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11th Annual Governors State University Student Research Conference Proceedings

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Proceedings of the
11th Annual GSU Student Research Conference

Governors State University
University Park, IL 60466

May 24, 2005

Editor:

Dr. Shelly Kumar
Division of Science
College of Arts and Sciences
PARTICIPANTS

Students of Governors State University

College of Arts and Sciences
College of Business and Public Administration
College of Education
College of Health Profession
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May 2005

Dear Student Researcher:

Welcome to the Annual Governors State University Research Conference. Thank you for sharing the results of your research with the GSU academic community.

Scholarship encompasses many types of research: the basic research of discovery, applied research, pedagogical research, and integrative research. The projects reported on in the Conference include all of these. The common thread is the creation of new knowledge.

Congratulations to you and to the faculty who have taught you. We are proud to have you as members of the GSU community.

Thank you for taking part in research in the adventure of creating new knowledge.

Sincerely,

[Signature]

Stuart I. Fagan
President
A MESSAGE FROM THE CONFERENCE
STEERING COMMITTEE

The steering committee is pleased to announce the 11th Annual GSU Student Research Conference to be held on May 24, 2005. For the past ten years this conference has become a tradition in excellence, and we are confident that today again we will witness another session of quality presentations by our students. This conference will be presented in its original format and with its original objectives:

1. To provide students an opportunity to present their research work before an audience of their peers, and to use the comments they receive to improve presentations made at professional conferences.

2. To provide a forum to highlight research accomplishments at GSU, and honor students presenting their research work.

3. To generate enthusiasm among the student body in general, and encourage them to pursue research and other scholarly activities.

4. To enhance communications in the area of research among the four colleges at GSU. The interactions may also lead to collaborative work among students and faculty of different colleges.

5. To enhance the image of GSU in the area of teaching, as research is considered an integral part of teaching at the university level. In the long run a larger number of students attracted to research would enroll at GSU to pursue higher education.

The committee hopes that you will enjoy the conference, that you share in the excitement of doing research, and that you will look forward to participating in future student and professional conferences.
KEYNOTE SPEAKER BIOGRAPHY

The Student Research Conference Steering Committee is proud to announce that the keynote speaker for the lunch will be:

Dr. Kathleen D. Morrison, Ph.D.

Professor of Anthropology and Director, Center for International Studies
University of Chicago, Chicago, IL

Kathleen Morrison is a Professor of Anthropology and of Social Sciences at the University of Chicago. She earned her Ph.D. in Anthropology from UC Berkeley in 1992 and primarily studies the archaeology and historical anthropology of South Asia with a focus on pre-colonial and early colonial South India. Her interests include state formation and power relations in South Asia, agricultural intensification as a general historical problem, colonialism and imperialism, landscape history, and the integration of archaeological, historical, and ecological analysis. In 2003, Professor Morrison was appointed to be the Director of the Center for International Studies. She has authored a large number of research articles, books, monographs, and chapters in books. She serves in the editorial boards of 1) the Journal of Archaeological Method and Theory and 2) SERINDIAN (Site for Education and Research India). She is the recipient of several awards and honors including Fellow, Center for Advanced Study in the Behavioral Sciences from Stanford University and Board of Senior Fellows from University of Chicago Society of Fellows.
MAKING PLACES AND MAKING STATES: AGRICULTURE, METALLURGY AND THE WEALTH OF NATURE IN SOUTH INDIA

Kathleen D. Morrison

Professor of Anthropology and Director, Center for International Studies
University of Chicago, Chicago, IL

ABSTRACT

Visitors to the semi-arid interior of the Indian peninsula, a landscape blessed with a rather unpromising suite of environmental conditions, might be surprised to hear that this region has supported nearly six thousand years of agricultural production, nearly three thousand years of urbanism, and nearly three hundred years of the existence of one of the largest cities in South Asia, the imperial capital of Vijayanagara. In so doing, local people created a complex anthropogenic landscape, a place where the consequences of past actions have had profound implications for later inhabitants. In this area, as elsewhere, the contemporary landscape is a complex, accretional product that cannot be fully understood without reference to longer-term human and environmental history. In this talk I will show, contrary to the assertions of much otherwise excellent work on the environmental history of South Asia, that the colonial period did not see the first, or in this area even the most significant, episodes of large-scale deforestation, erosion, and reworked hydrological regimes.

Although I frame the discussion in terms of a very long, five-thousand year period between about 3000 BCE and the end of the twentieth century, my primary focus will be on the centuries (1300-1600 CE) when this region was dominated by the city of Vijayanagara, when human modification of the regional landscape was the most dramatic. Most specifically, I will highlight some of the changes we have been able to document in regional vegetation, soils and landforms, and hydrology, linking these with changes in settlement and political organization. In laying out aspects of this long history, I hope to illustrate the possibilities of a broad approach which integrates information not only from written texts, maps, and other visual representations, but also from evidence of human manufacture (structures, features, artifacts), their spatial and temporal relationships, as well as material modifications of the landscape itself. In addition to information from texts and material culture, I also include data from paleoecology, particularly the proxy records of past vegetation and fire history provided by pollen and plant macrofossil analysis.
# PROGRAM SUMMARY

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Conference Registration & Continental Breakfast
8:30 A.M. Hall of Governors

Program Commencement Engbretson Hall
9:00 A.M. Welcome and Introduction:
Dr. Shelly Kumar
Division of Science
College of Arts and Sciences

Greetings:
Dr Eric Martin, Associate Provost

Podium Presentations Engbretson Hall

Session I Moderator:
Dr. Frances Kostarelos
Division of Liberal Arts
College of Arts and Sciences

9:10 A.M.

9:30 A.M.
"FLOYD-WARSHALL ALL PAIRS SHORTEST PATH ALGORITHM", David Kukulka and Shensheng Zhao*, Computer Science, Division of Science, CAS. p 14.

9:50 A.M.

10:10 A.M.

10:30 A.M. Refreshment Break
Session II Moderator:
Dr. Akkanad Isaac
Division of Management, Marketing, and Public Administration
College of Business and Public Administration

10:50 A.M.  “NMR INVESTIGATIONS OF ReH₇(PPh₃)₅”, Sam John, Santosh Soparawala, Jan Wazio, and Gregory Moehring*, Chemistry, Division of Science, CAS. p 17.


Conference Lunch
Hall of Honors

12:30 P.M.  Lunch

1:15 P.M.  Keynote Speaker

Kathleen D. Morrison
Professor of Anthropology and Director, Center for International Studies
University of Chicago, Chicago, IL

Speaking on:

MAKING PLACES AND MAKING STATES: AGRICULTURE, METALLURGY AND THE WEALTH OF NATURE IN SOUTH INDIA
Poster Presentations  

2:00 P.M.  
"METACOGNITIVE READING STRATEGY TRAINING IMPROVES PERFORMANCE IN AN INTRODUCTORY SCIENCE CLASS", Mary Deans, Maisha Lowery, Zataunia Jones, and Linda Buyer*, Psychology, Division of Psychology and Counseling, COE. p 22.

"TEMPORAL VARIATION IN LEAD CONCENTRATIONS AS REFLECTED BY TREE RINGS", Brandon Reynolds, Sonia B. Diaz, Karen D'Arcy*, and John Yunger*, Biology, Division of Science, CAS. p 23.

2:30 P.M.  
Certificates Presentation  
Dr. Eric Martin, Associate Provost

2:40 P.M.  
Concluding Remarks  
Dr. Shelly Kumar
ABSTRACTS OF PAPERS

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The authors with underlined names are the presenting authors. The authors with asterisks are the faculty sponsors.

Governors State University
University Park, Illinois
THE SOCIAL EFFECTS OF COOPERATIVE LEARNING GROUPS ON SIXTH GRADE STUDENTS WITH DISABILITIES

Rosanne A. Kramer and Maribeth Montgomery Kasik*

Multicategorical Special Education
Division of Education, COE

ABSTRACT

The results of the study provide evidence that students with disabilities in the sample population are not accepted socially or in cooperative groups to the same extent as their peers. This causal comparative study investigates the social effect of cooperative learning groups on sixth-grade students in a parochial school. The study looks further into the social dynamics of the group through the use of a social distance scale. Different social distance scores of the students in this sample indicate social out-casting of students with disabilities. Through the use of a sociogram, the social networks within the group illustrate where each student fits given different circumstances. No difference was found between social and cooperative group networks.
FLOYD-WARSHALL ALL PAIRS SHORTEST PATH ALGORITHM

David Kukulka and Shensheng Zhao*

Computer Science
Division of Science, CAS

ABSTRACT

Problem Statement: The Floyd-Warshall algorithm is used in finding a solution to the all pairs shortest path problem. This report will demonstrate the Floyd-Warshall algorithm being used to calculate the transitive closure of a graph.

Introduction: The Floyd-Warshall algorithm is a dynamic algorithm that is useful for finding the shortest path between all pairs of vertices on a weighted directed graph. The algorithm uses a bottom up approach to solving the all pairs shortest path problem. The algorithm starts off with paths that consist of a single edge, it will then iteratively calculate least cost paths using an increasing set of possible nodes until all nodes in the graph are possible intermediate nodes. The algorithm adds one node at a time while performing its calculations. The algorithm consists of 3 nested loops that run in O(1) time. Executing within the 3 loops, the Floyd-Warshall algorithm runs in \( O(V^3) \) time. Negative weighted edges may be present, however, no negative weight cycles are allowed. The work done within the loops takes the minimum of either the path from i to j through vertices \( \{1...k-1\} \) or the sum of the minimum path from vertex i to k through vertices \( \{1...k-1\} \) plus the minimum path from k to j through \( \{1...k-1\} \). A real world example is a roadmap with the vertices corresponding to locations and roads corresponding to edges. The pseudocode for the algorithm follows.

Floyd Warshall Algorithm Pseudocode

\[
\text{FLOYD-WARSHALL}(W) \\
1. \quad n \leftarrow \text{rows}[W] \\
2. \quad D^{(0)} \leftarrow W \\
3. \quad \text{for } k \leftarrow 1 \text{ to } n \\
4. \quad \quad \text{do for } i \leftarrow 1 \text{ to } n \\
5. \quad \quad \quad \text{do for } j \leftarrow 1 \text{ to } n \\
6. \quad \quad \quad \quad d_{ij}^{(k)} \leftarrow \min(d_{ij}^{(k-1)}, d_{ik}^{(k-1)} + d_{kj}^{(k-1)}) \\
7. \quad \quad \text{return } D^{(n)}
\]

Algorithm Analysis: The Floyd-Warshall algorithm works with 2 principles, based on a graph G with vertices \( (V) = \{1,2,...,k-1\} \). For any pair of vertices i and j which are members of V, it takes into account paths from i to j which have the set \( \{1,2,...,k-1\} \), which is used for selecting vertices. The relationship between the minimum-weight path (p) is and the shortest path from i to j with all intermediate vertices in the set \( \{1,2,...,k-1\} \) determines whether k is an intermediate vertex in the set or not. If k is an intermediate vertex in the shortest path i-j then we can break our shortest path down into two paths: i to k and k to j. All intermediate vertices in each set are from the set \( \{1,2,...,k-1\} \). If k is not an intermediate vertex in the shortest path then all intermediate vertices are from the set \( \{1,2,...,k-1\} \).
THE HISTORY, FUNCTION, SYMBOLISM AND AESTHETICS OF VOUDOU BANNERS

Dorita Fuller and Arthur Bourgeois*

Art History
Division of Liberal Arts, CAS

ABSTRACT

The drapeau or ceremonial flags used ritually in Haitian Voudou are the subjects of the research proposed. These works are functional, embellished textiles of longstanding distinction among Voudou practitioners and in contemporary western culture an exotic and sought after folk art. This paper will review the cultural origins of this still-practiced medium, the belief structure which generates its imagery, and the traditional techniques and materials employed. It will also address the relationship between this medium and others within the Haitian culture and compare it with selected aesthetic expressions originating elsewhere but utilizing similar techniques or having ritual significance.
FLIGHT OF THE SERPENT:  
DEIFIED SERPENTS AS APOTROPAIC DEVICES

Margaret L. Hosty and Arthur Bourgeois*

Art History  
Division of Liberal Arts, CAS

ABSTRACT

My thesis paper is intended to be an exegetical exploration (from a Christian perspective) of the origin of the apotropaic figure (Sisiutl) of the Kwakiutl and Kwakwaka'wakw Tribes of the U.S. and Canadian Northwest Coastal Natives, with an emphasis on the relationship between the eastwards migration of the idolatrous Kenites (the progeny of Cain) and the appearance of canine-mouthed, serpent-derivative worship in the cultures with which they were in contact.

My exploration of the origin of the Sisiutl figure necessarily involves intensive migratory and ethnological studies of the population demographics of several geographical regions, specifically those which correspond to the body of literary, archeological, and cultural anthropological evidence which exists pertaining to deified reptiles, and especially their employment as apotropaic portals and devices. Research for this course is intended to pay close attention to discerning subsequent relationships between the conventions/objects of the disparate cultures and ethnicities. At present, the progression of tentative regions of study include Iraq, Iran, Afghanistan, Pakistan, China, Russia, and the U.S. and Canadian northwestern coasts; as the genesis of the Sisiutl in context of the Kwakiutl society constitutes a primary focus of the paper, concentrated research is specifically intended to be on the Kwakiutl ethnicity and culture.
NMR INVESTIGATIONS OF ReH₇(PPh₃)₂

Sam John, Santosh Soparawala, Jan Wazio, and Gregory Moehring*

Chemistry
Division of Science, CAS

ABSTRACT

When ReH₇(PPh₃)₂ is dissolved in an aromatic solvent, there is a marked exchange of hydrogen atoms between the two compounds. This is demonstrated by dissolution of ReH₇(PPh₃)₂ in deuterated benzene. Aromatic solvent induced shift in the NMR of the ReH₇(PPh₃)₂ and other rhenium polyhydride compounds has been studied to find a mechanism by which this exchange occurs. The ASIS is compared to a reference compounds such as TMS. Other rhenium polyhydride compounds ReH₅(PPh₃)₃, ReH₅(PPh₃)₂(py), and Re₂(u-H₅)H₄(PPh₃)₄ were included in the study though there are no reports of hydride ligands with solvent protons. ASIS shifts in these compounds was compared with the ASIS shift in ReH₇(PPh₃)₂. No significant difference was found in the ASIS for ReH₇(PPh₃)₂ and the other polyhydride compounds. New research is being targeted to elucidate the mechanism by which a faster hydrogen exchange is occurring between C₆D₆ and ReH₇(PPh₃)₂ in the presence of D₂O.
THE EFFECTS OF DIVORCE AND UNHAPPY MARRIAGE EXPERIENCED IN CHILDHOOD ON ADULTS

James D. France and Rachel Berg*

Psychology
Division of Psychology and Counseling, COE

ABSTRACT

Background: For the past two decades marital divorce has increased in American Society. The effects of divorce and marital unhappiness have influenced children as they become adults. The most important relationship in their parents’ lives failed impacting their growing-up experiences. We have not fully respected how divorce or parents’ unhappy marriage influence the lives of young people after they reach full adulthood.

Purpose: Compare the effects of living in a home where parents were unhappy with each other with parents that divorced.

Method: As a means for presenting an update, this presentation will use both literature review an exploratory questionnaire. I will compare my questionnaire sample with the findings in the literature.

Results: Areas of advancement include a) greater understanding of the effects of a childhood divorce or parental unhappy marriage on adults, b) identify the psychological processes in children (e.g., cognitive, emotional, social, and physiological) that are affected when there is a divorce or an unhappy marriage, c) greater insight into childhood experiences, family history, and effects of children of the marital relationship and parent styles.

Conclusion: In comparing the literature review with the research questionnaire we can gain further knowledge about the effects of divorce and intact unhappy marriages on adults. Suggestions are made for future research directions.
IDENTIFICATION OF A COMPLEX MIXTURE OF TEN COMPONENTS BY USING GAS CHROMATOGRAPHY MASS SPECTROMETRY (GCMS)

Rima Patel and Joseph B Addison*

Analytical chemistry
Division of science, CAS

ABSTRACT

The purpose of the research was to identify ten components of a complex mixture, having functional groups like hydrocarbons, esters, alcohols, phenol, aromatic amine and polycyclic aromatic hydrocarbon. The separation of all ten components was achieved by the Gas Chromatography (GC) part of the instrument and the identification of all components was achieved by Mass Spectrometry (MS) part of the instrument. The MS was done by using two methods – Chemical Ionization (CI) and Electron Ionization (EI). All ten components were identified correctly using the data obtained from EI & CI and comparing that data with the data stored in the computer for different compounds (library of MS). The result was confirmed by looking at the fragmentation pattern of all the components and comparing them with library search. The results of separation and identification will be discussed.
GENDER BIAS IN THE MEDIA COVERAGE OF ATHLETICS

Elizabeth Fruth and Ana Kong*

Media Communications, Communications & Training,
Division of liberal Arts, CAS

ABSTRACT

Over the last several years, women athletes’ popularity has increased a considerable amount, and they have done this without the media. Women have participated in leagues, tournaments, and worldwide events for decades, but they still do not receive equal representation in the media when compared to men. This study examines previous research in regards to women and their representation in the media, especially media outlets such as television, newspapers, and magazines. Several women athletes and athletics were researched, including the WNBA, collegiate tournaments, and the Olympic games.

Cable television sports shows were the first to be examined. From the study, it was clear that the sports coverage on the sports shows favored men, by a ratio of 15:1. Adjectives and subject matters from transcripts and written words from female athletic events were also examined. It was found that there is much more negativity when announcers and authors discuss women athletes, when compared to male athletes. The media coverage for the Olympics does not differ from the other categories. Women are under-represented.

Over the last few decades, women’s participation in sports has increased dramatically. And in most cases, the media coverage for these events has decreased. Women’s athletics need the media’s help if the women athletes and their leagues are going to survive. At the moment, things are not looking good for women’s athletics, partly because of the media.
COMPILER DESIGN USING OBJECT-ORIENTED METHODS WITH APPLICATIONS IN SCIENTIFIC COMPUTATIONS

Jack Douglas Martin and Reino Hakala*

Computer Science
Division of Science, CAS

ABSTRACT

Object-oriented analysis and design will be used to construct a compiler, with basic syntax and structure similar to modern compilers, which will possess the ability to compute intervals that contain accurate results between guaranteed lower and upper bounds. (The result is known accurately to the extent of the agreement between the upper and lower bounds.) Interval analysis is useful in determining whether particular algorithms will provide accurate results using floating-point arithmetic.
METACOGNITIVE READING STRATEGY TRAINING IMPROVES PERFORMANCE IN AN INTRODUCTORY SCIENCE CLASS

Mary Deans, Maisha Lowery, Zataunia Jones, and Linda Buyer*

Psychology
Division of Psychology and Counseling, COE

ABSTRACT

Previous research (Cottrell & McNamara, 2002; Buyer, McNamara, Grossi, Ridley, & Cottrell, 2004) has identified subject variables (e.g., reading ability, prior domain knowledge and metacognitive reading strategy knowledge) that are very good predictors of student performance in an introductory science class. It was hypothesized that reading strategy training (SERT, Preview, or Control) would alter the relations between the subject variables and classroom performance by interacting with the subject variables to affect classroom performance. Results showed that this hypothesis was correct. Although there was no main effect of training condition on post-training performance, reading strategy training affected post-training classroom performance via interactions with reading ability, prior knowledge, metacognitive strategy knowledge and science comprehension.
TEMPORAL VARIATION IN LEAD CONCENTRATIONS AS REFLECTED BY TREE RINGS

Brandon Reynolds, Sonia B. Diaz, Karen D'Arcy*, and John Yunger*

Biology
Division of Science, CAS

ABSTRACT

During the past century, factories and industrial output along with roads and automobile traffic have increased dramatically. These increases were coupled with a shift from rural to urban populations. This urbanization resulted in the increased concentration of both point and non-point sources of potential pollutants and the concomitant increase in probability of human exposure. It was not until the 1970's that modern regulations and limits were placed on the emissions of potential toxins. These potentially toxic materials, including heavy metals, may be taken up through a tree’s root system and subsequently deposited in the annual xylem growth. This annual xylem, or tree rings, may provide a method for examining temporal fluctuations in heavy metal contamination and efficacy of the regulations. We sampled 10 oak trees (Quercus) in eastern Will County, part of the far southern Chicago suburbs. In the early 1900s this was a relatively rural region, which by the second half the last century was adjacent to heavy industry and surrounded by rapid suburban development. The tree rings were sectioned into five-year increments, digested using nitric acid, and lead and zinc concentrations determined using an atomic absorption spectrophotometer (AAS). Lead and zinc concentration from triplicate soil samples collected near each tree were also determined using an AAS. We predict a quadratic response in lead and zinc concentrations over the past 100 years, with lead declining primarily after the mid-1970s as a result of gasoline regulations.
## STUDENT PARTICIPANTS

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Dr. Frances Kostarelos, College of Arts and Sciences
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