



*Undergraduate Research
and
Scholarship Conference*

April 11, 2005

Boise State University

Welcome...
Boise State University
SECOND ANNUAL UNDERGRADUATE RESEARCH AND
SCHOLARSHIP CONFERENCE
Student Union Building
April 11, 2005
1:00 – 4:00pm

Poster session	1:00 – 4:00	Jordan Ballroom
Art display	1:00 – 4:00	SUB Gallery, 2nd Floor
Podium Presentations	1:15 – 2:30	Barnwell and Farnsworth
Barnwell Room – Social Science & Public Affairs Farnsworth Room– Arts & Science		
Performing arts session	1:30 – 3:00	Hatch Ballroom
Documentary Film	2:00 – 3:00	Lookout Room
The BSU Wind Quintet	3:00 – 4:00	Hatch Ballroom
Joe Holladay, ASBSU President, Introductions	3:15	Jordan Ballroom
Welcome by Dr. Sona Andrews,	3:15	Jordan Ballroom
Provost and Vice President for Academic Affairs & Dr. John Owens, Vice President for Research		



Welcome to the Second Annual Boise State University Undergraduate Research and Scholarship Conference. This conference is but one of the many examples as to how Boise State University is achieving its objectives as a Metropolitan Research University of Distinction.

I congratulate the students who have been selected to participate in this event. You not only represent the great range of academic disciplines here at Boise State University, but you exemplify the keen drive our students have for expanding their learning opportunities. The knowledge and experience you have gained from your hard work is an accomplishment that you should be proud of. I know we are and it is with pride and enthusiasm that we honor you for your outstanding work.

I also wish to thank our faculty sponsors. Their dedication to enriching the learning environment at Boise State University is another testament to our vibrancy and growth. We appreciate their commitment in mentoring our students and creating opportunities for our students to engage in scholarly inquiry.

I hope you take the time today to visit with our students, learn about the research they have conducted, ask them probing questions, and enjoy the Conference. On behalf of Boise State University I thank you for your support of this important campus event.

Sona K. Andrews



I would like to extend my welcome to all those participating and attending the second annual Boise State University Research and Professional Practice Conference. This conference is one of the strongest indications of Boise State's determination to become a Research University of Distinction.

Last year's conference involved over 300 participants and this year we expect an even larger turnout. For those who are participating, the opportunity to present your works in an open forum is a key to your development as a scholar in the academic world, and it is an opportunity to develop your research and presentation skills for the world beyond academia. You have demonstrated through your drive and hard work that you can do much more than the average student. You should feel a real sense of accomplishment in all that you have learned and accomplished.

I would also like to extend my thanks to the faculty who are involved in the activities presented. I know you have put a lot of time and effort into working with the students involved in these projects. You have extended their knowledge and experience far beyond the classroom and made your students truly better educated people.

For those who are visiting the conference, I want to extend our thanks for your time and effort. Please take the opportunity to visit with the students involved and see what outstanding individuals they are.

John Owens

– Podium & Documentary Film Presentations –

PODIUM PRESENTATIONS

COLLEGE OF SOCIAL SCIENCES AND PUBLIC AFFAIRS

1:15-2:30 P.M., BISHOP BARNWELL ROOM

Dr. Heidi Reeder, Department of Communication, Discussant

Sally Brown, Department of Communication (Laurel Traynowicz). Dialectical theory and conflict.

Kate Haralson, Jenna Elgin, & Dale Wright, Department of Psychology (Diana Doumas). Adult attachment and psychological distress: Is self-esteem a mediator?

Kelli Cortes, Christine Pearson, Kevin Taylor, & Jacquie Daniel, Department of Psychology (Wind Goodfriend). Attachment theory and the investment model: The symbiosis of two rival theories.

PODIUM PRESENTATIONS

COLLEGE OF ARTS AND SCIENCES

1:15-2:30 P.M., FARNSWORTH ROOM

Dr. Martin Schimpf, Department of Chemistry and Associate Dean, College of Arts and Sciences, Discussant

Christy Claymore, Department of English (Steven Olsen-Smith). From blisters to stars: The search for native identity in Diane Glancy's "Aunt Parnetta's Electric Blisters."

David Collinge, Department of English (Gail Shuck). Facilitating authentic language contact and intercultural exchange.

Irene Ruiz, Department of Modern Languages and Literature (Bruce Swayne). The face of Chicana border literature.

Nancy Henke, Department of English (Jacqueline O'Connor). A divide of privilege and opportunity: Lisa Loomer's "Living Out" and Anglo-Latina relations.

DOCUMENTARY FILM PRESENTATION

COLLEGE OF SOCIAL SCIENCES AND PUBLIC AFFAIRS

2:00-3:00 P.M., LOOKOUT ROOM

Dr. Peter Lutze, Department of Communication, Discussant

Stephanie R. Garcia, Department of Communication (Peter Lutze). Hurt, Perfectly.

– Performing Arts Session –

PERFORMING ARTS SESSION

COLLEGE OF ARTS AND SCIENCES, COLLEGE OF SOCIAL SCIENCES AND PUBLIC AFFAIRS

1:30-3:00 P.M., HATCH BALLROOM

Professor Dawn Craner, Department of Communication, Session Chair

Professor Marla Hansen, Department of Theatre Arts, Session Chair

Molly Beardmore, Department of Theatre Arts (Marla Hansen). Cant.

Lacey Rammell-O'Brien, Department of Communication (Dawn Craner). The Dirty Girls Social Club.

Adam Harrell, Department of Theatre Arts (Richard Klautsch). No Title Yet.

Wayne Rysavy, Department of Communication (Dawn Craner). Contradictions of the Male Image.

Kaira Hindman, Department of Theatre Arts (Marla Hansen). Outlandish Escapade.

Kali Allen, Department of Theatre Arts (Marla Hansen). I'll Love You Forever, I'll Like You For Always.

Annah Merkle, Department of Communication (Dawn Craner). Finding a Scapegoat: A Program of Oral Interpretation.

Hailey Hays, (Choreographer) Stephanie Mullen, Sarah Nielson, Allie Talboy, & Lindsey Sayers, Department of Theatre Arts (Ann Hoste.) Walls: Building, Breaking and Reshaping.

3:00-4:00 P.M., HATCH BALLROOM

The BSU Wind Quintet:

Christina Wilson, flute; Jeff Gander, oboe; Katie Matsuura, clarinet; Adam Gailey, horn; Laura Davis, bassoon (Department of Music) Jeanne Belfy

The Hungarian composer György Ligeti is most famous for the unauthorized use of his textural composition, *Lux aeterna*, in Stanley Kubrick's *2001: A Space Odyssey* (1968). But before his music moved into the realm of the post-World War II avant garde, he wrote some works that develop the rhythmic excitement and dissonant harmony of Bartok and Stravinsky. Between 1951-3, he composed twelve piano pieces that he called "bagatelles"--simple, light trifles. Six of these he arranged for the woodwind quintet, and these are the version most often heard. The first bagatelle uses only the pitches of the major-minor tetrachord based on C, in inventive, surprising bursts of activity. The slow second bagatelle has the character of a mournful, repetitive conversation, almost ending in violence before a final resolution. The third bagatelle floats along over a seven-note ostinato passed among all but the oboe. Sevens are further explored in the fourth movement, with its accented, fourteen-beat motive. The fifth movement is dedicated "Bela Bartok in memoriam," and relies on the short-long Magyar rhythm of Hungarian folk music. The Stravinsky-like sixth bagatelle is the most involved, with sections of cleverly shifting meter and accent, a climax of simulated insanity, and a brief epilogue for horn.

Six Bagatelles for Woodwind Quintet

Gyorgy Ligeti

I. Allegro con spirito

b. 1923

II. Rubato lamentoso

III. Allegro grazioso

IV. Presto ruvido

V. Adagio - Mesto

VI. Molto vivace - Capriccioso



ART GALLERY

COLLEGE OF ARTS AND SCIENCES

1:00-4:00 P.M., SECOND FLOOR ART GALLERY

Graphic Design Student Project:

Undergraduate Research and Scholarship Conference Program Cover

Students in ART 204, Graphic Design Studio II, set out to address the creative problem of designing a cover for the program of the 2005 Undergraduate Research and Scholarship Conference. Faculty and administrators associated with the conference acted as clients, and assigned the parameters of the project. Students prepared for the project by researching the seven colleges and numerous programs represented in the conference, and exploring the differing forms that research and scholarship may take in various disciplines. Students also considered the particular meaning of research in the Art Department, and deepened their knowledge of the history of the University system and the history of Boise State. Then each student developed an individual creative direction for the piece.

Some students employed imagery and language that literally or symbolically represented the various colleges and programs, while other students took a metaphorical approach, and sought to evoke the ideas and/or processes of research and scholarship. Because the program is a published work and subject to copyright law, each student generated original imagery for the design; some students opted for photographic solutions, while others created illustrations by analog or digital means. A jury of faculty and administrators selected the winning design, which is reproduced as the cover of this program. All of the students' designs, as well as a synopsis of the conceptual basis of each design, are displayed in the Student Union Building Gallery as part of the conference.

PARTICIPATING ARTISTS:

Mirella Alvarez	Chris Beaudoin
Christa Bennett	Stan Brewster
Ricky Cabrera	Tara Cady
Amy Corpstein	Eric Davis
Megan Decker	Liz Dragotoiu
Brian Felkel	Jen Glauser
Alan Gorringer	Izaak Hale
Jeffrey Jenkins	Andrea Kniep
Peter Kutchins	Eun Young Kwon
Hans Lohse	Joseph Murgel
Tyler M. Ramsey	Kim Sherman-Labrum
Brian Sprague	Edward Steffler
Judy Tallada	Miwa Uesato
Shawnee Voshell	Bethany Walter
Rachel White	Amber Wright

– Special Feature –

CLASSICAL GUITAR PRESENTERS...

Elisabeth Blin is a French guitarist and composer. She gave her first concerts as a Beaux Arts School student in Limoges, France, in 1978, and in 1989, she started to learn the bossa nova style of Antonio Carlos Jobim. In 1996, she made her first digital recording, and in 1997, Elisabeth received a grant from the Idaho Commission on the Arts to complete the CD *Lifetime Too: Soul to Soul*. In 2000, Elisabeth released *Therapie Bossa-Nova!*, funded by a second grant from the Commission on the Arts. The album again featured some of the finest Boise jazz musicians. She also teaches private guitar lessons and in 2002, she published her own method and CD, "Acoustic Guitar, Getting Started." Elisabeth is currently completing her classical guitar degree at BSU, under the direction of Dr. Joseph Baldassarre.

Torrobosque satirique -- Elisabeth Blin (b. 1958)
Petite bossa -- E. Blin
Prelude -- Francisco Tarrega (1852-1909)
Prelude No. 1 -- Heitor Villa-Lobos (1887-1959)

Jacob Ineck began studying guitar from his sister in fourth grade before transitioning to the classical guitar in the Childbloom Guitar Program under the guidance of Kelli Larson. He won several Childbloom national competitions within that time. He received 4 consecutive superior ratings at an annual National Federation of Music festival. Five years later, he began taking lessons from Dr. Joseph Baldassarre, with whom he has been studying for two and a half years. He is currently a freshman at Boise State, majoring in Music Performance. He was featured as the fretted strings representative for this year's Chair's Honor Recital. Apart from the classical guitar, Jacob has been a music minister and leader at St. Mark's Church for over five years. He also fronts a four-piece jazz/rock band. He currently plays string bass for the BSU orchestra.

Ballo Tedesco novo de l'autore – Giovanni Antonio Terzi (fl.c.1580-1620)
Gigue from Lute Suite BWV 997 – Johann Sebastian Bach (1685-1750)
Schottish – Chôro – Heitor Villa-Lobos (1887-1959)
Etude No. 5 – Gerald Garcia (b. 1949)

Alyssa Santoyo has been playing classical guitar for over nine years, studying first with Kelli Larson in the Childbloom program, and currently with Dr. Joseph Baldassarre of Boise State University. Alyssa is a seventeen year old high school senior, dually-enrolled as a Jumpstart student at BSU. Along with performing and competing locally and nationally, she has been featured in "Fingerstyle Guitar Magazine and the NPR radio program "From the Top".

Leyenda -- Isaac Albeniz (1860-1909)
Candombe en Mi -- Maximo Pujol (b. 1957)
Spanish Dance -- Enrique Granados (1867-1916)
The Peanuts Theme -- Vince Guaraldi (1928-1976)

Adam Kindberg studied at Metropolitan State College in Denver for two years prior to coming to BSU last spring. He currently is in the private guitar studio of Dr. Joseph Baldassarre, studies composition with Prof. J. Wallis Bratt and receives piano lessons from Nancy Galvin. This semester he is also in the University Singers and taking music technology and music history classes. I am looking to graduate with a BM in music composition next spring and perform as a local musician in local combos.

1. Preambulo F. Morreno Torroba (1891-1982)
2. Choro No. 1 Heitor Villa-Lobos (1887-1959)
3. Estudio in B Minor Fernando Sor (1778-1939)
4. Etude #7 Mateo Carcassi (1792-1853)
5. Recuerdos de la Alhambra Francisco Tarrega (1852-1909)

Derek Warren is originally from Albion, Idaho. Derek began taking piano lessons at the age of eight and continued until the age of twelve. During High School Derek played in the Jazz Band and taught guitar lessons at the local music store. He has been at Boise State University since 1999 and majors in Classical Guitar Performance, he will graduate in August of 2005. He hopes to be admitted to graduate school where he intends to major in Music History and one day be a professor of Classical Guitar and Music History.

COLLEGE OF ARTS AND SCIENCES

I'LL LOVE YOU FOREVER, I'LL LIKE YOU FOR ALWAYS

Kali Allen (Department of Theatre Arts) Marla Hansen

Performing arts session

I choreographed my dance piece to "Cello Concerto in E Minor, Opus 85: Third Movement" by Sir Edward Elgar. The song is about losing someone very close, yet knowing that one day you will be together again. The piece is dedicated to my mother who passed away about two and a half years ago. It is about my journey through the mourning process. I was very sad and confused and scared when it first happened and I didn't know how to deal with it. So, even though I was in pain, I went about my days, as I would have normally. Then I took these feelings and tried to think of a way to express them in movement. Even though I was in denial about the death, I was still terrified, sad, and confused. It's not easy taking complex emotions like these and transforming them into movement. I have become stable in dealing with her death, but I still have days when nothing seems right. These days will probably never go away, but I know now that she is with me in everything I do; especially my dance.

NOVEL ASSAY FOR ANTIMICROBIAL EFFECTS OF NATURAL AROMATIC COMPOUNDS

Patrick Aranda (Department of Biology) Greg Hampikian

We have developed a novel method for resting aromatic inhibition, which utilizes a standard microtiter plate, the Nunc 96 well plate and cover. This improved method allows the researcher to perform multiple studies on a single plate. The design reduces cost and time, while increasing the number of trials that can be run simultaneously. The increases in efficiency are measured by reductions in: time required, incubation volume, agar volume and costs. The method utilizes the tight seal of the Nunc 96 well plate to create 96 functionally isolated environments, resulting in a nearly 100-fold reduction in incubation space and materials over the previous method. One disadvantage is that relative rates of inhibition are harder to quantify, but the method is ideal for high throughput screening of compounds (and combinations of compounds), which inhibit the growth of various species. This study demonstrates the feasibility of automated testing of aromatic antimicrobials and reports the results of our first set of trials involving 20 compounds and 10 species of bacteria.

COSTUME DESIGN FOR EURIPIDES' OEDIPUS REX

Leah Austin (Department of Theatre Arts) Ann Hoste

The visual world of the play *Oedipus Rex* is an ancient one consumed by fate, faith, and reliance on spiritual guidance. The costume designs for this play have their basis in historically accurate clothing mixed with different historic and cultural styles in order to create an abstract, stylized appearance. This approach creates the suggestion of ancient Greece without locking into historical accuracy, representing a more universal visual motif. *Oedipus Rex* is a play for all historical ages, not just ancient Greece, and these costume designs reflect this idea in style. This design is an exercise in using primarily texture and value to establish and heighten the character relationships. This also helped in developing a consistent and unified visual world.

GERMINATION OF NATIVE AND NONNATIVE GRASSES ON MOSS-DOMINATED BIOLOGICAL SOIL CRUSTS.

Tara Barks & Jeanne Orm (Department of Biology) Marcelo D. Serpe

We investigated the effect of biological soil crusts dominated by short or tall mosses on the germination of native and nonnative grasses. Short mosses (*Bryum* spp.) significantly decreased the germination of the native grass *Elymus wawawaiensis* and the exotic grasses *Festuca ovina* and *Bromus tectorum*. The presence of tall mosses (*Tortula* spp.) decreased the rate of germination with respect to seeds placed on bare soil but did not significantly affect the final percent germination. For all the species analyzed, the

– Abstracts –

seeds placed on the soil showed higher water absorption than those placed on tall or short mosses. Similarly, the water potential of *Bromus tectorum* seeds placed on the soil was higher than that of seeds placed on mosses. The water potential values obtained were -0.69 ± 0.45 , -3.65 ± 1.8 , and -4.98 ± 0.62 MPa for seed placed on bare soil, tall moss, and short moss, respectively. The low water content of seeds placed on short mosses appears to be responsible for the reduction of germination observed on this type of crust. Further studies are needed to explain the distinct effects of tall and short mosses on germination. For the grasses tested, germination was significantly higher on tall than short mosses. These results, however, could not be correlated with clear differences in seed water content.

CANT

Molly Beardmore (Department of Theatre Arts) Marla Hansen

Performing arts session

I have spent twenty years of my life within a social network that prohibits independent thinking and encourages conformist actions. This past year, after much consideration, I have stopped attending required meetings and started relying on my own intuition. A major decision such as this compels me to express my inner feelings artistically. I have begun a personal journey of choreographic exploration that seeks to capture my dissatisfaction with organized religion. I felt that a small group of paired dancers would be best suited to portray the ritualized, mechanical actions that have defined my religious experiences. My vision for this piece is to demonstrate the insincerity and pharisaical nature of organized religion. Throughout *Cant*, viewers will notice the rigid and controlled coordinated sequences. *Cant* concludes with the performers demonstrating a newfound freedom—freedom from a duplicitous lifestyle that I myself have known. I can no longer cant (def: to practice hypocrisy by means of insincere speech). I must now continue on my path of self-exploration, accepting no boundaries.

SEC CALIBRATION AND OPTIMIZATION FOR INVESTIGATION OF CALSEQUESTIN AGGREGATION

Lou Bonfrisco (McNair Scholar) (Department of Chemistry) Susan E. Shadle and Martin E. Schimpf

Calsequestin (CSQ) is a calcium binding protein in the sarcoplasmic reticulum that is involved in calcium regulation, which is vitally important for cardiac contraction and relaxation. Calcium binding to CSQ is thought to be coupled to CSQ aggregation. Anthracyclines are anti-cancer drugs, which cause irreversible cardiotoxicity that limits their use. Cardiotoxicity is hypothesized to involve the anthracycline-dependent disruption of CSQ aggregation. The goal of this study is to investigate the extent to which anthracyclines disrupt CSQ aggregation. Size exclusion chromatography (SEC) was used to separate CSQ aggregates; determination of the molar mass of the aggregates was accomplished by Multi-angle Laser Light Scattering (MALLS). Before analysis of CSQ aggregates could begin, appropriate methodology had to be developed. This study has established experimental conditions and measured masses of CSQ aggregates.

IDENTIFICATION OF CALSEQUESTIN BINDING SITES FOR ANTHRACYCLINES AND TFP

Stephen Broyles & Aislinn Sherer (Department of Chemistry) Susan Shadle

Anthracyclines are a widely used family of chemotherapeutic drugs, whose use is limited by a poorly understood cardiotoxicity. One possible mechanism of anthracycline cardiotoxicity involves the disruption of function of calsequestin (CSQ), to which anthracyclines are known to bind. CSQ is a high capacity, low affinity calcium binding protein, which plays an important role in cardiac calcium regulation. This study aims to identify the anthracycline binding site using an analog of trifluoperazine, a molecule that has structural similarities to anthracyclines and is a known inhibitor of CSQ function. Affinity label analogs of TFP and the anthracycline daunorubicin were synthesized and covalently linked to CSQ. Each crosslinked sample was purified and analyzed spectroscopically in order to verify binding and to determine stoichiometry. Competition reactions using the authentic drugs were conducted to confirm specific labeling of binding sites by the affinity labels. These samples were then trypsin digested and analyzed by LC-MS-MS.

– Abstracts –

EFFORTS TOWARD ELECTROCYCLIZATION OF VINYL AZOMETHINE YLIDES GENERATED VIA ELECTROCYCLIC RING-OPENING OF 4-OXAZOLINES

Jessica Burlison & Amber Hibberd (Department of Chemistry) Don Warner

Five-member nitrogen-containing rings, pyrrolidines, are found in a plethora of medicinally useful compounds. The traditional cycloaddition reactions utilized in the formation of pyrrolidines have the disadvantage of either requiring manipulation to the pyrrolidine once it is synthesized or having unpredictable regio- and stereochemistry. In addition, traditional methods require harsh reaction conditions. Herein we report on the initial attempts made toward a mild and versatile route to prepare pyrrolidines, via 1,5-electrocyclizations, where the regio- and stereochemical outcome can be predicted. 1,5-dipolar electrocyclizations have not been extensively studied. Our preliminary studies aim to investigate electrocyclizations using stabilized azomethine ylides in order to develop optimum reaction conditions. Furthermore, computational studies may allow for prediction and control of reaction outcome. Our initial attempts at 1,5-electrocyclizations via ring opening of 4-oxazolines will be presented.

FORENSIC EDUCATION PROGRAM OUTREACH

Chuck Cato, Nikki Dwane, Jordan Strong, Becky Munoz & Holli Shultz (Department of Biology) Greg Hampikian

The Forensic Education Program is a hands on program designed to spark interest in science, while teaching basic concepts. The program can be tailored for children from Grade School to High School. It is designed to engage students who may be interested in, but not committed to, science learning. We exploit the popularity of forensic science on television and in other media, to stimulate interest in DNA and traditional fingerprinting technology. The program gives students the hands on experience of performing DNA Electrophoresis and Developing Latent Prints. We have administered a Pre and Post Test for each program, and the results demonstrate a significant improvement in content knowledge, as well as mastery of new skills: working with micro volumes, using a micropipettor, DNA electrophoresis, latent print development and examination, critical thinking and problem solving. The investigation uses concepts keyed to the Idaho Science Education Standards, and will be expanded to include further in-class activities centered on a forensic investigation.

SYNTHESIS AND CHARACTERIZATION OF A FIELD-PORTABLE ARSENIC SENSOR

Brian Cawrse (Department of Chemistry) Dale Russell

An arsenic selective molecularly imprinted polymer (MIP) has been prepared reacting 4-n-substituted cyclopentadithiophenes and various arsenite and arsenate compounds to create ethers of the form As-(O-CPDT)₂. Oxidative electro polymerization of the ethers out of MeCN + TBAHFP on Pt yields a blue/green polymer that shows a strong arsenic stretch in FT-IR around 800 cm⁻¹. The electrochemical behavior, i.e., the charge process of the polyCPDT coatings, have been studied and relevant parameters have been discussed. The arsenic compound can be excised from the polymer matrix by treatment with a strong acid, producing a polymer with arsenic specific receptor sites. This model will be used to investigate the specificity and sensitivity of the arsenic rebinding properties of these polymers, with an emphasis on the detection of arsenite species in groundwater. The formation of the monomers represents a novel method of preparing a CPDT-ligand macromolecule with low oxidation potential, functional groups that are removed from the polymerization sites, and the potential for less π -polymerization than thiophene or bithiophenes monomers.

– Abstracts –

FROM BLISTERS TO STARS: THE SEARCH FOR NATIVE IDENTITY IN DIANE GLANCY'S "AUNT PARNETTA'S ELECTRIC BLISTERS"

Christy Claymore (Department of English) Steven Olsen-Smith

Podium presentation

The research for this paper was performed to illuminate Diane Glancy's short story, "Aunt Parnetta's Electric Blisters." The narrative illustrates an elderly Native American couple's struggle with acculturation, as reflected in their ambivalent dependence on a broken refrigerator, a representation of Euro-American culture. They invest in a replacement, but Parnetta dislikes the new fridge and discovers her longing for the rich and defined identity that once belonged to the people of her heritage. She dies in her sleep while dreaming of the "Keetowah fire," a beacon of Cherokee identity symbolizing her rebirth as a Native American. This paper involved secondary research to analyze what the Keetowah fire means to the Cherokee culture, and to clarify the ambiguity of Parnetta's death (death, often viewed as negative illustrates hope in this particular story). Research also illuminated other historical and traditional allusions made in the narrative, were mainly ethnological, and consisted of online and library sources.

FACILITATING AUTHENTIC LANGUAGE CONTACT AND INTERCULTURAL EXCHANGE

David Collinge (Department of English) Gail Shuck

Podium presentation

Lack of authentic cultural and linguistic models in language classrooms often leaves students with incomplete and inaccurate notions about language and culture. Despite the best intentions of adult English as a Second Language programs and adult Spanish language programs, both may lack opportunities for authentic contact with the language being taught. This project aims at describing a pioneering language program that combines a classroom of native Spanish speakers learning English with that of native English speakers learning Spanish. It tries to respond to the question: Does combining groups with similar educational goals and different cultural and linguistic backgrounds result in a fuller understanding of the participating cultures and individuals? Research will take place through disciplined observations of and interactions with participants of this combined class setting. Analysis of these interactions will demonstrate the benefits and importance of authentic, accessible cultural models in the learning of English and Spanish.

SEPARATION AND CHARACTERIZATION OF LIPOPHILIC PROTEINS BY ELECTRICAL FIELD FLOW FRACTIONATION IN NON-POLAR FLUID

Markus Degirmenci (Department of Chemistry) Dale Russell

Isolating and characterizing membrane bound proteins is a frontier area of biomedical research, and is critical to proteomics. 20 – 35% of proteins encoded by an organism's genome are integral membrane proteins, yet very few have been isolated and characterized. We report protein separation with non-polar Electrical Field Flow Fractionation (EFFF). In EFFF, retention in the channel is by coupling with the imposed field; differences in retention time correlate to diffusivity and electrophoretic mobility of the proteins. The electrical double layer is very diffuse, and an electrical field across the channel is approximately uniform. This improves over aqueous EFFF, in which the electrical double layer drops ~96% of the electrical field within a few angstroms. Fundamental characteristics of an individual protein can be calculated from the retention time. Molecular mass and size of proteins are determined using MALLS detection. We report results for several membrane proteins isolated from mammalian tissues.

BACTERIAL INHIBITION BY NATURAL COMPOUNDS

Jacqueline DeWane (Department of Biology) Greg Hampikian

Microbial growth can be inhibited by numerous factors, including environmental aroma. The objective of this study was to determine whether aroma from natural extracts effects the growth of various classes of bacteria including gram positive, gram negative, and spore forming bacteria. I hypothesized that the more intensely aromatic extracts have a greater impact on the inhibition of bacterial growth. Non-contact

– Abstracts –

inhibition was assayed by growing a lawn of bacteria above small wells containing the aromatic extract. In order to assess the effect of the aromatic extracts, rings of inhibition were scored according to their size and clarity. My results indicate that the most intensely aromatic extracts have the greatest inhibitory effects on bacterial growth. By determining which aromatic compounds cause the greatest inhibition of bacterial growth, the food and cosmetic industries will be provided with key information that will aid in the design and implementation of novel products and packaging.

A PHYLOGENETIC ANALYSIS OF THE GENERA OF TRIBE EPISCIEAE (GESNERIACEAE) FROM MULTIPLE LOCI

Aaron Duffy, Mindie Funke, & John Clark (Department of Biology) James Smith

Episcieae have long been considered monophyletic based on unique nodal anatomy and chromosome numbers among Gesneriaceae (Gesnerioideae). The placement of several genera has been questionable, or the genera have been placed in other tribes- primarily Rhoogeton, Cremersia, Lampadaria, and Lembocarpus. Recently collected material places three of these genera in Episcieae, but sister to the remainder of the tribe. *Paradrymonia* and *Nautilocalyx* may not comprise a monophyletic group independently of each other and *Chrysothemis*. The fleshy-fruited genera of the *Columnea* alliance are well supported although generic delimitations are not as clear as previously classifications. *Nematanthus* and *Codonanthe*, with $n = 8$ chromosomes, are sister to each other, and *Codonanthesis* is sister to this clade. The remaining genera form two monophyletic groups, one sister to the *Columnea* clade, the other sister to the $n = 8$ clade. Fleshy fruits and reversals from epiphytic to terrestrial habit appear to have occurred multiple times in this group.

THE POSTHUMANIST AESTHETIC MANIFESTO: AN ARTIST'S STATEMENT FOR SOCIAL CHANGE

Melody Sky Eisler (Department of Theater Arts) Nicholas Newman

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

This interdisciplinary and multimedia creative research project was designed to explore the ways in which art can be used to affect social change in the microcosm of our local communities and the macrocosms of our increasingly global world. This project utilized a sculptural video installation titled *Ambiance of Sublime Regeneration*, a public sculpture titled *A Portal to Social Change*, public lectures about the artwork, a TVTV channel 11 public access program titled *Our Posthumanist Future*, and a manifesto discussing the new role of the artist as a public intellectual in the twenty-first century. *A Portal to Social Change* was a rotating display ten nonprofit agencies in Boise to draw attention to their worthwhile causes; and representatives of these organizations spoke about their nonprofit agencies on my TVTV show. *Ambiance of Sublime Regeneration* was displayed at Boise State's Hemingway Center Visual Arts Gallery and was a twenty-foot interactive sculptural environment. The project met with tremendous success and was featured in the *Idaho Statesman*, the *Arbiter* and the *Boise Weekly*. The manifesto will be disseminated this April. This project was awarded an Undergraduate Research and Creative Activity Award from Boise State University.

IMAGE ANALYSIS OF THE PHYSIOLOGICAL SIGNIFICANCE OF THE PREDICTED INTERACTION BETWEEN HEPARAN SULFATE AND THE AMINO TERMINAL DOMAIN OF COLLAGEN TYPE XI

Desiree' Hansen (Department of Biology) Julie Thom Oxford

Type XI collagen is predominantly localized to the pericellular matrix and assists in the organization of the extra cellular matrix. Its association with the pericellular matrix may be mediated by interaction with heparan sulfate. To investigate this possible interaction, the localization of collagen type XI will be detected by immunofluorescence in the presence and absence of excess free heparan sulfate. It is expected that the addition of heparan sulfate will cause a relocalization of collagen type XI. This redistribution of collagen type XI will be analyzed using the image analysis program, IMAGEJ (public domain). Results from this study may further elucidate the physiological role of collagen type XI and the importance of its molecular interactions in the establishment of the pericellular matrix.

– Abstracts –

NO TITLE YET

Adam Harrell (Department of Theatre Arts) Richard Klautsch

Performing arts session

No Title Yet is a ten-minute play about an actor and a writer who are working together to finish writing a play. They soon discover that their collaboration exists only to break down. The play was performed at the Boise State University Theatre Majors Association showcase and was later published by the One Act Play Depot (www.oneactplays.net).

DEVELOPMENT OF HIGH TEMPERATURE FERROMAGNETISM IN SnO_2 AND PARAMAGNETISM IN SnO BY FE DOPING

Jason Hays, Aaron Thurber, Mark Engelhard, Ravi Kukkadapu, Chongmin Wang, Vaithiyalingam Shutthanandan, & Suntharampillai Thevuthasan (Department of Physics) Alex Punnoose

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

We report the development of room-temperature ferromagnetism in chemically synthesized powder samples of $\text{Sn}_{1-x}\text{Fe}_x\text{O}_2$ (0.005 x 0.05) and paramagnetic behavior in an identically synthesized set of $\text{Sn}_{1-x}\text{Fe}_x\text{O}$. With increasing Fe doping, the lattice parameters of SnO_2 decreased and the saturation magnetization increased suggesting a strong structure-magnetic property relationship. Combined Mössbauer spectroscopy and magnetometry measurements showed a ferromagnetic behavior in $\text{Sn}_{0.95}\text{Fe}_{0.05}\text{O}_2$ samples prepared at 350oC which decreased gradually as the preparation temperature approached 600oC. All $\text{Sn}_{0.95}\text{Fe}_{0.05}\text{O}_2$ samples prepared above 600oC were paramagnetic. X-ray photoelectron spectroscopy (XPS), magnetometry, and particle induced x-ray emission (PIXE) studies showed that the Fe dopants diffuse towards the surface of the particles in samples prepared at higher temperatures, gradually destroying the ferromagnetism. No evidence of any impurity phases were detected suggesting that the emerging magnetic interactions in these systems are strongly related to the properties of the host systems SnO and SnO_2 and their oxygen stoichiometry.

WALLS: BUILDING, BREAKING AND RESHAPING

Hailey Hays, Stephanie Mullen, Sarah Nidson, Allie Talboy & Lindsey Sayers (Department of Theatre Arts) Ann Hoste

Performing arts session

How do we get through life? What obstacles or hurdles do we overcome to survive? In this original dance piece, choreographed to an original arrangement by the DeCapo Players string quartet, the stage is set to experience a rollercoaster of emotions called "life." The use of fabrics as metaphors for "barriers" assists the audience in perceiving the obstructions set in one's path. The choice of music in the piece along with a variety of dance styles and movement will help set the mood and inspire feelings, without dictating to the audience what those feelings might be.

A DIVIDE OF PRIVILEGE AND OPPORTUNITY: LISA LOOMER'S LIVING OUT AND ANGLO-LATINA RELATIONS

Nancy Henke (Department of English) Jacqueline O'Connor

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

Podium presentation

Lisa Loomer's play, *Living Out*, centers on the relationship of a Latina nanny and the white, upper-class woman she works for in Los Angeles. My research, made possible by an undergraduate grant from the Office of Research Administration, uses the play to examine the way in which 21st century economic imperialism brings women from first- and third-world countries together based on an employer/employee power differential. Despite their outward similarities, the women are different in inescapable and tragic ways, and the characters' relationship comes to symbolize the disjoint between Anglo and Latina women in contemporary American society. My analysis of the script is complemented by my viewing two live performances at the Borderlands Theater in Tucson, Arizona on February 18 and 19th, 2005 where I will examine how the implicit power difference between the women plays out on the stage with the staging and the actors' body language, voice intonation and gestures.

– Abstracts –

OUTLANDISH ESCAPADE

Kaira Hindman (Department of Theatre Arts) Marla Hansen

Performing arts session

Outlandish Escapade began as a choreography project for Repertory Dance class. These days everyone seems to take themselves so seriously. They forget to laugh and play because they are too busy acting dignified and professional. As students we are forever being told that we need to take our academic careers seriously. I've had enough of this serious business, so I decided to ditch the serious act and make the piece a celebration of my inner "goof." My goals for the project were twofold: to remind the audience that sometimes we need to embrace the lighter side of life, and to stretch myself as a choreographer by exploring new styles of movement.

INVESTIGATIONS OF THE STRUCTURE OF CALSEQUESTRIN USING ELECTRON PARAMAGNETIC SPECTROSCOPY

Tiffany D. Hopper (Department of Chemistry) Susan E. Shadle and Alex Punnoose

Calsequestrin (CSQ) is a Ca^{2+} binding protein of the sarcoplasmic reticulum of cardiac muscle. A class of anticancer drugs called anthracyclines, which are very effective at eradicating cancer, cause heart failure after reaching a certain cumulative dose. A possible mechanism for this cardiotoxicity is disruption of CSQ aggregation due to anthracycline binding. In order to understand the interaction of anthracyclines and CSQ, it is important to have probes of CSQ structure. This study is designed to develop the methodology to study CSQ using electron paramagnetic spectroscopy (EPR). CSQ is spin labeled and EPR is used to study the folding and aggregation of the protein under various conditions. The changes in EPR spectral parameters, including solvent exposure, side chain mobility, and interspin distance, are used to determine conformational changes in the protein. These results are compared with the current model for CSQ folding and aggregation.

DIVERSITY & EVENNESS OF BENTHIC ALGAL SUCCESSION IN AN IRRIGATION DISTRICT

Jamie Howard & Susan Filkins (Department of Biology) Stephen Novak

Succession refers to compositional changes in an ecological community following a disturbance event. Few, if any studies have addressed the concept of succession in irrigation canal waters. The chemical acrolein is currently used to control algal growth in irrigation canals, and can be considered a major disturbance in the system. The purpose of this study is to determine the effect of a single-event disturbance on benthic algal succession in irrigation canals. We determine succession of blue-green algae in irrigations canal following chemical and physical (water deprivation) disturbances. Of the six blue-green algae species observed, two species were classified as early successors, two as late successors, and two species were constantly present. The level of diversity and evenness was calculated using a modification of the Simpson Index, and our results suggest that the type of disturbance event influences the pattern of benthic algal succession.

DEVELOPMENT OF A WATER QUALITY-MONITORING PROGRAM FOR AN IDAHO IRRIGATION DISTRICT

Jamie Howard & Kitty Teeter (Department of Biology) James Munger

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

The Northern Spotted Owl controversy of the late 1980's serves as the primary example of the legal, political, and environmental entanglements that can be created by conflicting interests and uses of our natural resources. In March 2001, the United States Ninth Circuit Court of Appeal ruled in *Headwater v. Talent Irrigation District* that irrigation waters were "waters of the United States" and therefore subject to the Clean Water Act. This ruling may subject Idaho irrigation waters to similar legal, political, and environmental perplexities as those of the Northern Spotted Owl. Under this ruling, the injection of acrolein to control algal growth, into irrigation water may require a National Pollutant Discharge Elimination System, or NPDES permit. The purpose of this project was to research, develop, and implement a water quality-monitoring program for an irrigation district. We conducted all parameter testing, sample collection, and site selection. Development of a baseline trend analysis was done as well as a cost-comparison between a certified laboratory and our study parameters.

– Abstracts –

THE $\alpha 1$ CHAIN OF COLLAGEN XI, POST-TRANSLATIONAL MODIFICATIONS, AND THE ORGANIZATION OF THE PERICELLULAR MATRIX

Katey Irwin (McNair Scholar) (Department of Biology) Julie Thom Oxford

Collagen type XI is a quantitatively minor but developmentally essential component of the extra cellular matrix and as a secreted protein is subject to a variety of post-transnational modifications. These modifications have been shown to influence the affinity of endogenous binding between collagen XI and various extra cellular matrix components. The three dimensional structure of the amino terminal domain of this molecule has been determined through homology modeling. As a result a putative heparan sulfate-binding site has been predicted. Heparan sulfate is an abundant sugar found on the surface of most cells and on proteoglycan molecules of the pericellular matrix. This study focuses on the structure of amino terminal domain of collagen type XI and the subsequent interactions between this domain and other extra cellular matrix proteins.

PENSIVE LULLABIES: RE-EXAMINING CHILDREN'S STORIES THROUGH VISUAL REPRESENTATION

Megan Jensen (McNair Scholar) (Department of Art) Laurie Blakeslee and David Hall

Display in the Art Gallery, Second floor of the Student Union Building

In my exploration of various themes and the diverse techniques within printmaking, I have developed an interest in the history of American childhood nursery rhymes, stories and songs. As in many cultures, myths and stories are often created for various purposes to serve social interests. The imagery from these children's stories have become so deeply embedded in our culture that they have almost become iconic—serving as signifiers for the stories. Although the nursery rhymes and their imagery are evocative for many Americans, their original connotations have been lost or shifted. These elements present an intriguing avenue for my personal and artistic investigation. I am interested in the original context of these stories, the darkness to which they allude, and the whimsical way in which we recite them to our children. The fairytales seem outwardly harmless and playful, yet there are elements of violence and cultural disillusionment entrenched throughout the verses. By playing with the evocative imagery, I am attempting to re-explore the contemporary significance of these stories in connection with their overcast history, breaking down different aspects of the rhymes to pose questions about their meanings today.

CONSTRUCTION OF A RAMAN LASER SYSTEM FOR THE STUDY OF MODEL COMPLEXES OF PHOTOSYNTHETIC ELECTRON TRANSFER AND OXYGEN EVOLUTION

Brett Keys (Department of Chemistry) Jeffrey Peloquin

Raman spectroscopy is a useful tool for the energetic and mechanistic analysis of molecules and reactions. A Raman microscope has been constructed that irradiates a sample with laser light through a 40x microscope objective, allowing for an ultimate spatial resolution of 500 nanometers. A Spectra-physics ultra-fast Titanium Sapphire laser system in conjunction with harmonic generators provides the Raman excitation consisting of femtosecond or picosecond pulses of 400, 532, or 800 nanometer light. The Raman microscope will be used to study 1) the mechanisms of the highly enantioselective epoxidizer Jacobsens catalyst; 2) multinuclear manganese complexes; 3) quinones.

HARNESSING THE ENERGY POTENTIAL OF LANDFILL GAS AT HIDDEN HOLLOW SANITARY LANDFILL – ADA COUNTY, IDAHO

John Lavey, John Wiser, & Don Anderson (Department of Biology) James Munger

Bacterial anaerobes decompose organic matter in municipal solid waste to ultimately result in a byproduct known as landfill gas (LFG). Constituent products of this gas include methane, carbon dioxide, and non-methane organic compounds (NMOC's). Hidden Hollow Sanitary Landfill – the repository of Ada County's solid waste – has installed a LFG capture system that suctions the gas from deep inside the landfill and diverts it to a central point where it is combusted into the open atmosphere. This research studies the feasibility of diverting LFG for several alternate uses, including purification and compression into

– Abstracts –

automotive fuels, absorption of combustion for ambient space heat, and production of conventional electricity. Economic costs and benefits are analyzed over a life-cycle basis to estimate temporal feasibility.

AZIRIDINOMITOSENE SYNTHESIS AND ANALYZING THIS COMPOUNDS EFFECT ON DNA ALKYLATION INTERACTIONS.

Christopher J. Liby & Amber M. Hibberd (Department of Chemistry) Don L. Warner

A synthetic route yielding aziridinomitosenone B will aid in understanding its alkylation interactions with DNA. We hypothesize that aziridinomitosenone B forms DNA interstrand cross-links. A comparison of the compound's propensity to form DNA interstrand cross-links will be made to mitomycin C, which is a clinically used anticancer agent. It has been reported that aziridinomitosenone B possesses *in vivo* cytotoxicity similar to Mitomycin C. While naturally occurring aziridinomitosenones possess an unsubstituted or N-CH₃ aziridine, the reactivity of this group has hindered its synthesis. Thus, initial studies have focused on an N-triphenylmethyl substituted aziridine. Creating an N-triphenylmethyl analogue will also serve to verify our synthetic approach. The comparisons made to mitomycin C and future experiments will provide information about this compound and its therapeutic possibilities, which in turn will parlay into the synthesis of compounds with enhanced anticancer applications. The synthetic approach and results of any findings will be reported.

GEOCHEMISTRY AND PETROGENESIS OF A SOUTH AFRICAN DIAMONDIFEROUS ECLOGITE

Benjamin Linhoff (Department of Geosciences) Mark Schmitz

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

A recently collected diamond-bearing eclogite from the Roberts Victor Mine of South Africa was studied for its major and trace element chemistry and mineral compositions, to gain insight into the relationships between eclogite and diamond formation. The origins of this deep mantle rock were also studied as eclogites yield important information regarding Archean craton formation. Bulk rock composition was determined by mass spectrometry and rare earth element chemistry was determined by ion probe analysis of unaltered garnets and clinopyroxenes. Eclogites are classified as group I or group II depending on mineral chemistry and texture. The eclogite studied is of interest as it displays the textural characteristics of a group II eclogite and the minerals of a group I eclogite. This contrast in classification may point to diamond growth during metasomatic re-enrichment of an originally depleted cumulate rock matrix, and emphasizes the diversity of parent rocks in which diamonds may form.

PROTEIN REFOLDING OF THE RECOMBINANT AMINO TERMINAL DOMAIN (NPP) OF COLLAGEN TYPE XI

Rohn McCune (Department of Biology) Julie Thom Oxford

Collagen type XI plays a role in regulating the assembly and maintenance of the extra cellular matrix of cartilage. The recombinant amino pro-peptide domain of collagen type XI is produced in bacteria as inclusion bodies. Inclusion bodies are insoluble, non-functional forms of a protein. For further research to occur, the proteins must be unfolded and then refolded into their native conformation. The aim of this project involves developing a method to refold Npp from a denaturant, namely guanidine hydrochloride, into its native conformation. Several attempts have been made to accomplish this using the artificial chaperone cycloamylose with little success. Presently a matrix system is being investigated as a promising method to optimize refolding by altering buffer conditions and using macromolecule-crowding agents.

ANTHRACYCLINES AFFECT CALCIUM BINDING TO CALSEQUESTRIN

Wendy Mercer, Nico Cantone, Richard Olson, & Dawn Muhlestein (Department of Chemistry) Susan Shadle

Anthracyclines, such as daunorubicin (Daun), are chemotherapeutic drugs used extensively in cancer treatment. Their use is, however, limited by a potentially lethal chronic cardiotoxicity related to the cumulative dose of drug administered. Previous studies indicate that Daun effectively inhibits Ca₂₊ release from the sarcoplasmic reticulum. This inhibition has been hypothesized to be the result of Daun binding to

the SR protein calsequestrin (CSQ). This study will attempt to quantify the effects of Daun on Ca_{2+} binding to CSQ. Cells were loaded with Ca_{2+} , anthracyclines, and CSQ, and allowed to equilibrate. Ca_{2+} concentrations in each dialysis half-cell were determined by atomic absorbance spectroscopy. CSQ and anthracycline levels were monitored by UV-vis spectroscopy. Results were used to generate Ca_{2+} binding curves. Data were fit to the Hill equation, from which the CSQ- Ca_{2+} binding capacity, affinity, and cooperativity can be derived. It was found that Daun increases the Ca_{2+} binding capacity of CSQ while decreasing the binding affinity and cooperativity.

DOES ONCOSTATIN M HAVE A ROLE IN BREAST CANCER METASTASIS TO THE BONE?

Andrew Oler & Ryan Holzer (Department of Biology) Cheryl Jorcyk

Oncostatin M (OSM) is a pleiotropic cytokine in the interleukin (IL)-6 superfamily. Evidence from the literature and our preliminary data suggest that OSM could promote the formation of breast cancer metastases in vivo. The bone is the most common site of metastasis from breast carcinomas and this type of metastasis, which is osteolytic, is responsible for 50% of all pathological fractures. The role of OSM at the site of bone metastasis has not yet been studied. We are currently using a model involving 4T1.2 and 66c14 mammary cell lines, which are metastatic to bone and lung respectively, to simulate metastatic characteristics and to investigate the effect of OSM on bone resorption and osteoclastogenesis. Our findings may establish a foundation for experimental therapeutics that inhibit OSM. Funded through NIH grant P2ORR16454.

CHARACTERIZATION AND INTERPRETATION OF THE MIOCENE HOT SPRINGS LIMESTONE AND ITS SURROUNDING STRATA: SOUTHWESTERN SNAKE RIVER PLAIN, IDAHO

Darlee Paul (Department of Geosciences) Michelle Stoklosa

2004 Recipient, Research and Creative Activity Award, Office of the Vice President for Research

The Miocene Hot Springs limestone is a unique fossilized algal reef exposed along the southwestern Snake River Plain near Bruneau, Idaho. The processes that lead to the formation of lacustrine carbonate deposits are not fully understood; a goal of this study is to identify controls on lacustrine carbonate reef development. The mapping and measurement of stratigraphic sections of these strata in Fall of 2004 have revealed that the contact between the limestone and the underlying sediment marks the transition from a fluvial to lacustrine depositional environment. Future work includes petrographic analysis of the contact and the underlying sediment, which may reveal that chemical changes accompanied the drowning of the fluvial environment, and helped initiate reef development. A comparison of this data to other lake carbonates will be made to establish consistency in controls.

IMPORTANCE OF STEREOSELECTIVITY IN THE SYNTHESIS OF AN AZIRIDINOMITOSENE ANALOG

Andrea Radabaugh, Kate McDonough, & Anna Block (Department of Chemistry) Don Warner

In an effort to better understand the mechanism of DNA crosslinking by aziridinomitosenes, an assortment of analogs must be synthesized using a stereoselective approach. Setting the stereocenters throughout the synthesis of one analog will facilitate easier identification of mechanistically favorable compounds at each reaction step. Herein, we will discuss our synthetic progress. Specifically, we will report on our efforts toward an a,b-disubstituted ester precursor using two approaches. The first approach involves a one-carbon homologation of a chiral ketone. The second approach relies upon the stereospecific reduction of a a,b-unsaturated ester. We will also report on the process by which the ester will be reduced, ideally with high enantiomeric excess, in either the R or S form. Additional synthetic transformations will be reported within the framework of our current progress.

NANOSCALE BILAYER SEMICONDUCTOR DEVICES IN THE EXTREME QUANTUM LIMIT

James Rodriguez (Department of Physics) Charles Hanna

The relentless miniaturization of microelectronic components, which leads directly to devices with nanoscale feature sizes, brings with it important fundamental and practical issues in the physics of

– Abstracts –

quantum-confined low-density electrons. These issues dramatically dominate the behavior of electrons in bilayer semiconductor devices in the extreme quantum limit, corresponding to low electron density, frozen kinetic energy (induced by strong quantizing magnetic fields), ultrahigh purity, and near-absolute-zero temperatures. We have partnered with the Quantum Electronic Devices Group at the University of New South Wales to analyze the quantum behavior of electrons in bilayer devices in the extreme quantum limit. Our calculations, carried out entirely by undergraduates, have demonstrated the existence of tunable quantum phase transitions between different states of electron matter. Leading research groups in the field have cited our results. Our paper, co-authored by a Boise State undergraduate, has been accepted for publication by the leading journal of condensed-matter physics research.

THE FACE OF CHICANA BORDER LITERATURE

Irene Ruiz (McNair Scholar) (Department of Modern Languages and Literatures) Bruce Swayne

Podium presentation

Chicana literature details the trials and tribulations of Chicana life at the borderlands between United States and Mexico. In particular, it focuses on different challenges Chicana women face at the borderlands they must cross. While borderlands are usually represented as physical, many are not. Sandra Cisneros' *Women Hollering Creek*, Denise Chavez's *Loving Pedro Infante*, Maria Amparo Escandon's *Esperanza's Box of Saints*, and Alicia Gaspar de Alba's, *The Mystery of Survival*, exhibit several common themes that relate to Chicana identity and the struggles that they must go through to overcome these barriers. I will focus on the Chicana experience with racism, generational gaps, religion and culture.

CHARACTERIZATION OF ELECTRICAL FIELD FLOW FRACTIONATION (EFFF) CHANNEL USING MONODISPersed POLYSTYRENE STANDARDS.

Scott Schlegel (Department of Chemistry) Dale Russell

In Electrical Field Flow Fractionation (EFFF), two parallel plate electrodes confine the channel and impose a field. Particles suspended in non-polar medium are introduced via laminar flow. Separation of particles is based on variations in their ratios of electrophoretic mobility and diffusivity. Non-polar solvent is used to minimize electrical double layer effects and concomitant loss of field across the channel, which occurs in aqueous media. Electrodes are coated with an insulative medium to prevent electron transfer reactions from occurring during the separation. This also keeps current across the channel at zero. We report separation and characterization of polymer particles, using EFFF with MALLS detection. MALLS detection yields particle size and particle size distribution. The polymer samples are well characterized, monodisperse polystyrenes with charged surface groups. Retention follows theory; there is no evidence of mixed retention modes if particle size is below the steric limit for the channel.

HUMAN CARBONYL REDUCTASE: ANTHRAQUINONE SUBSTRATE SPECIFICITY

Andy Slupe, Berea Williams, & Laurie Lee (Department of Chemistry) Henry Charlier

The use of anthracyclines as anticancer chemotherapeutic agents is limited due to the development of dose dependant cardiotoxicity. Many studies have implicated the redox state of the C13 carbonyl and quinone moieties as the mediator of cardiotoxicity. The enzyme, carbonyl reductase, is well known to catalyze the reduction of the C13 carbonyl; however, reduction of the quinone by carbonyl reductase has not been documented. Herein we report the kinetic constants for the reduction of Daunorubicin, Doxorubicin, Daunorubicinol, 13-Deoxydoxorubicin, Naphthazarin and Mitoxantrone by carbonyl reductase. Reduction of the last four of the aforementioned substrates indicates that the quinone moiety is indeed a substrate of carbonyl reductase. The present study suggests the formation of a hydroquinone in the parent anthracyclines and their alcohol metabolites by the actions of carbonyl reductase could represent undocumented routes for either the development of cardiotoxicity or possibly the natural clearance of anthracyclines.

– Abstracts –

EVALUATION OF OSM-RECEPTOR IN NORMAL HUMAN BREAST TISSUE, BREAST CARCINOMA, AND METASTATIC CARCINOMA.

Jennifer Stear, Brian Byrne, & M. Queen (Department of Biology) Cheryl Jorcyk

OSM is a member of the IL-6 family of cytokines. Our lab has previously shown that OSM leads to breast cancer cell detachment and the induction of VEGF-mediated angiogenesis, suggesting a role for OSM in breast cancer progression and metastasis. Based on our findings and the published results of others, we hypothesize that OSMR expression should increase with increasing tumor progression; i.e. OSMR should be expressed more in breast carcinoma tissue than in normal tissue, and more in metastatic carcinoma than in breast carcinoma. To evaluate this, paraffin embedded tissue samples were sectioned and stained with hematoxylin and eosin to analyze the differences in morphology between the tissue cell types. The cancerous tissue showed the expected neoplasia, and other morphological changes inherent in cancer tissue. We are currently conducting immunohistochemical analysis using OSMR primary antibody (R&D Systems) and a DAB-Chromagen staining kit (R&D Systems). In addition, we are analyzing several breast cancer cell lines for OSMR expression. Data supporting our hypothesis would further implicate OSM in breast cancer progression metastasis. This work is funded through NIH grant P2ORR16454.

PRELIMINARY PHYLOGENETIC PLACEMENT OF AFRICAN SPECIES OF PIPER (PIPERACEAE) USING DATA FROM CHLOROPLAST DNA AND LOW COPY NUCLEAR GENE GLYCERALDEHYDE 3-PHOSPHATE DEHYDROGENASE (G3PDH).

Angela Stevens, Audrey Mollerup, Wee Seng Wong, & Christopher Davidson (Department of Biology) James Smith

Piper has a pantropical distribution, although the greatest diversity of species is found in South and Central America, Asia and the Pacific Islands. Africa, in comparison, is depauperate with estimated 15 species. Previous phylogenetic analyses of Piper have demonstrated the monophyly of the American, Asian and Pacific species, but have not sampled the African species. We have included two native African species as well as the presumably introduced *P. umbellatum* in our analyses to ascertain the placement of African Piper. Piper clearly is divided into New and Old World clades. While our analyses currently under-represent the Asian and Pacific diversity, these clades themselves are not resolved as monophyletic with respect to the African species implying multiple introductions into Africa from Asia or the Pacific. Further species sampling of the Old World clade will be essential before fully resolving the relationships within this clade.

INHIBITION OF BACTERIAL GROWTH BY NATURAL COMPOUNDS

Jordan Strong (Department of Biology) Greg Hampikian

The extent of the study was to represent the inhibition of bacterial growth due to aromatics found in essential oils. Each treatment contained the agar in a 96-well box with one strain of bacteria. The treatments were non-contact and located under the lawn of organism. We investigated the applications of six different extracts with different strains of bacteria in determining inhibition. A subjective ordinal rating system was used in measuring the effectiveness of inhibition. We expected to isolate a few strains of bacteria that would be successful in inhibition by natural extracts. Research has shown cassia bark showed to have the greatest potential as candidate for inhibiting growth. Evidence clearly showed eight of twelve strains of bacteria were successfully inhibited. Information from the study can help indicate a way to monitor the existence of microbes in the food industry.

ROLE OF FLUORINE DOPING ON THE PHYSICAL PROPERTIES OF SnO_2 AND FERROMAGNETIC $\text{Sn}_{0.95}\text{Fe}_{0.05}\text{O}_2$

Aaron Thurber (Department of Physics) Alex Punnoose

This study employs the sol-gel process to synthesize pure and transition metal doped semiconductor oxide powders. It has been proposed that the electron concentration in SnO_2 increases linearly with fluorine concentration. Theoretically, tailoring the carrier concentration can control the ferromagnetism in dilute semiconductors. Therefore, an increase in carrier concentration due to additional fluorine doping should

– Abstracts –

improve the magnetic properties of the powder samples. Our recent studies have also shown that decreasing lattice size directly correlates to increasing magnetization. The ionic size of fluorine is smaller than that of oxygen, so a decrease in the size of the crystal lattice is expected. Fluorine presence in the synthesis process results in incorporation into the crystal structure, replacing oxygen and causing a decrease in the lattice parameters. Details of our structural, optical, electrical and magnetic studies on fluorine doped SnO_2 and $\text{Sn}_{0.95}\text{Fe}_{0.05}\text{O}_2$ will be presented and discussed in relation to the available theoretical predictions.

COSTUME DESIGN FOR THE MISER BY MOLIERE

Shawn Walton-Hill (Department of Theatre Arts) Ann Hoste

This project approached costume design based on three factors: Social class, historical accuracy of costume in 1660's France, and support for Moliere's ironic style of comedy. The Miser revolves around the miserly patriarch, Harpagon. Harpagon controls the world of this play by controlling the purse strings. The costume design supports this world by defining familial relationships through line and style and defining romantic relationships through the use of split complimentary color. Social class is addressed through texture and fabric choices. Text references were addressed through the choice of style, visibility of wear and embellishments. While adhering to the block shape choice for unification of the relationship between Harpagon and his son, Cleante, Harpagon's costume must appear inexpensive and well worn while the text demands a more stylish costume for Cleante. For this project, visual unity and comedic text support is achieved through choices in shape, line, color and style.

BASIC MUSIC THEORY FOR HIGHLAND BAGPIPERS

Carolyn Watts (Department of Music) Peggy Jo Wihelm

The Scottish great highland bagpipe is played by thousands of musicians worldwide. However, because of its limitations, the bagpipe is frequently portrayed as not a "real" instrument, and pipers less than "real" musicians. Many pipers do not play other instruments, and have not had the opportunity to gain the theory skills available to more mainstream musicians. Theory knowledge requirements for the piper are unique. The melody range of the instrument is nine notes, with no accidentals. The scale is modal, unequal in temperament, and frequently utilizes gapped scales that affect modality and key. These are not addressed in any mainstream or piping theory curriculum. This project creates a curriculum that provides the piper with an understanding of general and specific musical concepts, vocabulary and knowledge to help promote communication with other musicians. An excerpt of this paper; Improving Aural and Pitch Perception Skills in the Piper was solicited by The National Piping Centre in Glasgow for publication in issue 14 (March 2005) of the peer-reviewed journal.

AUTOMATED ANALYSIS OF THE 2004 LAKEVIEW, OREGON EARTHQUAKE SWARM

Chaim Wells (Department of Geosciences) James Zollweg

The 2004 Lakeview swarm was the second strongest in Oregon's recorded history. An estimated 30-80,000 events were recorded on local broadband stations. To accurately map the extent and orientation of the fault plane(s) and infer the cause of the swarm it is desirable to locate every well-recorded event. The analysis procedure must not only catch single events, but also recognize and separate near-simultaneous events and time both P and S waves. Currently available software picks P phases only. However, these programs are sufficiently flexible that it may be possible to develop iterative schemes allowing retrospective phase identification based upon amplitude differences, polarization and time lags prior to event location. This study will develop methods for software to recognize and separate events, time phases and identify picks as P or S. Locating a sufficient number of events will allow an in-depth understanding of the spatial and temporal characteristics of the sequence.

– Abstracts –

NOVEL INHIBITORS OF HUMAN CARBOXYL REDUCTASE

Berea Williams, Kris Olson, & Andrew Slupe (Department of Chemistry) Henry Charlier

Anthracyclines are effective antineoplastic agents, but are known to cause a potentially lethal chronic cardiomyopathy, which severely limits their use. Anthracycline cardiotoxicity has been linked to the formation of a metabolite catalyzed by carbonyl reductase (CR). Since the metabolite does not possess the antineoplastic properties of its parent anthracycline, the action of CR may also contribute to drug resistance. In an effort to prevent the CR derived formation of the cardio toxic metabolite, CR inhibitor candidates were tested. Of the compounds that were tested, two were found to be noncompetitive inhibitors against both coenzyme and carbonyl substrates, with K_I values in the low micromolar range. The inhibition patterns suggest that the inhibitors bind to multiple enzyme forms. Intrinsic protein fluorescence quenching studies demonstrated that the inhibitors bind to at least the free enzyme and to an enzyme/product binary complex with K_d values similar to the K_I values. Supported by NIH/P20RR16454, NIH/R15CA102119-01.

COLLEGE OF BUSINESS AND ECONOMICS

CALIFORNIA 2003 BIRTH PROFILES BY ZIP CODE

Henar Chico (Department of Networking, Operations, and Information Systems) Patrick Shannon

The purpose of this project is to analyze and compare the birth data in California for the year 2003. This is secondary data that has already been organized by the number of live births by zip code of the mother's residence, then further organized by race of mother, age of mother, infant's birth weight, and mother's prenatal care. The descriptive analysis of the data will allow us to explore the relationships between area of birth and prenatal care received by the mother, the relationship between race and birth weight, or the relationship between the mother's prenatal care and infant's birth weight regardless of race, to name a few. We are hoping by the end of this project we are able to draw some solid conclusions about how the variables race, prenatal care, age, place of residence, and infant's birth weight relate to each other. We are especially interested in finding out what impact prenatal care has on infant birth weight: were mothers with no access to prenatal care more prone to have low birth weight babies than mothers who had prenatal care? Is there a need to reach out to certain groups to stress the importance of prenatal care or not?

QUALITY ASSURANCE AT A BOISE ELECTRONIC MANUFACTURING COMPANY

Evelyn Henry (Department of Networking, Operations, and Information Systems) Patrick Shannon

The purpose of this paper is to show quality statistics from a Boise Electronic Manufacturing Company on a weekly basis, for the past six months. The research will be based on secondary data collected by the quality inspection department within the company. It will show data pertaining to five different departments of the company's production area. These areas are the Electro-mechanical areas (EMA 1 and EMA 2), Printed Circuit Board area (PCB), and Cable Harness areas (Cable 1 and Cable 2). The data collected will show the different types of quality defects found in during work in process and final inspection. Some defects may pertain to materials that were received from the company's vendors that were defective in some way, and made it through the warehouse to the production floor. Other causes of errors within the company may be due to not enough training, lack of experience, lack of knowledge in reading prints, not following processes or procedures, faulty tooling, or faulty equipment. The purpose is to collect data that will help in finding a possible trend in product quality to show this company and possibly many other companies like it where they may need to focus their efforts in manufacturing a better product, with fewer errors, to make a higher profit in the long run. As the researcher on this subject, my hope by the end of this project is to be able to help the company I work for find a better way to stop errors before they start either through better training, better equipment, or by upgrading our incoming inspection process.