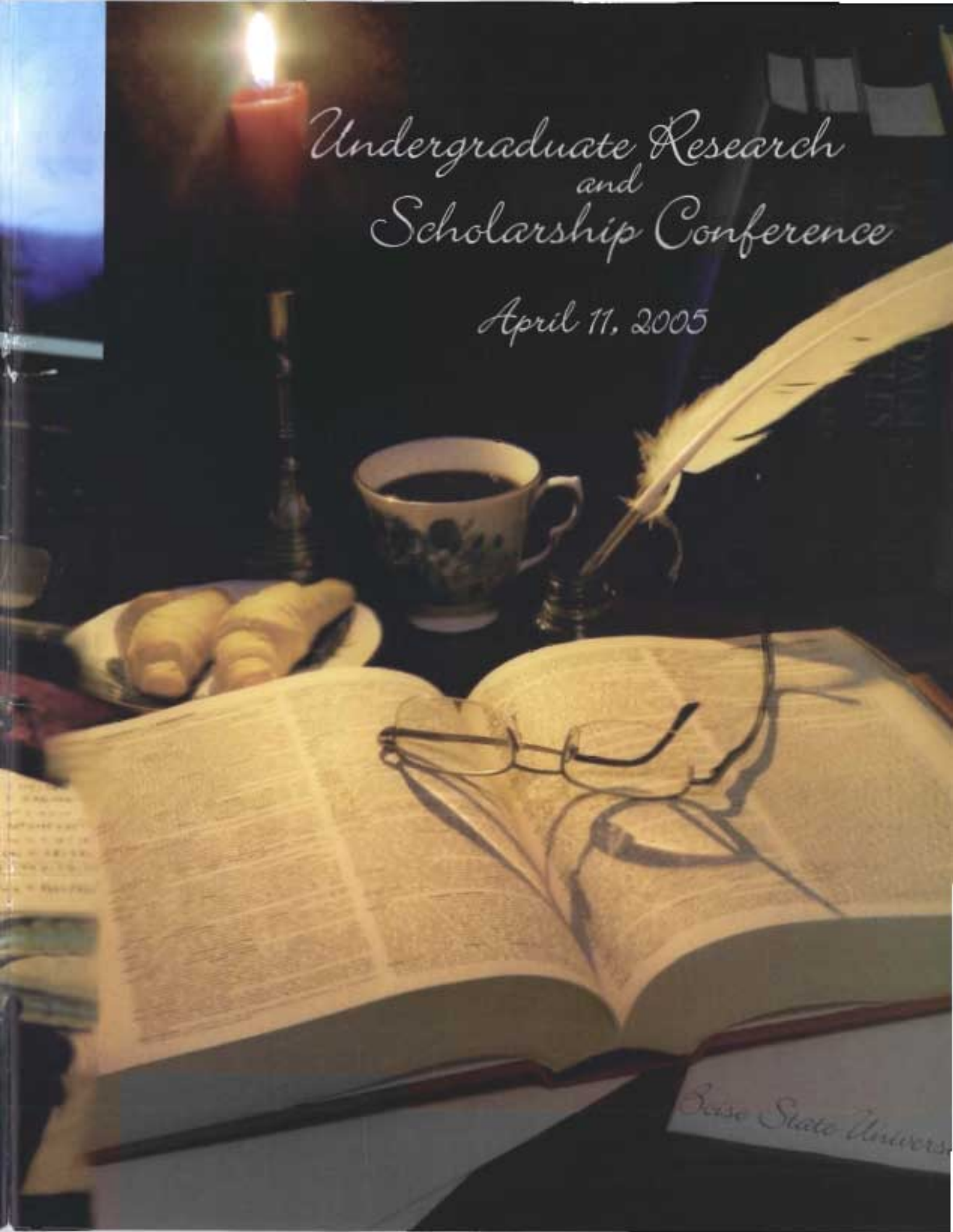
Undergraduate Research
and
Scholarship Conference
April 11, 2005

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 Barnwell Room – Social Science & Public Affairs Farnsworth Room– Arts & Science	1:15 – 2:30	Barnwell and Farnsworth
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, Provost and Vice President for Academic Affairs & Dr. John Owens, Vice President for Research	3:15	Jordan Ballroom

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 Merkley, 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 –

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 Gorringe	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.

Torrobesque 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 wuth 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.

– Abstracts –

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 Barkes & 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

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 Calsequestrin 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 Calsequestrin Binding Sites for Anthracyclines and TFP

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

Anthracylines 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 calsequestrin (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 Electroyclization of Vinyl Azomethine Ylides Generated Via Electrocyclic Ring-Opening of 4-Oxazolines

Jessica Burleson & Amber Hibberd (Department of Chemistry) DonWarner

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 electrocylizations 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 _-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

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 aide 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 Codonanthopsis 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 $Sn_{1-x}Fe_xO_2$ (0.005 x 0.05) and paramagnetic behavior in an identically synthesized set of $Sn_{1-x}Fe_xO$. 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 $Sn_{0.95}Fe_{0.05}O_2$ samples prepared at 350oC which decreased gradually as the preparation temperature approached 600oC. All $Sn_{0.95}Fe_{0.05}O_2$ 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 Ca2+ 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 bethnic 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 _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

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 aziridinomitosene B will aid in understanding its alkylation interactions with DNA. We hypothesize that aziridinomitosene 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 aziridinomitosene B possesses in vivo cytotoxicity similar to Mitomycin C. While naturally occurring aziridinmitosenes 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 mytomycin 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 composision 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 reenrichment 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 guanadine 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 Ca_{2+} 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 P20RR16454.

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 Rodriquez (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

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 Substrute 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 P20RR16454.

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 Sn0.95Fe0.05O2

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

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 $Sn_{0.95}Fe_{0.05O2}$ 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.

Novel Inhibitors of Human Carbonyl Reductase

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

Anthracyclines are effective antineoplasticagents, 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 KI 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 Kd values similar to the KI 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 month. 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.

Novel Inhibitors of Human Carbonyl Reductase

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

Anthracyclines are effective antineoplasticagents, 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 KI 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 Kd values similar to the KI values. Supported by NIH/P20RR16454, NIH/R15CA102119-01.

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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 month. 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.

– Abstracts –

Small Business Financial Planning

Rusti Joiner (Department of Networking, Operations, and Information Systems) Patrick Shannon

The purpose of this report will be to provide best practice methodology for small business financing. The report will provide representations of sources of financing for raising funds to start a small business. Based on the findings in this report, a small business developer will be able to target the most suitable financing activity for their operation. Data collected will be from both primary and secondary data sources. Primary data will result from information requested and reviewed from Farmers & Merchants State Banks, as well as the Small Business Association. Secondary data will result from information researched on the internet mainly, with use of resources suggested in search results. Demographics such as gender and race will play a key role in the determination of the sources of financing for a small business, both in Idaho and in the nation. National trends will be viewed and relied upon to determine possible state trends. My interest in this topic is to find the most efficient and plausible way to secure funding for the start of a small business. I am most interested in finding as many sources of funding as possible, and the steps necessary to receive the funding available.

Concentrated look into the overpopulation of deer hunters in Washington, Adams, and Valley counties

Victor Kelly (Department of Networking, Operations, and Information Systems) Patrick Shannon

Hunting is one of the most popular recreational activities in the state of Idaho. Every year thousands of hunters venture into the forests and rangelands of the state to participate in the sport of hunting. The Idaho Department of Fish and Game is the government agency tasked with managing wildlife and providing the citizens of the state with adequate populations and opportunities for hunting, fishing and trapping. This report is being put together to analyze the effect of the Idaho Department of Fish and Game policies regarding the management of deer tag licensing. Currently the Department of Fish and Game allows a hunter with a general deer tag to hunt in any Idaho hunting unit. All deer hunters must complete and submit a report for each tag issued within 10 days of harvest or within 10 days of the close of the season for which their tag was valid. Using this data, we will examine Mule deer harvest information from Washington, Adams and Valley Counties during the 2001, 2002 and 2003 hunting seasons. Information examined will include hunter population numbers, animal harvest numbers, the number of bucks and does harvested, weapons used and number of days in the field. Based on the harvest data, this report provides an analysis of hunter concentration and harvest success rate in each county. Additionally, we will discuss trends in hunter and deer population that can be affected by Idaho Department of Fish and Game policies. For example, assigning deer tags to specific hunting units rather than allowing hunters to harvest deer in any unit, thus better controlling deer populations as is currently done with elk populations in the state.

Comparative Study of Spending on Education, Average Personal Income and Unemployment Levels of Various States of USA

Riya Bhattacharya (Department of Finance) Patrick Shannon

This project will include a comparative study of spending on education, average personal income/GDP and unemployment levels of various states of USA. Data will be collected from secondary source, which mainly include Bureau of Labor Statistics, Bureau of economic Analysis, economic and government data, other auxiliary sources such as Federal Education Grants to states, Student enrollment data and a few other relevant web sites. These data will be organized together with respect to states and converted into graphs and charts, which will make the analysis much easier and more meaningful. The variables like income; spending and unemployment of specific states will be compared against the spending on education of that state on universities and degree granting institutions. This study will be useful in finding out the relationship between the education expenditure in specific states and the income, spending and unemployment rates in those states. It will be seen if there is a direct correlation of spending on education

and personal income or unemployment using statistical methods. This will further enable to take any steps regarding education to obtain any desired results by any universities, states etc. The study will investigate if there is any statistical correlation in government education spending, income and unemployment.

Branded Features: RESTAURANT FOODS

Jennifer Suitter, Daniel Kessler, Brett Peterson, Bryan Roberts, & Richard Taylor (Department of Marketing and Finance) Trina Sego

Co-branding occurs when two or more organizations agree to closely link their brand names and essentially form a "new" product. For example, T.G.I. Friday's lists Jack Daniels flavored products on its menus. Marketers believe branding provides perceptions of higher quality to consumers and therefore preference. We conducted in-depth interviews with consumers to discern whether the presence of branded ingredients on restaurant menus influenced quality perceptions of restaurants. Each interviewee was given two menus; each exactly alike having the same entrees and pricing with the exception that one was peppered with branded ingredients. The study found that the presence of brand names added value or quality. Most respondents would not pay extra for branded ingredients, but mentioned they are a "nice bonus." Ultimately, our study found that the presence of a brand name on a menu did alter the consumer's view of restaurant quality.

A Comparative Analysis of Business-to-Business and Business to Consumer Calling Methods

Katie Woslager (Department of Networking, Operations and Information Systems) Patrick Shannon

Sturner & Klein Call_Solutions, a Boise telemarketing firm conducts Business-to-Business (B2B) telephone surveys for National trade publications, and Business to Consumer (B2C) calls for selling and renewing magazine subscriptions. The purpose of this analysis is to compare the two types of calling methods, B2B or B2C, and their performance using the same statistical variables. Not only will a comparison determine what type of call generates the best performance, but it will also answer the following questions: (1) Which group, male or female telephone survey representatives (TSR's), perform above the specified survey goal? (2) What magazines generate the highest number of sales per hour? In analyzing these data, two B2B trade publications and two B2C magazine subscriptions will be used to determine this information. (3) Time zone analysis. Is there a specific time zone, Pacific, Mountain, Central, or Eastern, or time of day between 7:00 a.m. and 3:00 p.m. (MST) that produces a higher percentage of sales? The survey data will be collected from an automated dialing system that operates on a pacing algorithm. By the end of this statistical analysis, Sturner & Klein Call_ Solutions will be able to examine which calling group is the most profitable for the company and help them evaluate potential solutions for increased profitability.

College of Education

March of Dimes — Boise State University Folic Acid Awarenes Campaign

Trevor W. Newby (Department of Kinesiology) Caile Spear

During the spring of 2004, the March of Dimes funded a Folic Acid Awareness Campaign for Boise State University. The two health promotion majors developed, implemented, and evaluated the Boise State University Folic Acid Awareness Campaign as part of their student internship. The campaign lasted five days, April 12th-16th, and was carried out in association with the Health & Wellness Center at BSU. The purpose of the campaign was to assess student knowledge of folic acid and its health benefits at baseline and then create multilevel educational interventions to increase knowledge and awareness. Interventions included a workshop, brochure and folic acid water bottle dissemination, orange folic acid stress balls and a folic acid smoothie bar at multiple locations across campus. The final evaluation showed a 19% increase in awareness of the importance of taking folic acid everyday and the health benefits for both men and women.

– Abstracts –

Assessment of Boise State Vending Machine Snack Options and Student and Employee Snack Preferences

Keeley Osborn (Department of Kinesiology) Caile Spear

The 2003 college health assessment at Boise State University indicated that 47 % of the students were overweight or obese. Rising obesity and overweight rates are in part related to poor food choices. Health, Wellness & Counseling Services (HWC Services) created a survey to assess campus community interest in healthier snack choices in the 100 vending machines on the Boise State campus. Six-hundred Boise State students, faculty and staff completed the thirteen-item survey. Survey questions included opinions regarding snack selection and barriers to choosing healthy items. The majority of respondents felt eating healthy snacks was important, but very few felt that the vending machines offered healthy snacks. As a result of the needs assessment conducted at Boise State University and other surveys distributed nationwide by Canteen Vending Services, Canteen launched a new nation-wide campaign called Balanced Choices in November 2004 to offer healthier snack options at Boise State and nationwide.

The Effects of Different Warm-Up Strategies in Olympic Weightlifting

Josh Redden (*McNair Scholar*) (Department of Kinesiology) Chad Harris

The purpose of this study was to investigate the effectiveness of two types of clean pull routines commonly used during competition. Subjects randomly completed a control conditions (C; two sets of one repetition at 85% of 1-RM of full clean) or one of two different treatment conditions in a crossover design: T1, one clean pull of 100% of the full clean 1-RM 4 minutes prior to an 85% full clean; or T2, three clean pulls at 85% of the full clean 1-RM 4 minutes prior to 85% full clean. The control condition served to establish baseline data (average of 85% clean) against which the kinematic and kinetic parameters of the two treatment conditions were compared. Results indicated that the total load lifted (volume) in T2 was 2.54 times as high as in T1 (**p = .0001). There were no significant differences between kinematic and kinetic parameters across any of the conditions. The lack of statistical differences between the two treatment conditions indicates that both are sufficient to keep athletes warmed-up and prepared for their next lifting attempts. However, due to the reduced volume of T2, the athlete has a better chance of avoiding cumulative fatigue during the course of the competition and could theoretically perform better toward the end of the competition.

Children's preparation for Academic, Leadership and Social Competence after Leaving a Private School

Jessica Smith-Fisher (Department of Early Childhood Studies) Carrie Mori

This study investigated the following questions:

1. What are the student and parent's experiences of the transition from a private school to the new academic experience?
2. Did the students continue to have success after leaving the school?
3. Did friendships, started at the private school, continue after the students left the school?

All students and their parents who attended this school were sent a written survey to gather data on their perceptions of transition, academic preparation, and social preparation upon entering a new academic setting. Of over 400 surveys mailed, only ten percent of the surveys were returned. Due to the limited number of returned surveys conclusions cannot be made regarding the questions. While the information from the surveys was for the most part positive, over half of the respondents reported that their children did need additional support for math and reading. The low rate of returned surveys may indicate a challenge of maintaining commitment of alumni support. Recommendations for the school include a. garner a sense of ongoing commitment during the time the child is in the program; b. enlist alumni to provide ongoing and systemic support and guidance; and c. investigate the academic success of children after they transition to a new school.

– Abstracts –

College of Engineering

Techniques for Maximizing Magnetic Force Microscopy (MFM) Imaging Of Magnetic Materials

David Araujo & Zak Clark (Department of Materials Science and Engineering) William B. Knowlton

Magnetic Force Microscopy (MFM) is a scanning probe microscopy (SPM) technique that is highly sensitive to magnetic force interactions of the probe and the near surface of a magnetic material. The resulting data are two and three-dimensional representations of the magnetic force interactions or magnetic field strength produced by the material. In this study, efficient techniques are developed that allow the microscopist to find a set of parameters that maximizes the magnetic field interaction and thus produces high quality images with maximum resolution and contrast. This study shows that the Lift Scan Height and Drive Amplitude parameters have the greatest influence on overall magnetic field imaging. Adjustment of these parameters in a way that ensures the greatest magnetic field interaction is shown to produce quality images of the highest contrast and resolution.

State Highway 55, Smith's Ferry to Round Valley Realignment

Ricardo Calderon, Matt Tovey, Eddie Sanchez, Eric Waag, & Paul Walz (Department of Civil Engineering) Stephen Affleck

A section of Idaho State Highway 55 passing through Smith's Ferry is to be improved due to current inadequate safety and design conditions. A new alignment west of the existing road will be considered. This alignment will have a design speed of 50 miles-per-hour (mph) and will include the construction of a new bridge to cross the North Fork of the Payette River. The road will require a substantial amount of earthwork, retaining structures, and geometric design considerations. The bridge will be approximately 1,800 feet long, 250 feet high from the base of the canyon, and will require numerous piers, footings, and abutments.

Effectiveness of Bicycle Helmets

Patrick Callahan (Department of Mechanical Engineering) Michelle Sabick

Bicycle accidents can lead to head injuries, especially when a helmet is not worn. This study will determine the effectiveness of three different types of bicycle helmets to reduce the chance of head injuries during an accident. Three different bicycle helmets will be dropped several times from a fixed height with a weight inside to determine the average vertical ground reaction forces associated with each. These forces will be compared to determine which helmet is most effective in reducing the chance of a head injury.

Correlating the R-Value Obtained from Soils in the State of Idaho

P. Ryan Camp, Wei Wang, & Mona Vu (Department of Civil Engineering) Joseph C. Sener

The relationships between R-Value and percent finer than No. 200, No. 40, and No.10 sieves, plasticity index, optimum moisture content, and maximum dry density soil tests have been investigated in this study. Idaho Department of Transportation's archival data, where over 6,000 soil samples were obtained, were evaluated and statistically analyzed to formulate correlations among the studied material characteristics. Strong relationships were established by generating triple plots between the following soil characteristics:

- R-Value, Percent Passing No. 200 Sieve, and Plasticity Index
- R-Value, Percent Passing No. 40 Sieve, and Plasticity Index
- R-Value, Percent Passing No. 10 Sieve, and Plasticity Index
- Maximum Dry Density, Optimum Moisture Content, and Plasticity Index
- R-Value, Maximum Dry Density, and Optimum Moisture Content
- R-Value, Maximum Dry Density, and Percent Finer than No. 200 Sieve
- R-Value, Optimum Moisture Content, and Percent Finer than No. 200 Sieve

It was found that using a combination of the correlations a reliable R-Value could be predicted, thus it is probable to eliminate the complex, time consuming and expensive R-Value tests.

Automated Spine Segmentation

Brady Catherman (Department of Computer Science) Amit Jain

Spine segmentation is a process where each vertebrae are identified within a 3D image of a human spine. An automated spine segmentation program allows accurate classification of spine deformities and reduces the time required to build spine models in Boise State University's Rapid Prototyping Lab. These models assist the doctors in corrective surgery. However, computer automated segmentation takes a large amount of computing time. We have developed a version of the segmentation software that runs on the Boise State University Beowulf Cluster with 120 processors. This reduced the time required to run the program from 3 hours to 3 minutes. Currently, we are developing an enhanced version of the segmentation software, which will work on a wider range of data.

Comparison of Mechanical Behavior for Stainless Steel and Titanium Rods in a Spinal-Pelvic Fixation Assembly with Lumbar Curvature

Brandon Chaffin (Department of Mechanical Engineering) Anthony Paris

The study of the biomechanical behavior of spinal-pelvic fixation assemblies with stainless steel and titanium rods in a vertabrectomy model was done. The assemblies consist of a plastic model of a pelvis and a plastic model of a vertebra connected by two spinal implant rods that are inserted into the pelvis model and attached to the vertebra with two closed pedicle screws. The lumbar curvature model was developed by examining the x-rays of 12 patients that currently have spinal implant rods and statistically predicting the curvature of the lower back. The rods were bent to the shape of the model with regular medical equipment. The assemblies were loaded until failure. The difference in mechanical behavior of the stainless steel and titanium rods may be useful to surgeons in selecting the most appropriate implant material.

In-Situ Atomic Force Microscopy (AFM) and Device Characterization of a Chemical Field Effect Transistor (ChemFET)

Zak Clark & David Jenkins (Department of Materials Science and Engineering) William B. Knowlton

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

The operational theory of a chemical field effect transistor (ChemFET) suggests that local charges attached to the polymer coated gate of the transistor will noticeably alter the characteristic operation of the device. Due to the fragile nature of the polymer, any attempt to investigate the ChemFET behavior in a controlled manner must both be physically non-destructive and preserve the electrical operation of the device. This study shows the ability of an innovative in-situ AFM technique that incorporates an AFM system and an advanced electrical device characterization system to investigate the behavior of a ChemFET. The AFM system and the advanced electrical device characterization system are comprised of two unique systems with independent capabilities. A novel in-situ AFM approach is presented that uses both systems in combination and simultaneously acquires multiple ChemFET device characteristics.

IEEE 802.15.4a Compliant Medium Access Control Layer

Jonathan Cole, James Gray, & Greg Unruh (Department of Electrical Engineering) Sin Ming Loo

The Institute of Electrical and Electronics Engineers (IEEE) has set forth a standard for wireless personal area networks (WPAN) that is called the IEEE 802.15 standard. This WPAN standard is specifically designed for low range, low data rate, and extremely low power wireless devices. This paper describes the design of a Medium Access Control layer (MAC) that is compliant with the IEEE 802.15 standard. The MAC has been designed using a combination of hardware description languages (VHDL and Verilog) and C programming language. The MAC has been implemented using a Field Programmable Gate Array (FPGA).

– Abstracts –

Statistical Comparisons of Degradation Features

Jonathan Cole & Brad Huttash (Department of Electrical Engineering) Elisa Barney-Smith

Whenever a text image gets converted from a printed copy to an electronic copy via a scanner, certain amounts of degradation will occur. These degradations are often not a problem for the human eye, but can be extremely difficult for optical character recognition (OCR) software to handle. In this project, we statistically compare pairs of populations of degraded character images created with different model parameters to see which correlations exist between the different model parameters. The model parameters used in this project are the following: point spread function (psf), psf width, and binarization threshold. Knowledge of the correlation between different model parameters may prove valuable for improving the ability of OCR software to handle degradations.

Project Estimation

Robert Collins (Department of Construction Management) Charles Gains

For some project managers and estimators it is difficult to develop a fast, accurate hard bid on residential units. In the construction field, now more than ever, owners want it built better, faster, and cheaper. How do I accomplish this task? I have simulated this problem over the past four years by building a program that would equate complex quantity take-offs into simplified entries and keystrokes. This is done by the following method:

1. Takeoff of desired item.
2. A lookup function is performed to assign a known value.
3. From a database the value is assigned a cost/unit number.
4. The cost/unit number is equated into the item total costs.
5. The item /total costs are then cross-referenced with labor rates.
6. The labor rates then convert into a preliminary job schedule

This program, used properly, will provide a more time efficient and accurate estimate.

Defect Accumulation in 2 nm SiO2 Layer of Metal Oxide Semiconductor (MOS) Devices - Effects on Device & Circuit Operation

Mark Elgin, David Jenkins, & David Whelchel (Department of Electrical Engineering) William Knowlton

The continued scaling of integrated circuits (ICs) remains a key concern for design and reliability engineers as the performance of each consecutive generation is expected to outperform the last. Particularly, the dependability of SiO2 gate oxides has been scrutinized, as it may be a severely limiting factor in the future of microelectronic devices. The gate oxide is a very thin layer of SiO2 that is used as an insulator in metal oxide semiconductor field effect transistors (MOSFETs). Studies have shown that the gate oxide experiences dielectric wear out or breakdown over time. Wear out and breakdown degrades the insulative properties of the gate oxide, thereby reducing the transistor characteristics and the performance of the circuits. In this study, the effects of wear out on the characteristics of 2nm p-channel (pMOSFETs) are examined. Additionally, effects on the inverter circuit, in which the pMOSFET is a component, are studied. Data, analysis, test methods and a further explanation of the issues of gate oxide reliability will be presented in poster format.

Sensitivity Analysis of the Domenico Equation for Predicting Contaminant Transport in Groundwater

Jordi Figueras (Department of Civil Engineering) Molly Gribb

Movement of contaminants in groundwater can be predicted using the Domenico analytical solution with appropriate parameter inputs that describe the contaminant and site characteristics. Previous research has shown the deterministic sensitivity of this equation with respect to changes in contaminant source width, thickness, hydraulic conductivity, hydraulic gradient, dispersivity, porosity, and fraction of organic

carbon for different travel times and distances. Values for many of these parameters are difficult to measure, and therefore often approximated. Deterministic sensitivity values can be used to determine the effects of errors in parameter values on contaminant concentration predictions. Unfortunately, these sensitivities cannot be directly compared since each has different units. In this work, one percent prediction sensitivities are calculated for different distributions of input parameters and compared to determine the relative importance of each parameter on predicted contaminant concentrations. This information can be used to determine which parameters are most important to measure, and which can be approximated, without unduly affecting contaminant concentration predictions.

Digitally Addressable Lighting Interface (DALI) Implementation with FPGAs and ZiLOG Microcontroller

Ayush Goyal, Darren Shrader, Darin Frederiksen, & Tim Maness (Department of Electrical and Computer Engineering) Sin Ming Loo

This paper describes an implementation of Digitally Addressable Lighting Interface (DALI) using field programmable gate arrays (FPGAs) and a ZiLOG microcontroller. A graphical user interface (GUI) controls master and slave units via the ZiLOG microcontroller. Each slave unit controls individual lights and performs functions such as brightening lights, dimming lights, and sending information about the status of the lights back to the GUI.

Comparing Stainless Steel and Titanium Spinal-Pelvic Fixation Rods Based upon Mechanical Properties

Joshua Gunderson (Department of Mechanical Engineering) Anthony Parks

This paper compares the results of three standard mechanical properties tests on the two metals used most often in spinal-pelvic fixation rods manufactured for Johnson and Johnson's ISOLA system. Stainless steel has been preferred for decades, but with the improvement of titanium alloys there is now a question as to which material is more suitable for preparation and implantation and for sustaining the loads required to support a damaged or deformed spine. Stainless Steel (ASTM F-138) and Titanium (ASTM F-136) rods are tested in tension for ultimate tensile strength yield strength, and modulus of elasticity. Rockwell Hardness tests are conducted for hardness values and as an alternate source of ultimate tensile strength. Samples of each metal are polished, etched and examined with a microscope to reveal and compare microstructures. Test results are used to discuss the characteristics of each material in order to aid surgeons in determining which to implement.

CAL 3.0 Functionality Verification

Chris Hale (Department of Electrical Engineering) Elisa Barney-Smith

The CAL 3.0 computer program was designed for use in processing data obtained through electromyography. The new program was necessary to solve problems with existing software. However, many of the functions have not been independently verified. The goal of the current research is to experimentally verify the RMS smoothing function and several filter designs.

Reduction of Defect Densities on Silicon LASIK Surgical Blades

Kory Hall (Department of Electrical Engineering) Jeff Jessing

Recent research has been conducted to produce Bulk Micromachined silicon LASIK surgical blades at BSU. Due to process limitations at BSU, crystallographic defects have been observed along the blade plane and edges of these blades. This work focuses on the reduction of these defects using three methods available at BSU. The first method is to incorporate isopropyl alcohol (IPA) into the chemical bath during the silicon etch. The second method involves the growth and removal of a thermal oxide on the blade samples. The third method involves experimentation with removing the nitride masking layer used to produce the blades. The Scanning Electron Microscope (SEM), Profiler, and Optical Profiler will be used to determine the surface roughness and radius of curvature before and after each experiment in order to quantify results.

– Abstracts –

A Simulation of a Winter Inversion Event in the Treasure Valley

Luke Hindman & Justin Shepherdson (Department of Computer Science) Paul Dawson

We performed a simulation of a winter inversion event from January 2004, using the 'state-of-the-science' regional meteorological forecast model called WRF (Weather Research Forecast). This inversion event was the most severe event during the 2003-04 winter season, a perfect case study to put WRF though it's paces. The WRF software was run on the BSU Linux Beowulf cluster, and the simulation produced results of temperature, relative humidity, and wind speed/direction. These results were then compared to observations of these same parameters. The results are presented using GIS visualization and analysis software, as well as a 3-D graphics package called VIS-5D. Our goal is to couple the WRF code with Air Quality code to actually forecast winter inversion and air pollution events in the Treasure Valley.

Advanced Fabrication Techniques for an Ion Mobility Spectrometer in Low Temperature Co-Fired Ceramics

Brian Jaques (Department of Mechanical Engineering) Amy Moll

Ion Mobility Spectrometers (IMS) can measure the presence of many volatile organic carbons. Miniaturization of an IMS would allow deployment in multiple areas giving "real time" data readings. This project is focused on the development of a miniature IMS fabricated with Low Temperature Co-Fired Ceramics (LTCC). Fabricating an IMS in LTCC allows a constant electric field from the ability of close-packed electrodes, about 128 per inch. Fabrication techniques for an IMS in LTCC include a constrained heated lamination process, precision milling, and extended furnace firing profiles. While the newest technology has only reported to fabricate 100 layers, the work we have completed includes a successful device of 156 layers of printed circuitry and five embedded metal gates.

Design of a Small Wind Energy System

Richard Kidneigh, Matt McGee, & Harry Keat (Department of Electrical and Computer Engineering) Said Ahmed-Zaid

Idaho has been identified as a prime geographical location for potential wind power generation. It is the goal of this project to develop a cost-effective small-scale wind turbine to be used in the Southern Idaho region. The wind turbine design approach involves four general steps over the course of the academic year. These steps include research and data collection, computer simulation, system assembly, and wind turbine testing. A wind energy system is comprised of a set of wind blades connected to a shaft that converts wind energy into mechanical shaft torque. A generator then converts mechanical power into electrical power. The performance of several different types of generation systems will be evaluated including the squirrel-cage induction generator, the doubly fed induction generator, and the direct-drive synchronous generator. The completed system will be tested with the Boise State University wind tunnel.

Micro-Rocket Nozzles in Low Temperature Co-Fired Ceramics

Seth Kuhlman (Department of Mechanical Engineering) Amy Moll

In recent years engineers and designers have developed many technological advancements that have propelled industry into designing components for smaller and smaller applications. These advancements have been carried into Aerospace industries for the design of miniature satellites. With the reduction in size of satellites there is a need for smaller thrusters for orbital control of the satellites. This work will present the design, build, and test a rocket nozzle from Low Temperature Co-Fired Ceramics (LTCC) for use on miniature the satellites. The nozzle design incorporates the use of Computational Fluid Dynamics (CFD) and a Rao design methodology to determine the highest efficiency of the nozzle. The fabrication process of the nozzles involves the use of CAD software and CNC milling techniques. The testing of the nozzles requires the construction of a testing station that can monitor the mass-flow rate, internal pressure, and thrust output of the rocket nozzle.

– Abstracts –

Effect of External and Internal Rotation of the Foot on a Calf Raise Exercise

Seth Kuhlman (Department of Mechanical Engineering) Michelle Sabick

Many athletes need the ability to outperform their competition in running or jumping events. There are numerous exercises that can be performed to increase their running or jumping ability. One primary exercise is the calf raise. The goal of this study is to determine if different positions of the foot will exercise the muscles of the calf more efficiently. The positions tested are based on the external and internal rotation of the lower leg and foot from the anatomical position. The three positions are: no rotation, 15° external rotation, and 15° internal rotation. The efficiency of the lift is based on which position works the most muscles. Electromyography (EMG) will be used to determine which muscles are active throughout the calf raise. In addition, floor mounted load cells determine how the body's weight is distributed onto the foot during the calf raise.

Effect of Scanner Degradations on Edge Location Algorithms

Craig McGillvary (Department of Electrical Engineering) Elisa Barney-Smith

When a scanner degrades an image, it blurs and samples the image, adds random noise and then thresholds it to form a black and white image. Many of the algorithms for measuring the extent of blurring and the level of thresholding require us to measure the location of edges that have been degraded. We are researching how our ability to find the location of these edges is affected by the degradation process itself. We are also researching ways to improve edge location algorithms that take the scanner degradation into account.

Fluoroscopic Analysis of Knee Joint Kinematics

Abhiraam Mocherla & Charles Scott (Department of Electrical Engineering) Elisa Barney-Smith

The objective of the research is to develop a method for collecting accurate, 3-D kinematics data of bones and joints in vivo using a video fluoroscopy technique. This can be used to find the reason why Anterior Cruciate Ligament (ACL) occurs in women athletes more than men. The ACL connects the femur and tibia at the knee joint and its motion results in injuries. The methods involved are CT scan and fluoroscopic x-ray of the joint. A CT scan of a porcine leg at various positions is conducted. Using computer and imaging processing, the CT scan is converted to a 3-D image via Digital Reconstructed Radiograph (DRR). Simultaneously, edges of the bones are detected in real and projected images and the 2-D is matched with the 3-D image to obtain a 6-DOF (6 Degrees of Freedom) model of the bone.

Anomalous Current-Voltage Characteristics in Ultra-Thin Oxide MOS Devices

Patrick Nagler (Department of Electrical Engineering) William B. Knowlton

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

Even as semiconductor devices progress to smaller dimensions and thinner oxides, a transistor remains a transistor. Subsequently, basic transistor action is very well known and characterized; therefore, when transistors are scaled and experiments reveal behavior outside of the known normal characteristics, it is a cause for concern. Metal oxide semiconductor field effect transistors (MOSFETs) with 2 nm gate oxides have been characterized which displayed an abnormal decrease in output current under conditions that typically cause a MOSFET to attain a state of current saturation. It was hypothesized that the sharp decrease in output current may be the result of a charge carrier-phonon interaction (quanta of lattice vibrations). Several methods were used to prove or disprove this hypothesis. This study disproves the hypothesis and shows that the anomalous characteristics are a result of asymmetry between the sources and drain regions of the device.

– Abstracts –

Printer Modeling

Brandon Nixon, Jim Steele, & Elijah Udeochu (Department of Electrical and Computer Engineering) Elisa Barney-Smith

The goal of our research is to develop and calibrate a model for the distribution of toner particles in laser printers. Information from a working model could then be used to improve the Optical Character Recognition (OCR) process when scanning documents. An initial model has been developed and the research is in the testing and calibration phase. To test the accuracy and calibrate it, hundreds of microscopic pictures are used to compare whether small pixel patterns match what is expected from the model that we have developed.

Searching for Non-Existent Needles in a DNA Haystack

Ben Noland (Department of Computer Science) Amit Jain

In an effort to understand the limitations placed on DNA by evolutionary pressure, we have developed a parallel program that searches DNA for non-existent sequences. We have run this on the human genome, which is about 2.87 billion characters long, and have identified 86 length 11 sequences that do not exist. If the human genome was random (no evolutionary pressure), then the probability of this happening is less than 10 to the power of -311. The program is being run on the Boise State Beowulf Cluster with 122 processors. Using the cluster allowed us to run the program about 40 times faster than would be possible on a single workstation.

ACL Injuries in the Sport of Alpine Skiing and Ways to Mitigate this Risk

Michael Keith Oliver (Department of Mechanical Engineering) Michelle Sabick

A common injury in the sport of alpine skiing is a tearing of the anterior cruciate ligament or ACL. This occurs when a skier falls over the tail end of their ski in a phenomenon known as "phantom foot." The large forces involved in falling act through the long moment arm of the ski to subject the knee to a very large torque. This study attempts to quantify this torque and research solutions to avoid the moment being transferred to the ligaments in the knee. A subject will don a ski and a measured force will be applied perpendicular to the end of the ski, with a simple torque calculation following. This raw data will be processed and run through a detailed analysis. From this analysis, we can recommend ways to mitigate the dangers to the ACL during alpine skiing.

The Maze Solving Robot

Sang Hyun Park & Nick Pauly (Department of Electrical Engineering) Nader Rafla

The maze solving robot will study and store maze information and calculate the shortest path to the center of the maze. Each year competitions are held that encourage participants to use various engineering disciplines, such as electrical, mechanical, and computer. Robots must solve the maze given only the maze dimensions. Our maze solving robot will be built using stepper motors from old 5.25 inch floppy drives. Infrared sensors will be used to detect the walls of the maze. A PIC18F452 microcontroller will be used to control all robot functions. Elements of digital/analog circuit layout and design, logic implementation, computer programming, system control, and power management will all be used in the creation of the maze-solving robot.

The Impact of Light Wavelength on the Morphology of Emiliania huxleyi

Teri Penza (Department of Mechanical Engineering) Janet Hampikian

Emiliania huxleyi, is the most abundant calcite-producing unicellular algae in the marine environment. It can fix atmospheric carbon via photosynthesis and biomineralization, making it an important factor in the flux of CO2 across the air-sea interface. The architecture of the calcite shell is intricate and interesting in terms of potential novel material applications. In order to further our understanding of the process by which the calcite shell is formed we are conducting a series of tests to determine the impact of light

wavelength on shell morphology and architecture. It has been established that growth rate is optimized under green light (_≈560nm). E. hux will be grown under stable temperature (17oC ± 1oC) and chemical conditions (E hux strains and media to be provided by Tom Wahlund at CSUSM) with different monochromatic light sources and then examined via SEM and XRD to determine the impact of light wavelength on its morphology/architecture.

Fabrication of a 3D Field-Emission Device

Todd Plum, Kory Hall, Nick Kaiser, & Michelle Sherwood (Department of Electrical Engineering) Jeff Jessing

Field-emission devices can be used in many applications in the semiconductor world. Most devices however, have to be fabricated with specific geometries and dimensions that allow it to operate only in a single mode. This project focuses on the fabrication of a 3D field-emission tip that can be operated in several modes by varying the spacing between the tip and the electrode. The structure of this device will be characterized using the scanning electron microscope, Profiler, and other metrology tools located in the Idaho Microfabrication Lab (IML) at BSU. Several sizes of field-emission devices are currently being fabricated and will be studied to determine the appropriate dimensions required.

Design of a Delta-Sigma Modulator High-Fidelity Amplifier

Rudi Rashwand, Petru Sandor, Tami Nord-Taylor, & David Whelchel (Department of Electrical Engineering) Nader Rafla

This technical report describes the design process and implementation of a delta-sigma modulator (DSM) high-fidelity amplifier to power a large speaker. The report begins with an overview of the amplifier and its components by providing a top-level block diagram of each section. The sections of the amplifier include an audio pre-amplifier to condition the input signal and reduce noise, a DSM section capable of converting an analog signal to a digital signal, and a power amplifier section capable of powering a large speaker. A small signal from an electric guitar was used as the input to the amplifier. Converting the input signal to digital is preferable over analog due to less total power dissipation. The key concepts considered for the design of the amplifier include power levels, heat dissipation, gain, dynamic range, and low total harmonic distortion. The technical report ends with a summary of the outcome of the design process.

Golf Club Head Speed & Accuracy Analysis

Torrey Roberts (Department of Mechanical Engineering) Michelle Sabick

Club head speed control and accuracy is important to ball distance, height, and direction when swinging a golf club. A slower, less accurate club can result in golfer fatigue and frustration. In theory the club head velocity should decrease with smaller club sizes. In addition several golf club manufacturers claim to offer clubs that provide greater club head speed and accuracy than the competition. The purpose of this study is to test various sizes of three different club brands to determine if there is a correlation between head speed, accuracy, club brand, and club size. A student will swing 1, 3, & 5 wood and 4, 6, & 9 iron clubs 6 times each and the club head speed & location at the mid-point of the swing will be measured. The data gathered will be analyzed to determine if correlations exist.

Improved Binarization of Degraded Images using a Modified Local Adaptive Thresholding Technique

Delia-Alliece Russell & Tessa Triolo (Department of Electrical Engineering and Computer Science) Elisa Barney-Smith

We are attempting to improve binarization of document images, specifically binarization techniques that are targeted towards documents that were scanned with uneven illumination. Binarization of document images is an important step for optical character recognition (OCR) algorithms, and can have a significant impact on OCR accuracy. We have examined several different binarization algorithms that use local adaptive thresholding techniques, and have determined that a local adaptive thresholding approach

developed by Niblack exhibits the (visually) best performance on a wide variety of images. However, Niblack's local adaptive thresholding algorithm has specific shortcomings that need to be addressed for optimal performance. We have developed modifications to the basic Niblack algorithm that address the major shortcomings, and we present the results of our modifications in this poster.

Energy Scavenging Device in Low Temperature Co-Fired Ceramics

Sarah Scherrer (Department of Mechanical Engineering) Amy Moll

An Energy Scavenging device is being fabricated in low temperature co-fired ceramics (LTCC). This device is a micro electro mechanical system (MEMS) that converts vibrations into electrical power. Considerable research efforts have been focused on the development of MEMS devices including Energy scavenging devices in Si. Although substantial progress has been made, Si is not ideally suited for all of the functions that must be integrated into a system. In this device, vibrations will cause movement of a conductive coil resting on a spring. The coil will move through a magnetic field as the spring oscillates, transforming magnetic flux lines to an electric flow. This innovative research in remote power supplies will enable the development of robust, inexpensive devices. LTCC materials are uniquely suited to this application.

The Anatomy of an Atmospheric Inversion Event

Justin Shepherdson & Dustin Kayle (Department of Mechanical Engineering) Paul Dawson

An inversion is a weather event where the atmospheric temperature increases with altitude. This causes a cold layer of polluted air to become trapped in the valley and become a health hazard. These pollution levels are affected by the amount of pollution being released into the atmosphere and the strength and duration of the inversion. The objective of this research is to develop a correlation between the Air Quality Index (AQI) and the strength and duration on the inversion. Once the characteristics of the inversion are predicted through meteorological models, this correlation can be used to predict AQI values.

Reconfigurable Hardware Resource Utilization

Cameron Stewart (Department of Electrical and Computer Engineering) Sin Ming Loo

This research examines different methods for analyzing "optimum" resource utilization in a reconfigurable hardware environment. The logical functionality of reconfigurable hardware can be altered throughout the life of the hardware. Implementation of any design in a reconfigurable system is subject to two main performance constraints: available physical resources and computation requirements. Any task can be implemented in hardware or software. Hardware implementation of a function is usually much faster than software implementation, but could require an enormous amount of physical resources. A software implementation is usually slower and consumes less physical resources than a hardware implementation because it executes in a multipurpose processor. In this research, a task is separated into subtasks, each with hardware and software implementations. Each subtask implementation is analyzed for physical resources and computation requirements. Various algorithms are then used to determine the optimal mix of software and hardware implementations of all subtasks for the system.

Erosion Control on Construction Sites

Jake Stones (Department of Construction Management) Charles Gains

Since its inception in 1970 the Environmental Protection Agency (EPA) has placed emphasis on protecting our nation's water supplies. The National Pollution Discharge Elimination System (NPDES) regulations require the containment of contaminants and runoff from construction sites. Sigma Lambda Chi (BSU Construction Management Honor Society) and its members continue to provide students with information and updates on the NPDES construction site regulations. Partnering with the City of Boise Planning and Development Services, Sigma Lambda Chi members offer erosion control classes and certification for construction management students. These classes keep graduating students aware of the current regulations and management practices designed to keep construction waste from polluting the

environment. Students with this training are valuable to their perspective employers. This type of supplementary education, born of student initiative, prepares construction management students to face the diverse challenges that are plentiful in the construction industry.

The Emerging Sustainable Building Market

Jake Stones (Department of Construction Management) Charles Gains

Increasing costs and higher demand for energy and raw materials are forcing markets to deal with environmental concerns. Environmental markets are responding through the advent of "green" products and services. The building construction market is no exception to this developing market trend. The recent appearance and rapid acceptance of programs such as Leadership in Energy and Environmental Design (LEED) and Energy Star products are evidence of the green movement. The direct benefits to constructors who participate in sustainable engineering are both economic and environmental nature, and far outweigh the initial costs of getting involved. With owner demand for sustainable buildings on a steady increase, the extent to which a constructor involves his firm in sustainable engineering could decide the financial security of his firm in the future. This research will provide a study of an emerging market and the demand for that market.

Production Code ID Memory Reader (PCIDer)

Gary VanAckern, Brandon Nixon, & Mike Shang (Department of Electrical and Computer Engineering) Nader Rafler

Integrated memory circuits store not only user data, but rather they permanently store production information via fusible links. These links represent bits of data that are grouped into identification fields that signify information such as: fabrication location and date; lot number; die location. This information is used by failure analysis engineers who correlate failures in memory devices. The current fuse reading device, PCIDer, interfaces a host personal computer (PC) or personal digital assistant (PDA) to individual memory chips for reading such information. The host communicates through a serial port interface to the reader and accesses the memory device under test (DUT). The reader supplies operating power to the DUT. This reader is not able to satisfy the low power requirements, below 3.3 volts, of current generation memory devices. The purpose of this project is to redesign the PCIDer to dynamically scale supply voltages between 3.3 and 1.8 volts to accommodate future memory fabrication technologies.

Realignment of SH-55 between Smiths Ferry and Round Valley

George VanHorn, Jon Mills, Jeremy Brown, & Jordi Figueras (Department of Civil Engineering) Steven Affleck

The current alignment of State Highway 55 (SH-55) between Smiths Ferry and Round Valley is a hazardous stretch of highway. This section of SH-55 has numerous tight curves, which make for unsafe driving conditions. The Idaho Transportation Department and HDR Engineering have completed some preliminary environmental impact studies to determine an appropriate route. We have chosen an eastern alignment, which will provide a straighter highway, effectively eliminating the dangerous curves on the current roadway and improving driver safety. The new alignment will feature a bridge crossing the Payette River about six miles downstream of the existing Rainbow Bridge. The new crossing will ease the burden on the historic structure currently in use without interrupting the beauty of the canyon further upstream. Residents of Smiths Ferry will also benefit, as the new alignment will be moved east of their homes without encroaching too closely on homes in Round Valley.

Is MRI Acceptable When Working with Pediatric Growth Plates?

Judy Wayne, Katy Roeske, & Ayush Goyal (Department of Mechanical Engineering) Joseph Guarino

The number of anterior cruciate ligament (ACL) injuries in children has been rising, and if these injuries are left untreated more serious problems can develop. In order to treat a torn ACL it is necessary to drill

through both the femur and the tibia to insert a graft to replace the torn ACL. In children this procedure is complicated by the presence of growth plates. CT scans are a very accurate way of locating the growth plates to allow surgeons to plan for ACL reconstruction. However, CT scans are not advised for children due to the radiation. Our research compared 3-D models derived from CT and MRI scans of the same growth plates and determined that MRI scans are accurate enough to help plan for ACL reconstructive surgery.

Tennis Ball Compression Test

Judy Wayne (Department of Mechanical Engineering) Amy Moll

Most consumers assume that price reflects quality. We decided to test that assumption in tennis balls. We chose five different types of tennis balls and determined how well they modeled a perfectly elastic collision by measuring the force required to compress each ball the same distance. What we found was that all but the lowest priced variety required nearly the same force to compress. We also found that one of the mid-priced varieties was relatively unchanged by the test, when all the others were significantly deformed.

Distribution of Water within a Soil Column as a Function of Volumetric Moisture Content and Time

Sara Wheeler (Department of Civil Engineering) Molly Gribb

Development of an understanding of contaminant flow and transport in soil is vital for remediation of contaminated sites and testing of new subsurface sensors. Soil column tests are performed in the laboratory to mimic field conditions to test new sensors that will be used to detect and quantify the amount of gaseous contaminants present in the subsurface. During these tests, it is desirable to keep the water distribution within the soil column as uniform as possible. This research project involves evaluation of the changes in soil water distribution within a soil column over the course of one to seven days for water contents of 2% to 10% by volume. The results will determine the time interval over which different initial water contents will remain uniform. This information will be used to better control the experimental conditions under which the sensor will be tested.

Current Sensor Design for an AC Motor Drive

Jason Wilson, Robert Trammel, Chad Kidd, & Steve Fullmer (Department of Electrical Engineering) Said Ahmed-Zaid

This project is a study into the performance of current sensing devices. The aim is to investigate cost and performance of current sensors and signal conditioners for matching phase currents of an induction motor to the analog inputs of a DSP. The project will assure sensor performance during motor start-ups and guide input/output parameters from phase current output to the analog voltage input of a DSP controller. The end goal is to convert the phase currents to voltage inputs at the DSP interface. We will evaluate different sensor devices and choose a design based upon performance, simplicity, cost and safety. The research will explore the following sensor devices: Resistive Shunts, Hall-Effect Current Sensors, Current Transformers and Rogowski Coils. The final sensor design will be used in the design of an AC induction motor drive system.

Effect of Training Sets on OCR

Jason Wilson (Department of Electrical Engineering) Elisa Barney-Smith

This research examines the effect of incorporating information from a degradation model in training set generation for Optical Character Recognition (OCR) classifiers. These training sets provide classifier programs with a basis for recognition when character degradations are present. Synthetic degradations are created to model the degradations that a printed character undergoes during laser scanning. Different ways to divide the training set based on the model parameters are explored. OCR performance is then analyzed with the incorporation of these training sets in the classifier.

GPS Tracking Collar with Sensor Package for Wildlife-Livestock Research

Andrew Wood, Brad Huttash, Mark Kniep, Craig McGillivary, & Kevin Titus (Department of Electrical and Computer Engineering) Scott Smith

The project goal is to improve a prototype GPS telemetry tracking collar to be used in applications requiring large data storage capacity, low power consumption, GPS beacon transmissions, accelerometer sensors, and remote data download capabilities. The improved prototype must be designed to operate under long-duration (up to 1 year) test deployments on wolves, bear, elk, and livestock. The project development cycle will include the design and implementation of: PCB solution, low power circuitry, data storage management, encoded RF transmissions, sensor package, GPS based data beacons, and remote data download capability. Short duration field tests will be performed to test prototype capabilities. Field deployment will proceed immediately upon project completion.

College of Health Sciences

Response of the Ventilator Subsequent to Patient Disconnection During Dual-Mode Ventilation

Essam Aljamhan, David W. Southwick, King Abdulaziz (Department of Respiratory Care) Lonny J. Ashworth

In dual-mode ventilation the ventilator delivers a test breath to determine the compliance and resistance of the lungs. Each breath thereafter is pressure-limited such that the pressure level is automatically modulated to deliver a preset tidal volume. How do modern ventilators respond to a patient/ventilator disconnection during dual-mode ventilation? Three ventilators, which were connected to a mechanical lung model, were involved in the study. Values for Peak Inspiratory Pressure and Inspiratory Tidal Volume were recorded commencing with reconnection of the circuit until those values stabilized at pre-disconnection values. This study showed that only one ventilator recalibrated with a test breath then modulated the pressure to obtain pre-disconnection values, whereas the other two resumed at or near the pre-disconnection pressures. Clinical trials are necessary to assess the significance on patients that experience a disconnection or change in compliance during disconnection when utilizing dual-mode ventilation.

Automatic Tube Compensation During Expiration: What Effect Does it have on Peak Expiratory Flowrate?

Ross Armstrong (Department of Respiratory Care) Lonny Ashworth

Automatic Tube Compensation (ATC) compensates for resistance of ETT or tracheostomy tubes. With ATC active during expiration (ATCexp), PEEP levels are reduced at the beginning of expiration in attempt to deliver desired PEEP levels at the carina. This results in increased pressure gradients for exhalation, which may increase peak expiratory flowrates. Peak expiratory flowrates were measured immediately before the exhalation valve with ATC off and on after the ventilator stabilized. With ATC on, peak expiratory flowrates increased up to 12% with Cst 0.09 L/cm H2O at 10 cm H2O PEEP, 15% with Cst 0.07 L/cmH2O at 15 cm H2O PEEP and 14% with Cst 0.05 L/cm H2O at 20 cm H2O PEEP. ATCexp increases peak expiratory flowrates. Patients with ARDS/ALI may benefit from ATCexp by decreasing auto-PEEP. Patients with emphysema/dynamic airway collapse may have reduction in airway splinting resulting in increased auto-PEEP and increased work-of-breathing.

Occupational Exposure to Snowmobile Emissions at Yellowstone National Park

Ian Percy (Department of Community and Environmental Health) Dale Stephenson

In recent years, regulations regarding snowmobile recreation in Yellowstone National Park have become more restrictive. New regulations limit the number of snowmobiles entering the park, restrict the engine type, and require that all riders must utilize a licensed guide. Given these regulations, it is hypothesized

that occupational exposures to the combustion products from snowmobile exhaust have decreased. This research project performed occupational exposure monitoring of National Park Service Employees while working at the West Entrance to Yellowstone National Park during the 2004-2005 winter season. Products of snowmobile exhaust including CO, NOx, VOCs, fine particulates, and noise were sampled and the analytical results compared to the occupational exposures during previous years. The purpose of this research is to determine if compliance with current regulations regarding snowmobile recreation in Yellowstone National Park has any affect on the occupational exposures received by park employees during the performance of their normal job tasks.

Assessment of Occupational Noise Exposure at the Boise Airport

Darrel Krajnik (Department of Community and Environmental Health) Dale Stephenson

Employees at the Boise Airport are exposed to many noise sources in various work environments. This research project assessed noise exposures received by employees working in two different job tasks: 1) ground service agents working on the airport runway/tarmac area, and; 2) manual baggage encoders working in the baggage handling area. Personal sampling, area sampling, and octave-band analysis were performed for both job tasks. Evaluation of occupational noise exposure was assessed by comparison of sampling results to standards established by the Occupational Safety and Health Administration. In addition, hearing protection currently worn by airport employees was assessed in terms of the provision of adequate attenuation based on noise exposure levels. Finally, the overall results were used to make recommendations to reduce and control employee noise exposures.

Ventilatory Response During Dual-Mode Ventilation After Removal of a Fiberoptic Bronchoscope

Nikolas Sira & Ross Armstrong (Respiratory Care) Lonny Ashworth

When an intubated patient has a bronchoscopy performed, the airway resistance increases substantially while the bronchoscope is inserted. This study was designed to evaluate the response of three ventilators during simulated bronchoscopy. Three ventilators were evaluated: Drager Evita 2, Puritan Bennett 840, Viasys Avea. Each ventilator was connected through the same circuit. A catheter was passed into the circuit, simulating a bronchoscope. The ventilators were allowed to equilibrate and then the catheter was removed. All of the ventilators delivered one breath at the pressure reached with the catheter inserted resulting in an elevated VT. On the second breath the pressure decreased to the level prior in the Avea, and the pressure lowered by no more than 3-4 cm H2O in the 840 and Evita 2. Each ventilator responds somewhat differently during dual-mode ventilation and the delivered VT and pressures should be monitored closely.

College of Social Science and Public Affairs

Wartime Experiences and Their Effects on Bosnia War Survivors

Sandina Begic (*McNair Scholar*) (Department of Psychology) Theodore W. McDonald & David Hall

The aim of this study was to investigate the long-term effects of war experiences on the psychological well-being of the residents of Bosnia and Herzegovina. The Bosnia-Herzegovina version of the Harvard Trauma Questionnaire and the Hopkins Symptom Checklist-25 were used to assess the level of trauma experienced during the 1992-1995 war and the symptoms of depression and anxiety almost a decade later, respectfully. As hypothesized, war-related experiences were positively correlated with PTSD, anxiety, and depression. Additionally, PTSD symptomatology emerged as being more prevalent than anxiety or depression. The strongest predictors were lack of shelter, destruction of personal property, ill health without medical care, forced evacuation, and disappearance or kidnapping of a family member. The results suggest that the mental health outreach should be targeted on those who experienced greater exposure to wartime conditions and that outreach efforts to survivors of specific experiences are particularly warranted.

– Abstracts –

Cuban Diaspora: Relocation of Cuban Refugees in Countries of First Asylum

Adriana Black (McNair Scholar) (Department of Sociology) Robert McCarl, Virginia Husting, David Hall

This study introduces comparative ethnographies of Cuban refugees living in the United States (Boise, Idaho) and in Latin American countries (southern Costa Rica). These two groups represent a minor body of refugees for whom the United States and Costa Rica serve as countries of first asylum. Theoretical considerations addressed in this work are the issues of immigrant identity through the refugee experience, separation from one's culture, and introduction to a new culture. Data analysis revolves around demographic and sociological data including family income, occupational adjustments, inter-ethnic relations, family relations, socio-economic status, education, employment and government care of the refugee population.

Dialectical Theory and Conflict

Sally Brown (Department of Communication) Laurel Traynowicz

Podium presentation

Dialectical theory is a philosophy that is used to analyze an entire range of human behavior from social orders to roles used in mass media. This theory is based on gaining understanding through the opposing forces that are ubiquitously found in our world. After looking at various ways social scientists have applied dialectics, and more specifically Leslie Baxter and Barbara Montgomery's (1996) relational dialectics, to explain and understand social phenomenon; we will see how this incredibly versatile theory can be applied to manage conflict effectively. Many theories focus on teaching conflict management tools while dialectical theory can focus on the initial intent that two parties need in order to manage conflict effectively, a desire to understand the self and other. It is through dialectical theory or the understanding gained by looking at the opposing needs or desires that collaboration or a win\win for both parties can be more easily found.

Demographic Changes and Urban Education of Racial Minority Children In Idaho 1990-2004: An Analysis at the State, Metropolitan and County Levels

Maggie Chiang (Department of Sociology) Huei-Hsia Wu

Using census 1990-2004 data, this analysis overviews Idaho's demographic changes at the state, metropolitan and county levels, their impact and challenges on the education of immigrant children of racial/ethnic minorities. In addition, special attention is directed to the role of local communities in assisting and improving the educational attainment (e.g., reducing the high school dropout rate) of racial/ethnic minority children. This analysis finds several important demographic changes in Idaho since 1990s: In particular, the population composition of racial/ethnic minorities, migration flows, immigration, fertility, mortality, socioeconomic status, employment and class of workers. These demographic patterns suggest that Idaho is becoming more racially/ethnically/culturally diverse than the past, generating many new challenges to the population and social institution in Idaho. This analysis urges that policy makers need to recognize the importance of local communities in assisting racial minority children's future education. Finally, some policy suggestions are also provided.

Attachment Theory and the Investment Model: The Symbiosis of Two Rival Theories.

Kelli Cortes, Christine P. Pearson, Kevin Taylor, & Jacquie Daniel (Department of Psychology) Wind Goodfriend

Podium presentation

Attachment Theory and the Investment Model are two of the most popular perspectives from which to study romantic relationships. Although theorists from these two perspectives may view these theories as very different from each other, the purpose of this study was to explore ways in which the theories overlap. Correlations showed that individuals high in attachment avoidance are less likely to have most types of relationship investments; this most likely reflects their reluctance to form strong ties keeping them in relationships. Highly ambivalent individuals, however, are less likely to have tangible investments (e.g., a shared bank account), but do not seem to have a problem making intangible investments (e.g., time and effort spent on the relationship). It is important to continue to research ways in which the two rich traditions of Attachment Theory and the Investment Model can be symbiotic in their study of relationships.

– Abstracts –

Specificity vs. Globality in Measurement: Types of Relationship Commitment and Investment

Jacqueline M. Daniel, Kelli Cortes, Christine L. Pearson, Kevin C. Taylor (Department of Psychology), Wind Goodfriend

Two of the most researched and established constructs relevant to adult romantic relationships are commitment and investments. Much support has been found for the general principle that greater levels of investments (e.g., effort and time put into a relationship) predict greater levels of relationship commitment. Regression tests explored the associations between three types of relationship commitment and four types of relationship investments. Although many researchers measure commitment and investments as global constructs, recent work has provided evidence that breaking down these constructs is both theoretically and empirically useful. The purpose of the current work was to further explore the association between investments and commitment by measuring these specific types of each construct and testing associations among them. Results provide evidence for the utility of measuring these constructs as specifically as possible, as opposed to the traditional global approach to measurement. Further implications and future research goals will be addressed.

Together Forever? Age as a Predictor of Relationship Commitment and Investments

Jacqueline M. Daniel, Kevin C. Taylor, Kelli Cortes, & Christine L. Pearson (Department of Psychology) Wind Goodfriend

The purpose of the current work was to further investigate commitment and investments in relationships with a focus on how these constructs relate to age. Goodfriend and Agnew (2002) established that there are four types of relationship investments: past tangible, past intangible, planned tangible, and planned intangible. In addition, Arriaga & Agnew (2001) established that there are three components of commitment: psychological attachment, long-term orientation, and intent to persist. Correlations provided evidence that commitment and types of investments do change as individuals age. Results showed that older individuals are more likely to have tangible investments, perhaps because they are more comfortable with these types of investment than are younger individuals. Results also showed that older participants have higher levels of long-term orientation in their relationships, perhaps showing a perspective of looking for a life partner, as opposed to a casual dating relationship.

Gambling Behaviors Among College Students

Alison Eatough, Marianna Becker, Coby Karl, & KC Walsh (Department of Communication) Laurel Traynowicz

Gambling in the United States has flourished in the past two decades. One segment of the population experiencing greater problems with gambling obsession and addiction is college students. Our research purpose was to examine personal traits, background variables and social behaviors associated with gambling. Results of surveys and interviews with college students revealed several relevant associations. Some of the more interesting associations revolved around student gamblers' relatively consistent use of alcohol, nicotine and/or marijuana. Interview data provided deeper information regarding family histories in gambling, and indicated that a history of risky family behaviors were related to compulsive gambling of later members.

Hurt, Perfectly

Stephanie R. Garcia (*McNair Scholar*) (Department of Communication) Peter Lutze

Documentary film

"Hurt, "Perfectly" is a documentary video that analyzes attitudes, histories and laws regarding domestic violence in the state of Idaho. Within the dynamic of intimate, domestic partnerships of all types, violence against women is only one form in which domestic violence within families and domestic relationships manifests itself. Through a series of interviews and imagery, the film presents domestic violence as the responsibility of every community member while at the same time revealing every citizen within that community as a victim of domestic violence. "Hurt, Perfectly" is an examination of both Ada and Canyon counties in Idaho. By juxtaposing the neighboring regions, the video attempts to debunk socioeconomic and racial associations and stereotypes commonly attached

to domestic violence. Meanwhile, cultural and physical boundaries are examined regarding the Angie Leon case. Finally, the documentary explores the indoctrination of feminist literature into the language of Idaho law and legislation.

Adult Attachment and Psychological Distress: Is Self-Esteem a Mediator?

Kate Haralson, Jenna Elgin, & Dale Wright (Department of Psychology) Diana M. Doumas

Podium presentation

Recent research has examined psychological distress from an attachment theory perspective, demonstrating a relationship between adult attachment and both depression and anxiety. More recently, research has identified the role of cognitive vulnerabilities in mediating these relationships. To date, however, these relationships have not been studied in a single model. Thus, the goal of this study was to examine the relationship of adult attachment to depression and anxiety and the mediating role of self-esteem within the same model using structural equation-modeling. Questionnaires on attachment, depression, anxiety, and self-esteem were completed by 198 undergraduate students. Results of structural-equation modeling indicated that the relationship between attachment anxiety and psychological distress was partially mediated by self-esteem, whereas attachment avoidance was not related to self-esteem or psychological distress. Results suggest that increasing both self-concept and decreasing fears about relationships may be useful cognitive and interpersonal intervention strategies in the treatment of psychological distress.

Risk Factors for Alcohol Abuse: Athlete Status, Gender, and School Term

Kate Haralson (Department of Psychology) Diana M. Doumas

Research indicates that athletes and males are both high-risk groups for college drinking. While most alcohol orientations take place at the start of the academic year, few are conducted throughout the year. Little research, however, has been conducted to examine patterns of use during different periods of the year. Thus, the aim of this study was to examine the relationship of athlete status, gender, and school term to alcohol use and alcohol-related consequences. Questionnaires were completed by 457 freshmen. Results of 2 x 2 x 2 ANOVAs indicated that males, athletes, and students in the Spring reported higher levels of weekend drinking than females, athletes, and students in the Fall. Further, athletes in the spring were at the highest risk for both weekend drinking and alcohol-related consequences. Clinical implications include targeting prevention of drinking toward athletes with an emphasis on reducing drinking and associated consequences, particularly in the spring.

Reconstructing the Environmental History of a Prehistoric Western Snake River Site

Tedd D. Jacobs (Department of Anthropology) Mark Plew

Archaeological excavations in the Snake River Canyon south of Melba, Idaho have exposed stratigraphic sequences representing more than 14,000 years of environmental history. Sediment analysis permits study of the depositional changes useful in paleoenvironmental reconstructions. The results of the analysis demonstrate that the stratigraphic sequence was formed through multiple depositional events that occurred during the past several thousands of years and indicate that the stratigraphy accumulated over time by conditions that have remained relatively constant. This suggests probable continuity in native use in the area.

Movers and Shakers: A Case Study on the Role Policy Entrepreneurs Play in Politics

Jeni Jenkins (McNair Scholar) (Department of Sociology) Les Alm, David Hall

Using the theoretical concept of "policy entrepreneurs" in public policy, this study draws on interview data form six key figures in a controversial city debate to examine the impact, role and characteristics such entrepreneurs play city policy making. The study begins with an overview of the concept of policy entrepreneurs in relation to their role in the agenda-setting process of policy formation, followed by a historical summary of the case under study. Data analysis is based on in-depth analysis of information collected during oral interviews. Characteristics of policy entrepreneurs are identified; these include persistence, a willingness to invest in resources, value systems, expertise, opportunity, and influence. The influence of occupation and knowledge of external issues were also found to be important.

– Abstracts –

Cohabitation and Commitment: The Role of Commitment in Determining Relational Quality

Lisa L. McKinley (Department of Psychology) Eric Landrum

The relationship between commitment level and relational quality was examined in cohabiting partnerships. Participants responded to relevant survey items regarding their cohabiting relationships. Commitment level was found to be positively related to measures of relational quality and satisfaction. Individuals who entered cohabitation as a permanent partnership experienced greater relational quality than those who chose to live with their partner out of convenience. Respondents with high commitments to their partner experienced greater long-term orientation, attachment, and happiness, accompanied by fewer arguments with their partner. These findings are consistent with previous research suggesting that cohabiting relationships will be more successful if partners choose to move in together based on relationship-driven reasons rather than event-driven or convenience-based influences.

Finding a Scapegoat: a Program of Oral Interpretation

Annah Merkley (Department of Communication) Dawn Craner

Performing arts session

"Finding a Scapegoat" displays evidence and effects of blaming within the American culture at both the macro- and micro-social levels. The program artistically displays the frequency and ease with which we indict others, as it examines historical cases and patterns of scapegoating, e.g., (1) processes leading to finger-pointing during the commission hearings after 9/11; (2) parental behaviors that unwittingly teach future generations to legitimize scapegoating; (3) the trend of blame projection evident in frivolous lawsuits, and (4) the case of blame being projected onto Janet Jackson instead of on the broad cultural moral collapse that media reflected during the 2004 Super Bowl. The performance script intermingles excerpts drawn from: "The Hearings," a short story addressing the 9/11 commission hearings by Jaime Alder; E.L. Doctorow's novel, The Book of Daniel, examining historical social tendencies toward blame projection; an essay by Kerry Biggell taken from a collection of short essays on parenting; Benjamin Krall's poem addressing the cultural phenomenon of frivolous lawsuits; and finally Janice White's cynical essay, "Remember the Super Bowl?" which recalls events surrounding the now-famous wardrobe malfunction.

Attachment Style as a Risk Factor for Intimate Partner Violence

Christine L. Pearson (McNair Scholar) & Jenna E. Elgin (Department of Psychology) Diana M. Doumas

Intimate partner violence (IPV) represents a significant social problem, with 16 % of couples reporting violence yearly. Recent literature suggests attachment style may be implicated as a risk factor of male perpetrated violence. Research indicates Fearful, Preoccupied, or Dismissing attachment styles propose the highest risk factors. In contrast, an understudied paradigm has been the victim's attachment style. Limited data suggests an over-representation of Preoccupied and Fearful attachment patterns in women who have separated from abusive partners. Research in this area focuses on clinical populations, with limited community or couples sampling. This study examined the relationship between the woman's attachment style and male perpetrated violence in a sample of 35 community couples. Hierarchical regression analyses indicated the couple's report of male-perpetrated violence was predicted by females' anxious attachment. Thus, attachment anxiety may be a risk factor for victimization or exposure to violence may contribute to the development of attachment anxiety.

Soul Mates? The Correlation between Relationship Investments and the Belief in Destiny

Christine L. Pearson (McNair Scholar), Kevin C. Taylor, Jacqueline M. Daniel, & Kelli Cortes (Department of Psychology) Wind Goodfriend

Knee et al. (2003) proposed that some individuals have growth beliefs (relationships grow in compatibility over time), whereas others have destiny beliefs, (relationships are fated to either last or fail). The present research explored whether growth versus destiny beliefs are associated with investments in relationships, or resources put into relationships that increase commitment (e.g., time, money, and emotional ties). 273 participants currently in

a romantic relationship completed measures of both growth/destiny and of four different types of relationship investment (past/planned and tangible/intangible. Surprisingly, growth beliefs were correlated with none of the types of investment (ps all > .254); however, destiny was positively correlated with all four types of investments, (ps all < .001). These results go against some of the theoretical arguments offered by Knee et al. (2003). These data provide insight into both ITR theory and investment theory, and the thinking processes of individuals within romantic relationships.

Treatment Components as Predictors of Outcomes in a Partial Hospitalization Program

Christine L. Pearson (McNair Scholar) & Tamra K. Cottle (Department of Psychology) Diana M. Doumas

This study examined the efficacy of a Partial Hospitalization Program (PHP) and treatment components predictive of outcomes. While most research has examined psychodynamic PHPs, few studies have examined other types of therapies in a PHP setting. Thus, this study examined the relationship of psychodynamic, cognitive-behavioral, and occupational therapy components to treatment outcomes in a PHP. Patient satisfaction surveys were completed by 67 patients at discharge. Questions included satisfaction with treatment components as well as self-reported pre- and post-treatment functioning. Results of a paired t-test indicated that patients reported higher level of functioning at discharge than admission. Further, results of a hierarchical regression analysis indicated that satisfaction with cognitive-behavioral therapy and occupational therapy were significant predictors of discharge functioning, whereas psychodynamic therapy was not predictive of outcome. These findings add to the literature demonstrating the efficacy of PHPs and support the use of cognitive-behavioral and occupational therapy in these programs.

Treatment Outcomes in a Cognitive-Behavioral Partial Hospitalization Program

Christine L. Pearson (McNair Scholar) & Tamra K. Cottle (Department of Psychology) Diana M. Doumas

Over the past decade, several studies have examined the efficacy of Partial Hospitalization Programs (PHPs). While most of these studies have evaluated treatment programs with a psychodynamic focus, few studies have examined the efficacy of PHPs with a cognitive-behavioral orientation. Thus, the aim of this study was to examine treatment outcomes in a cognitive-behavioral PHP. Sixty-seven patients (57 female, 10 male) completed questionnaires assessing psychiatric symptoms at admission and discharge. Questionnaires included the Beck Depression Inventory, the Positive and Negative Affect Schedule, and the Brief Symptoms Inventory. Paired t-tests were conducted to assess mean differences between psychiatric symptoms at admission and discharge. Results indicated an improvement in symptoms of depression, positive and negative affect, and other symptoms of psychiatric distress. Results of this study demonstrate the efficacy of a cognitive-behavioral PHP, thereby adding to the literature endorsing the PHP level of care as viable and cost-effective alternative to inpatient treatment.

The Dirty Girls Social Club

Lacey Rammell-O'Brien (Department of Communication) Dawn Craner

Performing arts session

Interpretive performance involves speakers forming and presenting programs using other authors' published works organized around specific themes. Speakers may focus on poetry, drama, prose, or a combination of at least two genres of literature. Through prose interpretation, Ms. Rammell-O'Brien explores the ways that we both consciously and unconsciously perpetuate stereotypes based on perceived traits of race, gender, and ethnicity. Most people know about harms that can be caused by labels and false associations arising from a person's race or heritage. Despite their awareness, many people react negatively whenever a person of non-minority status attempts to analyze the issues facing a minority population. Ms. Rammell-O'Brien's cutting and performance of Alisa Valdez Rodriguez's The Dirty Girls Social Club, attempts to sever cataloguing connections by relaying the story of a red-headed, fair-skinned woman of Cuban lineage. Ultimately, Lauren's story is able to reflect the values of an increasingly diverse culture.

– Abstracts –

Voter Influences in the 2004 Presidential Election

Lacey Rammell-O'Brien, Miles Stirewalt, Gabriel van Komen, & Brandi Vigen (Department of Communication) Laurel Traynowicz

This study examined group polarization among eligible voters within the student population at Boise State University during the 2004 United States presidential campaign. Questionnaires were completed by 87 undergraduates. An additional 13 interviews were conducted to probe deeper into specific attitudes and justifications for those attitudes among the voting public. Survey results indicated that polarization existed on specific contemporary political issues, ranging from abortion and gun control to family values and economic policy. Results further indicated that parental influence was manifested in the political attitudes of college students, especially those with conservative tendencies. Finally, responses illustrated that the presidential debates were not informative for undecided voters but were effective at solidifying positions already held for both major parties. Moral issues were significantly important for those who voted for the incumbent, George W. Bush. However, among more liberal leaning voters, perceived current administration problems on domestic and foreign policy were of primary importance rather than any specific desire to vote for the Democratic candidate, Senator John Kerry.

Contradictions of the Male Image

Wayne Rysavy (Department of Communication) Dawn Craner

Performing arts session

Programmed Oral Interpretation is a performance genre utilizing two or more types of literature by transforming them into a thematic expression of living art. Literary excerpts can have different voices and characters, but must be fused together under a running theme. The concept explored in the program, "Contradictions of the Male Image," is the cultural construct of male gender and the differing perceptions of what it means to be male in our culture. Synthesizing prose by Gary Garrison, Alferd Lumbardo, and Loren Valrey; also poetry by Big Poppa E and Jack McCarthy, the speaker invites the audience to confront the silent struggle of the male as he reflects on imposing stereotypes and attempts to design his "masculinity."

The Effect of Alcoholism on Demographic Health

Karen Wadley (Department of Anthropology) John P. Ziker

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

The purpose of this research was to examine the effect of alcohol on the demographic health of a small-scale native society. The study was conducted with information gathered by Dr. John Ziker in Ust-Avam, Taimyr Region, Siberia. Due to economic and political changes in the 1990's, the native peoples of Siberia have experienced a rise in both unemployment and violent mortality. This is concurrent with a cycle of inactivity and periods of alcohol abundance leading to alcohol abuse and self-inflicted death that has been recorded by Bogoyavlinskii (1997), Pika (1993), and Ziker (2002). Rates of violent mortality in the community are checked against a series of independent variables in multiple regression analyses in order to test the relevance of hypothesized causal factors.

– Abstracts –

Adult Attachment, Gender, and Alcohol Use

Dale A. Wright (Department of Psychology) Diana M. Doumas

Alcohol abuse represents a significant problem on college campuses. While research indicates that interpersonal factors contribute to college drinking, the relationship between attachment and drinking is understudied. Further, although males are at risk for alcohol-related consequences, gender differences in the relationship between attachment and drinking have not been found. Thus, t he purpose of this study was to examine gender differences in the relationship between attachment and alcohol-related consequences. Questionnaires were completed by 457 undergraduates. Results of hierarchical multiple regression analysis revealed that the relationship between attachment and alcohol-related consequences was different for males and females. Specifically, consequences were related to a positive model of self or strong self-concept, for males and related to a negative model of self and other, or poor self-concept and avoidance of intimacy, for females. Clinical implications include targeting different interpersonal factors for males and females when designed prevention and intervention programs to decrease alcohol-related consequences.

Risk Factors for Alcohol Abuse: Adult Attachment, Athlete Status, and Gender

Dale A. Wright (Department of Psychology) Diana M. Doumas

Student athletes have been identified as an at-risk-group for heavy drinking. Although both peer influences and social context have been related to student alcohol use, little is known about the relationship between attachment and alcohol use, particularly in student athletes. Thus, the aim of the current study was to examine the relationship between attachment and alcohol use in student athletes and non-athletes. Questionnaires were completed by 250 freshmen. Results of hierarchical regression analyses indicated that for alcohol use the interaction between athlete status and attachment avoidance was significant. Specifically, for athletes, attachment avoidance was related positively to drinking, whereas for non-athletes, attachment avoidance was related inversely to drinking. In contrast, although athletes reported more alcohol-related problems than non-athletes, the relationship between alcohol-related problems and attachment was not different for athletes and non-athletes. Results indicate that targeting attachment avoidance may improve prevention efforts aimed at reducing of drinking for student athletes.

– Special Thanks –

Special Thanks

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A Look Back at Conference 2004

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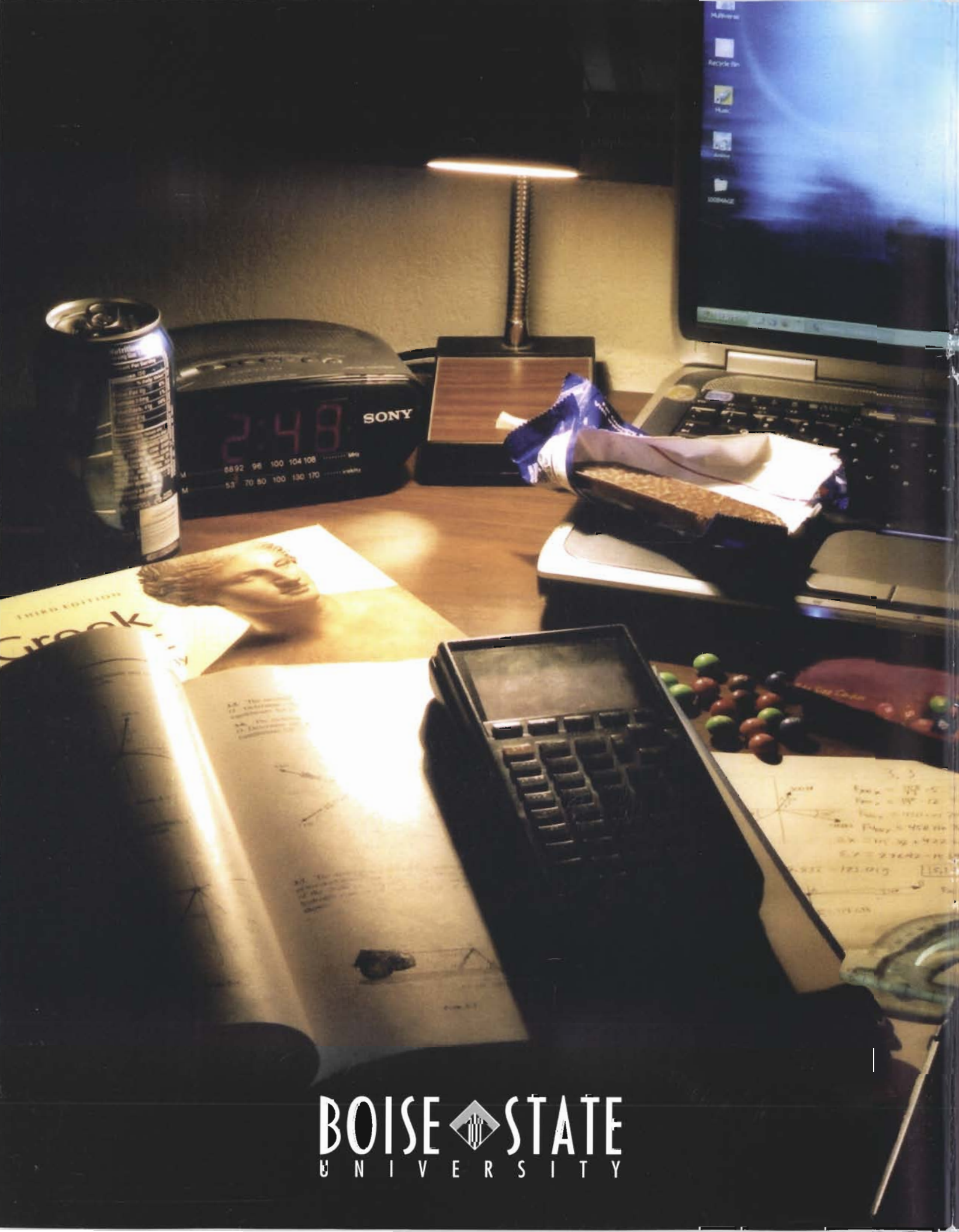
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