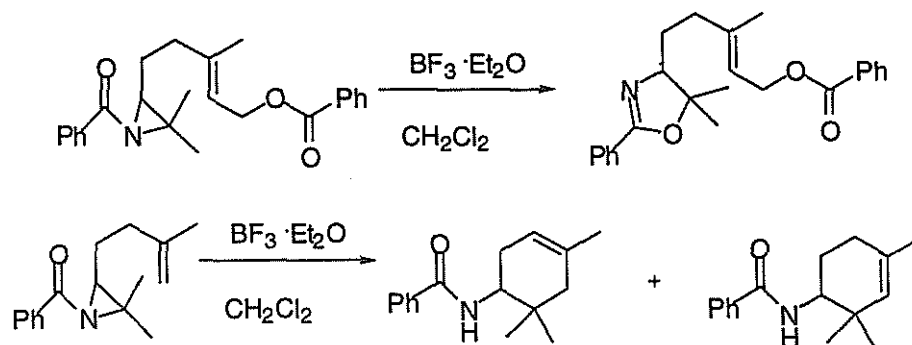
LEWIS ACID CATALYZED REACTIONS OF
AZIRIDINO-OLEFINS

Steven A. Tymonko and Ram S. Mohan^{1*} Corey Stanchina* and Robert. M. Coates^{2*}

¹Department of Chemistry, Illinois Wesleyan University

²¹Department of Chemistry, University of Illinois-Urbana

Rearrangement reactions resulting in the formation of new carbon-carbon bonds are an important tool for use in organic synthesis. These reactions have been well documented for compounds such as epoxyolefins, yet similar rearrangements with aziridines have been largely unexplored. We wish to report the rearrangement of a series of olefin aziridines to the corresponding oxazoline or carbocyclic products.



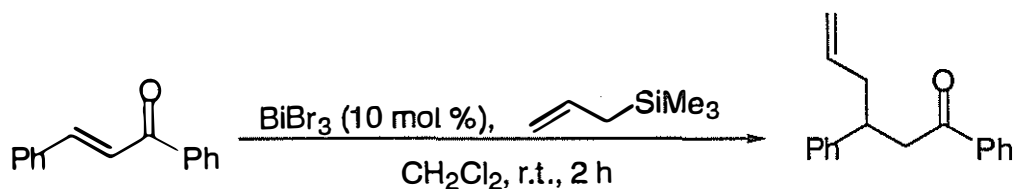
Poster Presentation 29

**UTILITY OF BISMUTH REAGENTS IN ORGANIC SYNTHESIS:
BISMUTH BROMIDE AS AN EFFECTIVE CATALYST FOR THE
SAKURAI REACTION**

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The conjugate addition of allyltrimethylsilane to an α,β -unsaturated carbonyl compound (Sakurai Reaction) is a useful way to generate carbon-carbon bonds. The Sakurai reaction is typically carried out using a stoichiometric amount of TiCl_4 . We wish to report that bismuth (III) bromide is an effective catalyst for the Sakurai reaction. Bismuth compounds are attractive as reagents in organic synthesis due to their relatively low toxicity and low cost.



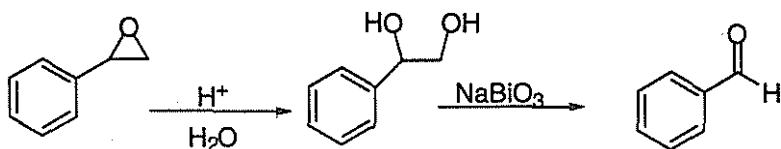
Poster Presentation 30

**UTILITY OF BISMUTH COMPOUNDS IN ORGANIC SYNTHESIS:
A ONE-POT METHOD FOR OXIDATION CLEAVAGE OF
EPOXIDES USING SODIUM BISMUTHATE**

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Department of Chemistry, Illinois Wesleyan University

Bismuth compounds are attractive as reagents in organic synthesis because of their low toxicity, low cost and ease of availability. Sodium bismuthate has been reported to cleave 1,2-diols to aldehydes and ketones. In light of the fact that epoxides can be opened to 1,2-diols, the goal of this project is to develop a one-pot method for cleavage of epoxide to carbonyl compounds.



Poster Presentation 31

**A STUDY OF THE EFFECTIVENESS
OF THE NEW CHINESE INTEREST TAX**

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In November 1999, the Chinese government initiated a new tax, interest income tax. This tax was introduced after several years of deflation and increase in total savings. Under this new interest income tax, a flat-rate tax of 20% is levied on interests earned in the Chinese currency Reminbi (RMB) and all foreign currency deposit accounts at Chinese domestic banking institutions. The interest tax was introduced to achieve the following objectives: 1)to stimulate consumer spending; 2)to redistribute income; and 3)to encourage individual investment in the capital market. The purpose of the research is to gather data and to empirically determine the effectiveness of the new tax in achieving its economic goals.

We collected data on savings and consumer spending before and after the tax was levied in order to study the effects of the new tax on overall savings and consumer spending. We also interviewed people with different levels of income to see whether and how the tax had affected their behavior. We also gathered data of the securities markets to see whether the new tax has an impact on investments in the capital markets.

Our results indicate that the tax has indeed achieved its intended objectives. The increase in savings has slowed down and consistent price declines, which started more than two years ago, have stopped. More funds have since flown into the stock markets, which recently reached record high.