Center of Excellence for Faculty and Undergraduate Student Research Collaboration • 2003-2005

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Excellence. Our measure, our motto, our goal.

Scholarly Contributions 2003-2005
for Faculty and Undergraduate Student Research Collaboration
Center of Excellence
for Faculty & Undergraduate Student Research Collaboration

Scholarly Contributions 2003-2005

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University of Wisconsin-Eau Claire
ON THE COVER

Cover design by Sheila Pederson. The grid pattern was integrated into the design to represent not only the broad array of individuals and disciplines on campus, but also the multitude of concepts and variables being researched and analyzed. The larger squares represent the data, evaluations, and theories developed from the research. The listing of each academic department fades into multiple overlapping layers representing the depth and vastness of the academic disciplines offered on campus. The research photo chosen illustrates the human element, and the circular window surrounding the photo represents the encompassment of all ideas and disciplines related to university research. The colors chosen reflect the official University colors, blue and gold.
This edition of *Scholarly Contributions* of the Center of Excellence for Faculty and Undergraduate Student Research Collaboration demonstrates the broad array and quality of faculty/student collaborative research characteristic of the University of Wisconsin-Eau Claire. The 2003-2005 biennial volume documents more than 200 peer-reviewed journal articles and presentations at professional meetings with UW-Eau Claire undergraduate students as authors and co-authors. Included is the work of faculty and students from twenty-seven academic departments. In all cases a complete citation of the work is provided, and in most instances a published abstract is also included.

The UW System Board of Regents designated UW-Eau Claire as the Center of Excellence for Faculty and Undergraduate Student Research Collaboration in 1988. Through this Center we engage undergraduate students from all disciplines in collaborative research projects with faculty mentors. UW-Eau Claire is now a leading institution within the state and nation focusing on research in the undergraduate experience. It is recognized for its undergraduate research and creative projects both by the Council on Undergraduate Research and more recently in *U. S. News and World Report* “America’s Best Colleges 2006.” UW-Eau Claire is selected for this recognition with highly regarded private liberal arts colleges, private universities, and research intensive public universities.

Growth of the Center of Excellence testifies to the willingness of our faculty to engage students in this type of experiential learning. It speaks to excellence beyond the classroom and to an academically rich environment where faculty and undergraduate students engage in important scholarly pursuits. The research results reported in this volume contribute to the academic profession and to the professional literature in a broad array of academic disciplines.

Christopher T. Lind, Ph.D.
Director, Center of Excellence
The Center of Excellence for Faculty and Undergraduate Student Research Collaboration was established at UW-Eau Claire in 1988 by action of the Board of Regents of the University of Wisconsin System. This Center was built on a quarter century tradition of engaging students in collaborative research with faculty scholars and incorporating research into the undergraduate experience.

The goals of the Center include (1) enhancing the quality of undergraduate education by providing students with an opportunity to participate with faculty in research projects, (2) keeping the undergraduate curriculum vital and updated by incorporating the results of current research into the curriculum, (3) facilitating collaborative research among faculty and students representing diverse undergraduate programs in order to identify and address problems requiring multidisciplinary solutions, and (4) encouraging undergraduate students by way of their successful research to consider advanced studies in their disciplines.

The Center has provided students with an opportunity for “hands on” experience in research, presentation of results at the annual UW-Eau Claire Student Research Day, and encouragement to present findings at meetings of professional organizations.

Faculty/undergraduate student research collaboration will continue to be a hallmark of the undergraduate degree at UW-Eau Claire, and the Center of Excellence for Faculty and Undergraduate Student Research Collaboration will continue to support this faculty effort.

The Center operates three programs that provide grant support for faculty and students engaged in collaborative research. These programs include Faculty/Student Research Collaboration, Summer Research Experiences for Undergraduates, and Student/Faculty Travel for the Presentation of Research Results. In addition, an annual UW-Eau Claire Student Research Day is held during the spring semester to disseminate the results of faculty/student research collaborations.

The Center is funded largely with student differential tuition funds allocated for collaborative research. These student funds are augmented with support from the UW-Eau Claire Office of Research and Sponsored Programs, the UW System Undergraduate Initiative, the UW-Eau Claire Foundation, Inc., and other extramural funding sources.

Excellence: Our Measure, Our Motto, Our Goal!
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**ACCOUNTING AND FINANCE**

**WHY PLAY MILLIONAIRE? EFFECTS OF ACTIVE TEACHING ON STUDENT INTRINSIC MOTIVATION.** Ann Walker, undergraduate student, with D’Arcy Becker, faculty, same department. 

It is commonly accepted that teaching methods that are active and involve students in an engaging manner are essential to effective teaching. However, students have a variety of preferred learning styles, which means no single teaching method is appropriate and effective with all students. Students respond in unique and often unpredictable ways to different teaching methods, requiring instructors to use portfolios of teaching methods that cater to a broad set of students. The choice of teaching methods for a given set of course material may be simplified by the application of general principles such as those found in the Bonner (1999) framework. This study examines the choice among active teaching methods for an undergraduate course in Auditing based on the specific educational outcomes desired and the potential motivational impact on students. A Millionaire-style game was played, and student intrinsic motivation changes were monitored through surveys. Millionaire had short-term positive effects on student intrinsic motivation. In addition, the game had marginally significant impact on improving student quiz scores. Playing the Millionaire game encouraged students to reflect on their own knowledge, test themselves against the questions prior to a formal assessment, and discuss the course information in a unique forum.

**ADULT LEARNERS OF OJIBWEMOWIN AT UNIVERSITY OF WISCONSIN-EAU CLAIRE.** Tammy Goss, undergraduate student, with Lawrence Martin, faculty, same department. 

Adult Learners of Ojibwemowin at University of Wisconsin-Eau Claire attempted to establish the study skills, habits, and techniques of successful leaners of Ojibwemowin at the university setting. The primary target was to establish if group projects and team learning resulted in a more successful student of Ojibwemowin. This study showed that successful students did have a large set of learning skills and good study habits. They also participated in group meetings to help them learn, retain, and retrieve words in the Ojibwemowin language.

**FREDERIC BARAGA AND OJIBWE LITERACY.** Tammy Goss, undergraduate student, with Lawrence Martin, faculty, same department. 

During the late 19th century and early 20th century, there was a strong Ojibwe literacy movement. Frederic Baraga was the principle proponent of this literacy movement and his work was a major factor in the development of this phenomenon. His dictionary of the
Ojibwe language is still in print and being used, and his Ojibwe grammar is groundbreaking and has really only been replaced recently by J. Randolph Valentine’s *Ojibwe Grammar*. Less well-known are Baraga’s religious works in Ojibwe and Odawa. Particularly influential in the development of Ojibwe literacy was his prayer book (along with its collection of hymns in Ojibwe), which went through multiple editions. We will present information that we have gathered from these prayer books, which will show the following: Baraga’s orthography and its evolutionary changes, and changes in wording to explain abstract concepts. These changes show the constant refining Baraga did of his Ojibwe, in grammar and wording. We have examined several additions of these prayer books and there are significant changes, especially from the earliest works of 1837 to later editions that show Baraga’s growth in mastering Ojibwe and his interest in perfecting his translation of theological concepts into Ojibwe. We will discuss a number of the editions, the quantities printed and used, and Baraga’s use of these prayer books in the teaching to his parishioners and school children how to read and write Ojibwe.

**Art and Design**

**VISUAL CULTURE EDUCATION IN THE MIDDLE SCHOOL/HIGH SCHOOL ART CURRICULUM.** Melissa Mulvaney and Samantha Siker, undergraduate students, with Karen Horan, faculty, same department. *Wisconsin Association for Educators of Art Fall Conference, Milwaukee, WI, 31-31 Oct. 2003.*

In a society dominated by visual images and designed objects, this presentation will present three sample lessons that closely examine material culture from students’ everyday environments and contemporary art as inspiration for their own work.

**Biology**

**ANALYSIS OF ENTEROCOCCUS FAECALIS ISOLATE CONTAINING PHROMON-RESPONSIVE PLASMIDS ENCODING VANCOMYCIN RESISTANCE AND BACTERIOCIN PRODUCTION.** Cathy Pohl and Deanna Freidel, undergraduate students, with Sasha Shoush, faculty, same department. *North Central Branch of the American Society of Microbiology Meeting, Madison, WI, 11-13 Nov. 2004.*

*Enterococcus faecalis* 368 is a clinical isolate that is resistant to vancomycin (Vm'), gentamicin (Gm'), streptomycin (Sm'), tetracycline (Tc'), erythromycin (Em'), and kanamycin (Km') and produces a bacteriocin. The strain was of particular interest because of its ability to transfer the Vm' trait in response to pheromone signaling. The data indicate that strain 368 contains at least two different conjugative plasmids. One plasmid, designated pAM368, codes for VanA-type resistance and a response to the cAM373 pheromone. The other plasmid, designated pAM369, codes for Em'Gm'Km' and for the production of a bacteriocin, and encodes a response to the cCF10 pheromone. Both Tc' and Sm' traits are chromosomally located. Plasmid analyses suggest that pAM368 and pAM369 have sizes of approximately 107kb and 93kb, respectively. During filter-matings with *E. faecalis* FA2-2, Tc' transfer was detected at 10^6, Em', Gm', or Km' was detected at 10^3, and Vm' and Sm' were detected at 10^3 tranconjugants/recipient. Em'Gm'Km' tranconjugants (sensitive to other antibiotics) produced bacteriocin and responded to the sex-pheromone cCF10. Analysis
of the bacteriocin demonstrates that it is an extracellular protein with a molecular weight of 66KDa. It is heat labile, exhibiting bacteriostatic activity against *E. faecalis* (non-producer strain) over a wide pH range (pH=6-11).


Syrian hamsters held in continuous light exhibit circadian phase advances of about 2.5 hr after an abrupt transition to constant darkness in the middle of the subjective day. The transition induces little locomotor activity in the subsequent 3 hr, a period during which locomotion and waking are thought to be important in inducing phase shifts. We tested the hypothesis that adrenergic stimulation associated with arousal mediates the phase shifting effect of the transition. Systemic administration of the beta–adrenergic antagonist, propranolol (0.1-10mg/kg), which readily crosses the blood-brain barrier, caused a dose-dependent attenuation of phase shifts with a reduction of about 50% at the highest dose. There was no effect of propranolol on locomotion or waking in the 3 hr after the light-to-dark transition. Nadolol, a peripherally-acting beta-adrenergic antagonist, had no effect on phase shifts at doses up to 20mg/kg. The results support the hypothesis that central–adrenergic receptors mediate at least part of the phase-shifting effect of light-to-dark transitions. Furthermore, blockade of beta-adrenergic transmission does not appear to exert its attenuating effect on phase shifts by reducing locomotion.

**BODY WEIGHT AND CIRCADIAN CLOCK RESETING IN SYRIAN HAMSTERS.** Nick Cartwright and Jeral Dennis, undergraduate students, with Daniel Janik, faculty, same department. *Meeting of the Society for Research on Biological Rhythms, Vancouver, BC, 22-27 June 2004.*

Hamsters awakened in the day and allowed to exercise in a novel running wheel reset their circadian clock by about three hours if they run vigorously. About 50% of hamsters show this response. Previous work has shown that food restriction boosts the total amount of activity that hamsters show. We tested the idea that food restriction would lead to more running in a novel wheel and therefore more clock resetting. We selected animals that, under ad-lib feeding, were shown to be poor runners and resetters. When these animals were food restricted for 24 hours, they showed no increase in resetting, but did show an increase after 48 hours of food restriction. We further asked whether increased food intake decreases the amount of running and resetting shown by hamsters that were good runners and resetters under ad-lib feeding conditions. To do this, we fed these hamsters a high-calorie diet with a variety of foods that changed on a daily basis. This increased body weight by 10% over that of controls, but there was no decrease in running and resetting. These results suggest that the change in body weight associated with food restriction is not the critical factor in increasing running and clock resetting.

We have observed localized feeding aggregations of *Lytta sayi* (Coleoptera: Meloidae) on *Lupinus perennis* occupied by the federally endangered Karner blue butterfly *Lycaeides melissa samuelis* (Lepidoptera: Lycaenidae). We monitored a *L. sayi* aggregation and Karner blue butterfly behavior within a 1,020m² stand of lupine. Absolute counts of *L. sayi* were performed throughout the aggregation. Activity budgets of butterflies were conducted before and during the beetle aggregation. Visual estimates were made of lupine cover. Karner oviposition was monitored through locality of larval feeding damage. An aggregation of *L. sayi* formed and dispersed within 11 days. Three beetles were observed on day 1 with a maximum of 951 beetles by day 7. Over this period, the beetles ate 100% of the lupine flowers, 2% of lupine seeds, and no lupine leaves. In comparisons of Karner blue activity before and during the beetle aggregation, Karner males spent significantly less time on *P. simplex* and significantly more time flying during the beetle aggregation. Second flight Karner larval feeding damage was abundant throughout the site with the exception of the area that contained the most consistent concentration of *L. sayi* throughout the aggregation.

THE EFFECTS OF GROUP SIZE ON FEEDING AND AGGRESSIVE BEHAVIORS IN JUVENILE SALMONIDS FROM A LAKE SUPERIOR TRIBUTARY.

Carissa A. Pannell, undergraduate student, with David Lonzarich, faculty, same department.

*Tri-Best Northcentral District Convention, Green Bay, WI, 23 April 2005.*

In this study, we examined the effects of school size on aggressive and foraging behavior in juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) from the Cranberry River, Wisconsin. For both species, aggression (attacks against conspecifics) and feeding behavior (strikes on drift or benthic food) increased with group size, and for all comparably sized groups, steelhead were much more aggressive and more active foragers than coho salmon. For coho salmon, which occurred in larger groups than steelhead, we also found that aggression and feeding dropped sharply beyond group sizes of 12 fish, producing a parabolic relationship between group size and behavior. We also generated estimates of territory size in coho salmon and found a strong positive relationship with group size. Group size showed remarkable variability across habitat types, with the largest groups occurring much more often in stream habitats lacking cover. Fish in simple habitats were three times more aggressive than those in the complex habitats and fed significantly less often as well. These habitat-specific differences were maintained even when correcting for differences in group size between habitat-types. Our study serves as one of the few field tests concerning the effects of group size on foraging and aggression in fishes, and on the whole yielded results that were consistent with theoretical expectations.

EVALUATION OF A HABITAT CONSERVATION AND RESTORATION PLAN FOR THE KARNER BLUE BUTTERFLY IN WISCONSIN. J. M. Sporrong and C. Raebel, undergraduate students, with Paula Kleintjes, faculty, same department, and S. F. Thon, Wisconsin Department of Natural Resources.


Due to recent growth in residential construction along lakeshores (Engel and Pederson 1998), the Wisconsin Department of Natural Resources has taken a keen interest in promoting the ecological restoration of shorelines and their adjacent shore lands in order to protect and improve water quality as well as aquatic and terrestrial wildlife habitat. To that end, the agency has supported projects that encourage and teach landowners how to restore their Shoreland property to a more natural condition. Here, we describe an experiment that we carried out at a Shoreland demonstration site. The purpose of the demonstration was to educate the public and showcase the aesthetic qualities of native vegetation. We also wanted to experimentally test the efficacy of two types of site preparation (black plastic, herbicide treatment followed by tilling) and two planting treatments (hand seeding and planting with seedlings).


Little documentation exists to confirm that butterflies use the woody shrub *Potentilla fruticosa* (shrubby cinquefoil) as a nectar plant, and reviews by other Lepidopterists have cast doubt as to whether the plant provides nectar. During the summer of 2004, we observed 59 individual butterflies belonging to 11 species nectaring on *P. fruticosa* in the Jemez Mountains, New Mexico. Butterflies spent 53% of total observed nectaring time on *P. fruticosa* while it composed 26% of total blooming forb availability (out of 17 species). Analysis (anthrone method) of *P. fruticosa* nectar samples indicated presence of carbohydrates. There were significantly more carbohydrates (i.e., nectar) in flowers (n=68) excluded from nectivores (26.83±1.35 μg/2ml) vs. available (n=63) to nectivores (6.71±1.40 μg/2ml), and carbohydrate levels were significantly higher later in the sampling season (two-way ANOVA with repeated measures, p<0.05).

**LOCOMOTOR ACTIVITY AND CIRCADIAN ENTRAINMENT TO A SHORT PHOTOPERIOD.** Justin Frey and Molly Ferron, undergraduate students, with Daniel Janik, faculty, same department. *Meeting of the Society for Research on Biological Rhythms, Vancouver, BC, 22-27 June 2004.*

We examined the effect of running activity on circadian rhythms of hamsters in a short (6h light: 18h dark) photoperiod. Hamsters in this light cycle begin five to six hours following darkness onset. We shifted hamsters’ nightly activity onset to within two hours of darkness onset by allowing them to exercise soon after lights out. After their circadian rhythm had stabilized at the new earlier phase, we took away their exercise wheels for 28 days and continued to monitor their circadian activity rhythm with passive infrared detectors. The activity rhythm of these animals shifted about one and half hours back toward the original pre-novel wheel stimulus onset and shifted forward again when the wheels were returned. The results indicate that the animals’ own daily activity plays an essential role in circadian stabilization.
Local vegetation structure, habitat geometry, and the quality of the surrounding landscape can affect bird diversity, but rarely have all of these factors been simultaneously addressed. Furthermore, we know of no cases where structural equation modeling has been used to assess the independent effects of these factors. We mapped the main vegetation units (habitat patches) in a 1,200 ha mosaic of bottomland hardwood forest, oak forest, oak savannah, prairie, and shrub thicket in western Wisconsin and conducted four replicate breeding bird counts at 90 sampling points (from late May to early July). Vegetation data included measurements of cover, structural complexity, composition, and diversity. We used GIS to determine patch geometry (area, area-perimeter ratio, distance to edge), and surrounding landscape context (surrounding habitat diversity at five scales). In general, standardized richness (species richness divided by the log of the number of detections) increased with vegetation cover and evenness, with bird abundance, and with landscape diversity. We used structural equation modeling to determine the independent effects of four latent variables on standardized richness: landscape diversity, patch geometry, local vegetation, and bird abundance. The final structural equation model explained 33% of the variation in standardized richness. Vegetation and bird abundance independently had twice the effect of landscape factors, while habitat geometry was not significant. Landscape diversity and evenness within a 200 m radius (about 12.6 ha) had the strongest effects on bird richness, and this suggests a possible critical scale for birds in this system.

In order to investigate how scale (grain size) affects the relationships between species richness and environmental drivers (such as stress and disturbance), we collected 12 nested quadrats (from 0.25 m$^2$ to 1023 m$^2$) from seven remnant oak savannas located in the floodplain of the Chippewa River in western Wisconsin, USA. Large and small-scale richness were not significantly correlated, suggesting that small-scale richness is not strongly controlled by sampling effects of the local species pool. Linear and curvilinear regressions between species richness and disturbance, canopy cover, biomass, and soil organic matter were dependent on sampling scale (grain size). Disturbance by fire was strongly related to richness at small scales, while tree canopy cover was strongly related to richness at larger scales. While there was some evidence suggesting the transition from disturbance to canopy effects occurs between 10 and 100 m$^2$, the transition was not particularly abrupt. The results cast doubt on the general importance of local species pools in affecting small-scale richness as well as our ability to make generalizations that do not explicitly include scale.
Analyses of carbon isotopic ratios in concomitant bulk sediment samples and fossil grass epidermal fragments from Lake Bosumtwi, Ghana, demonstrate that both records reflect paleohydrologic variability. However, the bulk sediment signal is dominated by within-lake processes, whereas the fossil grass epidermal record provides the terrestrial vegetation response to changes in available moisture. The direction of change is similar, but the magnitude and timing of response are different. During the terminal Pleistocene, the aquatic record shows a dramatic, flip-flop behavior (bulk sediment $\delta^{13}C$: “4 to “32‰), while the terrestrial grass epidermis record is much more muted (st $\delta^{13}C$ shifts from “11 to “15‰). Furthermore, during the transition to the relatively moister conditions of the Holocene, a dominance of C₄ plants persisted for at least 800–1,000 years after limnological changes began. On the other hand, the epidermal isotopic record shows a much more dramatic response than that provided by the bulk sediment to the onset of drier, more seasonally contrasted conditions during the late Holocene. These results emphasize the need to consider varying response times of the biogeochemical systems that control the production of proxies, especially when attempting to correlate widely separated records based upon fundamentally different proxies.


Spores and tetrads identified as Cymbosporites echinatus were extracted from Lower Devonian sediments from the Woodbury Quarry, Herefordshire, England. The spores are patinate (possessing a much thicker distal than proximal wall) but their plant affinities are not known. No in situ patinate spores have been reported. As the term suggests, patinate spores are presumed to have a thicker distal wall due to the addition of an outer layer (a “patina”) to an inner. Ultrastructural studies support this interpretation, with the structure of the thin inner layer being homogeneous to faintly lamellate, and the “patina” consisting of homogeneous and spongy regions. The patina covers the entire distal surface and the outer edge of the contact face. This pattern of deposition is reminiscent of that seen in older cryptospore dyads. Suture morphology is unusual and variable. Serial sectioning and single grain SEM/TEM preparatory techniques help unravel the complexities of suture morphology, but have yet to shed much light on the affinities of the parent plants.


In vitro determination of minimum inhibitory concentrations (MICs) of gentamicin, cefazolin, and clindamycin, alone and in combination with iohexol against laboratory strains of Eschericia coli B, Staphylococcus aureus, and Staphylococcus epidermidis. Objective: To study the effects of iohexol on the efficacy of gentamicin, cefazolin, and clindamycin. Summary of Background Data: Prophylactic antibiotics have been advocated to prevent
discitis following discography. Intravenous cefazolin administered before discography has been shown to penetrate the intervertebral disc. However, the use of systemic antibiotics for prophylaxis may lead to bacterial resistance. Intradiscal antibiotic administration is an attractive alternative to systemic antibiotic prophylaxis before discography, but there is no data documenting the efficacy of commonly used antibiotics in the presence of iohexol. 

Methods: MICs were determined by adding standard concentrations of bacteria to serial dilutions of antibiotic with and without the addition of iohexol in Todd-Hewitt Broth medium. MICs were determined as the lowest concentration well that demonstrated inhibition of cell growth. Results: Gentamicin, cefazolin, and clindamycin remain efficacious in the presence of iohexol. MICs were lower for cefazolin and gentamicin than for clindamycin. Iohexol alone also demonstrated some inhibition of cell growth. Conclusion: This study supports the use of intradiscal antibiotics for prophylaxis of disc space infection during discography. Intradiscal placement of antibiotic should obviate the need for systemic antibiotic prophylaxis and its attendant risk of generating antimicrobial resistance.


The objective of this study was to evaluate the response of species from different functional groups to species richness, atmospheric CO$_2$ concentration, and increased soil N in terms of biomass, photosynthesis, and related traits. We hypothesized that species performance in multi-species plots depends on their functional attributes and the length of time interacting with co-occurring species. We measured leaf net photosynthetic rates and biomass production across six years for Lupinus perennis (N-fixer), Andropogon gerardii (C4 grass), Bromus inermis (C3 grass), and Achillea millefolium (forb) grown in monoculture and 16-species mixtures. Bromus and Achillea showed lower photosynthetic rates in mixtures compared to in monoculture consistently across all years. However, the response of Lupinus and Andropogon changed over time. Initial stimulation of Lupinus photosynthesis in mixtures compared to in monoculture (+56%) declined until year six when rates in mixtures were 9% lower. Conversely, 65% higher photosynthesis in Andropogon grown in monoculture vs. mixture diminished to no difference by year six. Biomass and leaf nitrogen data further elucidate mechanisms involved in species responses to interspecific interactions. The results suggest that the role of species with unique functional attributes may change under elevated CO$_2$ and altered N conditions.


New multi-proxy data from Lakes Edward, George, and Kyoga, East Africa document significantly reduced lake levels between 1,000 and 750 cal. years before present (BP).
the shallow lakes basins of George (central basin) and Kyoga, evidence for aridity is provided by a distinct desiccation surface of gray mottled clay with organic matter content below 20% and water content values of 60%, both well below typical values for the biogenic oozes that overlie these surfaces. Dates from these surfaces suggest that they may be linked to geochemical evidence for increased aridity around Lake Edward, which is hydrologically connected to Lake George. In Lake Edward sediments, a large positive spike in the % Mg in inorganic calcite occurs from 940 to 790 cal. years BP. The timing of all these events, particularly in the Edward record, corresponds closely with the Grand Solar Maximum and supports solar forcing of increased aridity in tropical East Africa at this time. Following this period of aridity, sedimentological evidence and biogenic silica profiles from George and Kyoga indicate that both basins supported a shallow marsh prior to a return to open water conditions dominated by non-silicic algal populations.


Cytokine antibody arrays were used to establish cytokine release profiles from THP-1 monocytic cells exposed to different Amphotericin B (AMB) drug delivery systems. Fungizone (FZ) and Amphotec (ABCD) caused release of significantly more inflammatory molecules and to higher levels than either AnBisome (L-AMB) or Abelcet (ABLC) after six hours of treatment. Specifically, TNF-a, IL-8, Gro, MCP-1, RANTES, IL-10, and IL-6 were detected and semi-quantified using a chemiluminescence imaging system. TNF-a, IL-8, and MCP-1 were the most predominant; however, little if any TNF-a was present in ABLC or L-AMB treated cultures. TNF-a and IL-8 levels determined by quantitative ELISA correlated with the relative cytokine levels measured using the antibody arrays. Although viabilities of THP-1 monocytes were similar in all AMB treated cultures by trypan blue exclusion, lactic dehydrogenase (LDH) release was significantly greater in FZ and ABCD cultures than in L-AMB or ABLC cultures indicating more membrane perturbations with those formulations. These results may help provide rationales for the side effects observed with FZ and ABCD and the reduced side effects observed with L-AMB and ABLC. We are continuing to establish AMB-induced cytokine profiles from THP-1 monocytes and the other cells including macrophages, T-lymphocytes, and endothelial cells.


One of the chief problems with studying cholesterol trafficking and liquid-ordered...
cholesterol-rich microdomains in real time is the lack of probes for these domains. Current visualization methods range from fluorescence of the highly toxic and fade-prone cholesterol binding agent filipin to complicated, time consuming and membrane impermeant protein labeling methods using cholera toxin B (CTB) subunit or other lipid binding protein. The cholera toxin kits in particular may create an artificial permanent clustering by antibody cross-linking, which may not reflect the plasticity of these domains. We have developed a new probe, Seppo, which has many advantages over current methods. Seppo is highly fluorescent, non-cytotoxic, and rapidly taken up by cells at 200 nM or less. It accumulates in bright punctate domains and perinuclear domains which colocalize with CTB. Seppo has purple/blue excitation, green emission (530 nM max), a large Stoke’s shift, high quantum yield and exhibits very little self-quenching.

CHEMISTRY

3,4-DISUBSTITUTED-3, 4-DIHYDRO-2(1H)-QUIONOLONES. Jessica Walters and Glen Gullickson, undergraduate students, with David Lewis, faculty, same department. 228th American Chemical Society National Meeting, Philadelphia, PA, 22-26 Aug. 2004.

The reaction of N-phenylamides and two equivalents of butyllithium in THF at 0 degrees C gives the corresponding dilithiated species, which then reacts with aldehydes to give the corresponding aldehydes as a mixture of syn and anti isomers. The anti isomer usually crystallizes from the crude reaction mixture in modest yields. Intramolecular Friedel-Crafts cyclization of these anilides occurs in refluxing formic acid to give the corresponding dihydroquinolones as a 3:2 mixture of E and Z isomers. Where the intermediate cation is exceptionally stable, the conjugated, open-chain amide is the only product obtained. When the two steps are combined in a single pot, yields of the mixed dihydroquinolone stereoisomers rise to 60% or higher. The aldol addition and the cyclization will be discussed.


The catalytic properties of metalloporphyrins are improved by bromination or chlorination at the beta-positions. As part of a research program concerning the synthesis of catalysts for azo dye degradation, a literature method for the halogenation of aromatic amines was used in the bromination of nickel tetraphenylporphyrin (NiTPP). The reaction was easily monitored by UV-visible spectroscopy, and clean conversion to octabromotetraphenylporphyrin was verified by NMR. A variety of metalloporphyrins were brominated using slight modifications of the method. The successes and failures of the method will be reported along with detailed experimental conditions and yields.


The membrane-active antifungal agent amphotericin B (AmB) is one of the few agents shown to slow the course of prion diseases in animals. Congo Red and other small mol-
ecules have been reported to directly inhibit amyloidogenesis in both prion and Alzheimer peptide model systems via specific binding. We propose that it is possible that AmB may act similarly to physically prevent conversion of the largely alpha-helical prion protein (PrP) to the pathological beta-sheet aggregate protease-resistant isoform (PrP(res)) in prion disease and by analogy prevent fibrillization in amyloid diseases. To assess whether AmB is capable of binding specifically to amyloid fibrils as does Congo Red, we have used the insulin fibril and Abeta 25-35 amyloid model fibril system. We find that AmB does bind strongly to both insulin (K(d) = 1.1 microM) and Abeta 25-35 amyloid (K(d) = 6.4 microM) fibrils but not to native insulin. Binding is characterized by a red-shifted AmB spectrum indicative of a more hydrophobic environment. Thus AmB seems to have a complementary face for amyloid fibrils but not the native protein. In addition, AmB interacts specifically with Congo Red, a known fibril-binding agent. In kinetic fibril formation studies, AmB was able to significantly kinetically delay the formation of Abeta 25-35 fibrils at pH 7.4 but not insulin fibrils at pH 2.

CHROMIUM(II) AND CHROMIUM(III) COMPLEXES OF TRIS(2-PYRIDYLMETHYL)AMINE: SYNTHESIS, STRUCTURES, AND REACTIVITY. Nicholas Robertson, undergraduate student, with Michael Carney and Jason Halfen, faculty, same department.


This report describes the synthesis, structural characterization, and polymerization behavior of a series of chromium(II) and chromium(III) complexes ligated by tris(2-pyridylmethyl)amine (TPA), including chromium(III) organometallic derivatives. For instance, the combination of TPA with CrCl(2) yields monomeric (TPA)CrCl(2) (1). A similar reaction of CrCl(2) with TPA, followed by chloride abstraction with NaBPh(4) or NaBAr(F)(4) (Ar(F) = 3,5-(CF(3))(2)C(6)H(3)), provides the weakly associated cationic dimers [(TPA)CrCl][BPh(4)](2) (2A) and [(TPA)CrCl][BAr(F)(4)](2) (2B), respectively. X-ray crystallographic analysis reveals that each chromium(II) center in 1, 2A, and 2B is a tetragonally elongated octahedron; such Jahn-Teller distortions are consistent with the observed high spin (S = 2) electronic configurations for these chromium(II) complexes. Likewise, reaction of CrCl(3)(THF)(3) with TPA, followed by anion metathesis with NaBPh(4) or NaBAr(F)(4), yields the monomeric, cationic chromium(III) complexes [(TPA)CrCl(2)][BPh(4)] (4A) and [(TPA)CrCl(2)][BAr(F)(4)] (4B), respectively. Treatment of 4A with methyl and phenyl Grignard reagents produces the cationic chromium(III) organometallic derivatives [(TPA)Cr(CH(3))(2)][BPh(4)] (5) and [(TPA)CrPh(2)][BPh(4)] (6), respectively. Similar reactions of 4A with organolithium reagents leads to intractable solids, presumably due to overreduction of the chromium(III) center. X-ray crystallographic analysis of 4A, 5, and 6 confirms that each possesses a largely undistorted octahedral chromium center, consistent with the observed S = (3)/(2) electronic ground states. Compounds 1, 2A, 2B, 4A, 4B, 5, and 6 are all active polymerization catalysts in the presence of methylalumoxane, producing low to moderate molecular weight high-density polyethylene.

GOT THE CONFOCAL BLUES? TOWARD A ROBUST SERIES OF ORGANELLE-SPECIFIC FLUORESCENCE PROBES. Damon Campbell, Elizabeth Ott, Rachel Nauss, Kristy McNitt, Nicholas Deprez, and Lori Scardino, undergraduate students, same department, with Scott Hartsel and David Lewis, faculty, same department.
A chief problem of Confocal and epifluorescence microscopy is the rapid fading of organelle-specific probes. Anti-fade agents may be used, but they are often toxic and not usable with live cells. We have synthesized a robust series of organelle-specific fluorescence probes based on the naphthalimide fluorophore. We have compared a designed lysosome specific naphthalimide, LT1, to commercially available lysosome probes. In experiments using live (and fixed) THP-1 monocyte, LT1 is fade resistant by more than an order of magnitude in comparison to commercial lysosome probes, shows co-localization with commercial probes, has low toxicity, is fixable, and can be used at concentrations of 50-100 nanomolar. The probe is excitable by either the argon 488nm line or by blue or violet excitation filters. We find that LT1 has a large Stoke’s shift, high quantum yield, and exhibits very little self-quenching, which ought to make it possible to design membrane potential sensing probes.

**HOMOALLYLIC ALCOHOLS BY THE BARBIER-GRIGNARD REACTION.**


First reported in 1900, the Grignard reaction is a modification of the earlier Barbier reaction, in which the alkyl halide and carbonyl compound were heated together with magnesium under an inert atmosphere. Subsequently, Barbier and Grignard found that the presence of ether as a solvent accelerated the reaction dramatically. When one is dealing with reactive alkyl halides, the Wurtz coupling of the alkyl halide often becomes a major reaction. This is especially true for allyl and benzyl halides: allylmagnesium bromide, for example, must be formed at low temperature and under conditions of low concentration to avoid the formation of 1,5-hexadiene as the major, or even sole product of the reaction. We have found that the Barbier-Grignard reaction between allyl bromide and carbonyl compounds is an especially convenient method for the synthesis of homoallylic alcohols, but that this reaction is limited in that it fails with benzyl halides and with nitriles. The scope and limitations of the reaction will be discussed.

**IR SPECTRA OF CH$_3$CN-BF$_3$ IN SOLID NITROGEN: IMPLICATIONS OF MATRIX EFFECTS ON STRUCTURE AND BONDING.** Christopher Knutson and **John Wrass**, undergraduate students, with **James Phillips**, faculty, same department.


The structure and bonding of CH$_3$CN-BF$_3$ has been shown to be remarkably sensitive to chemical environment, as demonstrated via large differences between gas and crystal phase structures, as well as substantial shifts of vibrational bands across several media. Recently, we have observed 4 IR bands of CH$_3$CN-BF$_3$ in a nitrogen matrix at approximately 10K. For the parent isotopomer (CH$_3$CN-$^{13}$BF$_3$) we have observed the CN stretch at 2367cm$^{-1}$, the BF$_3$ symmetric bend (or “umbrella mode”) at 617 cm$^{-1}$, the BF asymmetric stretching mode at 1235cm$^{-1}$, and BF symmetric stretching mode at 834cm$^{-1}$. All are shifted markedly from both those measured for the pure solid as well as those calculated for the two minimum energy gas phase structures. They are even shifted somewhat from those measured in solid argon, implying that solid N$_2$ has a significantly greater stabilizing effect.
KINETIC STUDIES OF AZO DYE OXIDATION BY PEROXIDASE ENZYMES.
Beverly Piggott, Miranda Lange, and Anthonia Arikawe, with Marcia Miller-Rodeberg, faculty, same department.

Azo Dyes are a class of compounds used extensively in the textile, printing, and paper making industries. Because azo dyes are recalcitrant to natural degradation, they visibly contaminate waterways and industrial waste streams for extended periods of time. One possible method for remediation of these pollutants is through the use of peroxidases. Peroxidases are promiscuous heme enzymes that catalyze the oxidation of hydrogen peroxide into water. Azo dyes are oxidized by several different peroxidases, but with exceedingly low turnover numbers relative to standard peroxidase substrates. The objective of this research project is to elucidate the chemical mechanism of azo dye oxidation as catalyzed by peroxidases. The results of steady state and transient kinetic studies of the oxidation of specific azo dyes by three peroxidase enzymes, namely horseradish peroxidase, cytochrome c peroxidase, and B. fuscum catalase/peroxidase, a novel bacterial enzyme, will be presented.

LOWEST N,PI* TRIPLET STATE OF 2-CYCLOPENTEN-1-ONE: CAVITY RINGDOWN ABSORPTION SPECTRUM AND RING-BENDING POTENTIAL-ENERGY FUNCTION. Nathan Pillsbury (primary co-author), undergraduate student, with Stephen Drucker, same department, Jaebum Choo, Hanyang University, South Korea, and Jaan Laane, Texas A&M University.

The room-temperature cavity ringdown absorption spectra of 2-cyclopenten-1-one (2CP) and deuterated derivatives were recorded near 385 nm. The very weak (e < 1 M⁻¹ cm⁻¹) band system in this region is due to the T₁ <S₀≥ electronic transition, where T₁ is the lowest-energy (n,π*) state. The origin band was observed at 25,963.55(7) cm⁻¹ for the undeuterated molecule and at 25,959.38(7) and 25,956.18(7) cm⁻¹ for 2CP-5-d₁ and 2CP-5,5-d₂, respectively. For the –d₀ isotopomer, about 50 vibronic transitions have been assigned in a region from –500 to +500 cm⁻¹ relative to the origin band. Nearly every corresponding assignment was made in the –d₂ spectrum. Several excited-state fundamentals have been determined for the d₀/d₂ isotopomers, including ring-twisting (ν₂₉ = 238.9/227.8 cm⁻¹), out-of-plane carbonyl deformation (ν₂₈ = 431.8/420.3 cm⁻¹), and in-plane carbonyl deformation (ν₁₉ = 346.3/330.2 cm⁻¹). The ring-bending (ν₃₀) levels for the T₁ state were determined to be at 36.5, 118.9, 213.7, 324.5, and 446.4 cm⁻¹ for the undeuterated molecule. These drop to 29.7, 101.9, 184.8, 280.5, and 385.6 cm⁻¹ for the –d₂ molecule. A potential-energy function of the form V=ax⁴+bx² was fit to the ring-bending levels for each isotopic species. The fitting procedure utilized a kinetic-energy expansion that was calculated based on the structure obtained for the triplet state from density functional calculations. The barrier to planarity, determined from the best-fitting potential-energy functions for the –d₀, –d₁, and –d₂ species, ranges from 42.0 to 43.5 cm⁻¹. In the T₁ state, electron repulsion resulting from the spin flip favors nonplanarity. The S₀ and S₁ states have planar structures that are stabilized by conjugation.
NEW CHROMIUM COMPLEXES FOR ETHYLENE Oligomerization:
EXTENDED USE OF TRIDENTATE LIGANDS IN METAL-CATALYZED
OLEFIN POLYMERIZATION. Danah Holman and Colleen O’Rourke, undergraduate
students, with Michael Carney and Jason Halfen, faculty, same department.

A family of chromium complexes bearing tridentate pyridine-based ligands are dis-
closed as highly active precatalysts for the oligomerization of ethylene. The ligands are
comprised of two distinct types: Type 1, in which both ketone groups of 2,6-diacetylpyridine
are converted to imines to produce pyridine bisimine NNN ligands; and Type 2, in which
only one ketone group of 2,6-diacetylpyridine is condensed with an aniline derivative to
give monoimine NNO coordination sets. Ligands of either type are coordinated to
chromium(II) or chromium(III) chlorides, and activation of the resultant complexes with
methylaluminoxane (MAO) produces highly active ethylene oligomerization and polymer-
ization catalysts. Catalysts of Type 1 (NNN set) generally produce 1-butene when only two
ortho alkyl substituents are present, but switch to making waxes or polyethylene when the
size and/or number of the ortho substituents are increased. Catalysts of Type 2 (NNO set)
produce waxes and polyethylene under all of the substitution patterns studied. The butene-
producing catalysts can make 1-butene with 99.5+% purity, and the wax-producing cata-
lysts make highly linear to moderately branched waxes, depending on the presence of an a-
olefin comonomer.

OCTAHEDRAL CHROMIUM(III) COMPLEXES SUPPORTED BY BIS(2-
PYRIDYLMETHYL)AMINES: LIGAND INFLUENCE ON COORDINATION
GEOMETRY AND ETHYLENE POLYMERIZATION ACTIVITY. Nicholas
Robertson, undergraduate student, with Michael Carney and Jason Halfen, faculty,
same department.

This report describes the synthesis, structural characterization and polymerization beh-
vavior of a series of chromium(III) complexes supported by bis(2-pyridylmethyl)alkylamine
(BPA) ligands. The compounds are prepared in high yield by room temperature reaction of
the appropriate BPA ligand with CrCl$_3$(THF)$_3$. X-ray crystallographic studies reveal that
the complexes’ coordination geometries depend on the substituent at the 6-position of the
pyridine ring. Unsubstituted ligands yield fac-\{N-propyl-N,N-di-(2-
pyridylmethyl)amine\}CrCl$_3$ (6A) and fac-\{N-hexyl-N,N-di-(2-pyridylmethyl)amine\}CrCl$_3$
(6B), whereas 6-methyl substituted ligands produce mer-\{N-propyl-N,N-di-(6-methyl-2-
pyridylmethyl)amine\}CrCl$_3$ (6C) and mer-\{N-hexyl-N,N-di-(6-methyl-2-
pyridylmethyl)amine\}CrCl$_3$ (6D). Moreover, ethylene polymerization studies indicate that,
on activation by methylalumoxane, the fac derivatives are 30 - 40 times more active than
their mer counterparts.

SITE-SELECTIVE FLUORESCENT PROBES FOR CELLS AND OR-
GANELLES. Kristy McNitt, Grant Sormunen, Lori Scardino, and Elizabeth Ott,
undergraduate students, with Scott Hartsel and David Lewis, faculty, same department.
229th National Meeting of the American Chemical Society, San Diego, CA, 13-17 March
2005.

The use of fluorescence has revolutionized the study of a wide range of biological
processes, including cellular metabolism. The key to using fluorescence for screening of
drug candidates, for example, at the cell culture level is to ensure that the fluorescent probe is highly specific for the target, and this is often accomplished by conjugation to a target-specific adjuvant. We have developed several simple naphthalimide dyes that have shown excellent localization characteristics in organelles (e.g. lysosomes) and membrane domains (e.g. high-cholesterol microdomains), and which show superior bleach resistance. The synthesis of these dyes, and their localization will be discussed, as will progress towards the development of new dyes for localization in other subcellular organelles (e.g. mitochondria).

**STRUCTURE, BONDING, AND VIBRATIONAL FREQUENCIES OF HALOACETONITRILE-BF$_3$ COMPLEXES: SOLID-STATE IR SPECTRA, CRYSTAL STRUCTURES, AND COMPUTATIONS.** John Wrass and Christopher Knutson, undergraduate students, with James Phillips, faculty, same department.


Nitrile-boron trifluoride complexes are now well known for their remarkable structural chemistry. Specifically, structures suggest that the B-N bonds are intermediate between bonding and non-bonding interactions. Furthermore, there are large structural differences between the gas and solid state. We have prepared F-CH$_2$CN-BF$_3$, Cl-CH$_2$CN-BF$_3$, Br-CH$_2$CN-BF$_3$, and I-CH$_2$CN-BF$_3$, and crystal structures all have B-N distances around 1.6 Å, much like solid state CH$_3$CN-BF$_3$. Also, we have conducted an extensive computational study of these complexes, using the B3LYP method with basis sets ranging from 6-31G* to 6-311+G**. The results from these calculations are fairly consistent with B-N distances around 2.5 Å and N-B-F angles of about 93°. Also of note, all are bent slightly about the B-N-C linkage. These calculated structures, however, differ dramatically from the measured solid-state structures. For example, the calculated B-N distance for F-CH$_2$CN-BF$_3$ is 2.44 Å, while the solid-state is only 1.65 Å. Consequently, the measured vibrational frequencies from argon matrix experiments will be discussed in the context of this medium-dependent structural chemistry.

**SUPRAMOLECULAR LIQUID CRYSTALLINE POLYMERS BASED ON FUNCTIONALIZED AZOPYRIDINES.** Don Rogness, Paul Riedel, and Larry David, undergraduate students, with Kurt Wiegel, faculty, same department.

*San Diego American Chemical Society Meeting, San Diego, CA, 12-16 March 2004.*

A series of azopyridine-based supramolecular polymers have been synthesized. These polymers are made with differing lengths of ethyleneglycoxy spacer groups. These polymers display characteristic liquid crystalline phases and also show a modulation of the liquid crystalline to crystal transition in the cooling cycle. Similar results were observed in our laboratories with supramolecular networks. The azo functionalities in these molecules will be photoirradiated with UV light to induce an e to z transition and alter the molecular shape from a calamitic to a banana shape.

**SYNTHESIS AND FLUORESCENT PROPERTIES OF NEW TROGER’S BASES.** Kristy McNitt and Nicholas Deprez, undergraduate students, with David Lewis, faculty, same department, and Robert Brown, University of Glamorgan, UK.

Troger’s bases (methanodibenzodiazocines) have attracted a great deal of interest since their first synthesis in 1887. We have prepared a series of fluorescent Troger’s bases containing the naphthalimide fluorophore treatment of N-alkyl-4-amino-1, 8-naphthalimides with formalin and concentrated hydrochloric acid in ethanol. Depending on the reactant, this reaction gives a seco-Troger’s base when the reaction is carried out at ambient temperatures, and the Troger’s base when the reaction is carried out at elevated temperature. These dimeric naphthalimides exhibit solvent-dependent fluorescent behavior which involves, inter alia, a reduction in fluorescence quantum yields by up to two orders of magnitude in polar solvents compared to cyclohexane. The synthesis and photophysics of these dimeric naphthalimide dyes will be discussed.


A series of new monomers have been synthesized containing highly conjugated hydrocarbon segments. These monomers have been synthesized through Suzuki palladium based coupling reactions using (4-vinlyphenyl) boronic acid. From these reactions, ter- and quaterphenyl divinyl species have been synthesized as well as two naphthyl derivatives. These have been synthesized in good yields and are easily purified. These molecules will be used as comonomers in chain growth polymers, included into siloxanes through hydrosilation reactions and further polymerizations. The extended conjugation of these molecules could produce an interesting fluorescence effect under both long and short UV light.


Despite their photochemical importance, molecular triplet states have received relatively little attention in spectroscopic studies. This is primarily due to the challenge of detecting the spin-forbidden \( T_n \leftarrow S_0 \) transitions. To meet the challenge, we have implemented cavity ringdown (CRD) spectroscopy, a high-sensitivity absorption technique, in our studies of photochemically relevant triplet species. In this article we outline the sensitivity requirements for observing singlet–triplet transitions and show how CRD detection achieves the needed sensitivity. We also specify the construction and operating details we used to set up the CRD spectroscopy system in our laboratory. Finally, we review investigations from our laboratory and others that have exploited the sensitivity of CRD detection to obtain triplet data that was not previously available. These studies include measurement of vibronically resolved \( T_n \leftarrow S_0 \) spectra of some cyclic enones and conjugated hydrocarbons.


Vinylamine is a transient compound that can be produced pyrolytically from various small precursor amines. The ultraviolet spectrum of pyrolyzed cyclobutylamine was recorded using a commercial spectrophotometer. A vibronically resolved band system was
observed and assigned to a vinylamine low-lying Rydberg transition. This is the first reported spectroscopic study of vinylamine in an electronic excited state.

**VIBRATIONAL FREQUENCIES OF H$_3$N-SO$_2$ AND H$_3$N-SO$_3$: IMPLICATIONS FOR MATRIX EFFECTS ON STRUCTURE AND BONDING.** Christopher Knutson, undergraduate student, with James Phillips, faculty, same department. *5th Annual UW-System Symposium for Undergraduate Research and Creative Activity—Poster Presentation, Oshkosh, WI, 27-28 April 2004.*

Previous studies have shown that the structures of amine-SO$_2$ and SO$_3$ complexes are quite sensitive to chemical medium. For example, H$_3$N-SO$_2$ has an N-S distance of 1.957 Å in the gas phase, but the bond compresses to a value of 1.771 Å in the crystal. Such observations raise the question as to what extent such complexes are affected by a bulk, condensed-phase medium such as solvent, or cryogenic rare gas matrix. In this study, we focus on H$_3$N-SO$_2$ and H$_3$N-SO$_3$. Vibrational frequencies of these compounds have been observed in both nitrogen and argon matrices, and in the latter case, a crystal structure has been determined and solid-state IR spectra have been measured. We have reexamined the gas phase properties of these complexes with B3LYP calculations and basis sets ranging from 6-31G* to 6-311+G**. For H$_3$N-SO$_3$, comparisons of gas phase, crystal, and matrix vibrational frequencies indicate that the matrix environment does cause a significant contraction of the N-S bond, though not to the extent of the crystalline complex. Similar effects are inferred for H$_3$N-SO$_2$, though there are no solid-state data with which to compare. Recent attempts to obtain these data will also be discussed.

**WHAT MEDIATES THE MONOCYTE RESPONSE TO AMPHOTERICIN B?** Rachel Nauss, undergraduate student, with Scott Hartsel, faculty, same department. *American Society for Biochemistry and Molecular Biology, Boston, MA, 12-16 June 2004.*

Amphotericin B is a membrane active antifungal antibiotic whose toxicity may be associated with cytokine release from monocytes. The stimulation of cytokine secretion by the cell membrane leading to calcium influx and subsequent IL-1beta expression. The Amphotericin B might directly cause calcium permeability or it may through cell membrane depolarization, monovalent ion fluxes or activation of voltage gated channels. In another abstract, we show that cytokine response caused by different Amphotericin B preparation is correlated with relative monovalent cation permeability in model membranes. We show here, using fluorescence stopped-flow detection of calcium currents and potassium currents, that Amphotericin B has very little intrinsic ability to increase calcium permeability in model membrane systems at therapeutic levels. Amphotericin B can, however, cause significant and rapid potassium and sodium permeability at the same concentrations. Thus it is possible the response of monocytes to Amphotericin might involve membrane changes or cation (K+, Na+) permeability, which may subsequently instigate calcium permeability and/or cytokine response.
CHEMISTRY/PHYSICS AND ASTRONOMY

BROMINE ETCHING OF GaN SURFACES. Kim Kranski and Christopher Conklin, undergraduate students, with Marcus McEllistrem, Chemistry, and Douglas Dunham, Physics and Astronomy, same department.

Gallium nitride (GaN) is a relatively new semiconductor now finding application in light-emitting diodes (LEDs) that emit green, blue, and white light. These diodes are being used in traffic lights, cell phones, and flashlights, and show promise for solid-state lighting. Further improvements in GaN-based device performance, and LED efficiency at converting electricity to light, will require improved understanding of the material, its growth, and etching. These issues motivate our study of how bromine etches the GaN surface. Our prior results indicated that bromine facilitates gallium desorption from the surface, such that etching occurs at temperatures 300 degrees cooler than evaporation of GaN. Results from our current studies reflect how surface composition changes with bromine dose, and further support the proposed etching mechanism. We correlate these results with our prior studies of how surface structure changes with etching.

INVESTIGATING INDIUM NITRIDE PROTECTIVE LAYERS FOR GALLIUM NITRIDE BY X-RAY PHOTOELECTRON SPECTROSCOPY. Sara Chamberlin and Christopher Conklin, undergraduate students, with Douglas Dunham, Physics and Astronomy, and Marcus McEllistrem, faculty, Chemistry.

Gallium nitride (GaN) is a compound wide band gap semiconductor that has many technological applications. It has been the focus of current research due to applications in UV photodetectors, light emitting and laser diodes and high performance transistor. GaN light emitting diodes can be made to emit green, blue, and violet light, and have been proposed as a solid state white light source for residential and industrial lighting. Preventing contamination and preserving high quality surfaces of the gallium nitride between the time the gallium nitride crystals are grown and the time they can be used in devices has been problematic. In order to protect the GaN surface an Indium nitride layer is deposited on the surface. We investigated the effectiveness of a thin layer of Indium nitride deposited on the surface to prevent contamination from the air. The Indium nitride was removed by heating. Using X-ray Photoelectron Spectroscopy (XPS) and Scanning Tunneling Microscopy (STM) we have determined that the Indium nitride layer neither protects the surface from contamination nor results in a well-ordered GaN surface after its removal.

COMMUNICATION DISORDERS

APPLYING KNOWLEDGE OF GRAMMATICAL STRUCTURES: A SURVEY OF STUDENTS. Jason Bennett, undergraduate student, with Kristine Retherford, faculty, same department.
The purpose of this study was to obtain a sample of grammatical knowledge from the average college student and to compare these data to data obtained from first- and second-year Communication Disorders’ majors at the University of Wisconsin-Eau Claire. Results and implications of the study will be discussed.

**EDUCATIONAL SPEECH-LANGUAGE PATHOLOGISTS’ PERSPECTIVE OF AUDITORY PROCESSING DISORDER: A SURVEY.** Kerry Witherell, undergraduate student, with Timothy Steele, faculty, same department.  

A survey to describe the acceptance, knowledge, comfort-level, clinical caseloads, and training related to auditory processing disorders (APD) was mailed to 442 Speech-Language Pathologists (SLPs) working in Wisconsin schools who were members of the Wisconsin Speech Language and Audiology Association (WSHA). There was a 34.6% return rate. Results indicated strong acceptance that APD is a physiological and quantifiable phenomenon. There was also strong agreement that team assessment, intervention, and management is preferred over an individual approach. SLPs reported an average caseload size of 33 students with an average of 0.8 students per caseload diagnosed with APD. Finally, continuing education and/or additional training related to APD appears warranted.

**LANGUAGE SAMPLE ANALYSIS: A COMPARISON OF TWO PROCEDURES APPLYING KNOWLEDGE OF GRAMMATICAL STRUCTURES.** Sara Halada, undergraduate student, with Kristine Retherford, faculty, same department.  
*ASHA Schools 2004, Baltimore, MD, 8-11 July 2004.*

This study investigated the effectiveness of two language sample analysis procedures for determining if a child is evidencing language impairment. Bricker’s (1993) Assessment, Evaluation, and Programming System for Infants and Children (AEPS) and Retherford’s (2000) Structural Analysis were analyzed. Results and implications of the study will be discussed.

**COMMUNICATION AND JOURNALISM**

**THE ETHICS OF UNDERCOVER REPORTING.** Jody Whitsitt, undergraduate student, with Michael Dorsher, faculty, same department.  
*6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI, 29 April 2005.*

The practice of undercover reporting raises many ethical questions. Sometimes, reporters say they cannot obtain the truth without going undercover. However, the use of deception to gather information erodes credibility. This is the dilemma that was raised in a case involving a North Carolina news station and their investigation of a local assisted living facility. A reporter entered the establishment and filmed patients without their consent. When the broadcast aired, the owners of the nursing home sued the news station for trespassing, claiming the reporter had no permission to enter. The patients at the nursing home claimed that their privacy was invaded, saying they were filmed without their permission and that the reporter had read their private medical records. Using the Potter Box, a model for ethical decision-making, I will examine the dilemma, values, principles, and
loyalties involved in this case. After considering all aspects, I will ultimately construct and present an ethical policy on undercover reporting.

**SENIOR NEEDS STUDY.** Jody Whitsitt, undergraduate student, with Edward Frederick, faculty, same department.  
*6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI, 29 April 2005.*

The baby boomer generation is on the verge of retirement, and organizations that serve senior citizens need to prepare for this new group of retirees. In order to aid the L. E. Phillips Senior Center in preparing to serve these community members, I distributed a questionnaire to adults living in Eau Claire who were between the ages of 55 and 65. We received professional input on our questionnaire structure and content. The survey was then sent to a random sampling of participants who answered questions regarding their lifestyle choices at present and their plans for the future. The random sample was chosen from a mailing list donated by the AARP, and names of those who were already members of the senior center were omitted from the list. The questionnaire was created in hopes of gathering information about those community members who plan to retire within the next 10 years. By studying the results of the survey, the L. E. Phillips Senior Center will be able to anticipate the needs of this group and better support them during their retirement. The questionnaire results could be useful to other organizations in the Eau Claire community that work primarily with senior citizens.

**COMPUTER SCIENCE**

**AN ANALYSIS OF VERILOG SOFTWARE DESIGN TECHNIQUES ON HARDWARE IMPLEMENTATIONS.** Justin Ehler, undergraduate student, with Andrew Phillips, faculty, same department.  

Verilog is a hardware description language that allows hardware designers to use a software style approach, via a high-level programming language, to construct realizable hardware implementations reflected in a blueprint called a “netlist.” This paper presents a study of the various software coding styles and constructs available in Verilog and the effect of those design style choices on the resulting hardware implementations. Using a Verilog compiler and a netlist viewer, we show that different software design constructs often result in radically different implementations. In particular, we show that when using the data flow and behavioral Verilog coding styles, it is not uncommon for significant cost increases to occur as a result of some common software design approaches. A collection of such inefficient software design techniques will be described, and improved approaches will be demonstrated.

**A CASE STUDY IN REFACTORING.** Christopher Andringa, undergraduate student, with Steven Ratering, faculty, same department.  
This study began with the implementation of the game of Risk in the computer language Java. Risk is a game where up to six players try to take over a simulated world using one’s armies. Either a person or the computer can control each of the players. The computer-controlled players would then use one of several strategies. One objective of this project is to refactor the original implementation of Risk using two object-oriented design patterns. The Model-View-Controller pattern will be used to separate three closely related parts of the program: the model of the simulated world, the graphical view the user sees, and the handling of user inputs to control the game. The Strategy pattern will be used to encapsulate different strategies for the computer-controlled players. Finally, we want to find and apply other refactoring patterns.


We have developed an open-source software component as a major part of a faculty/student collaborative research project. Specifically, we have developed an open source database benchmark for the Oracle database management system that will soon be contributed to the Open Source Database Benchmark (OSDB) project. We found that the process of developing this software complemented the research we did and provided a number of benefits to the overall project. We also found that this idea raised several issues that we had to deal with to maintain the focus of the project.


The lack of security in the widespread use of the Simple Mail Transfer Protocol (SMTP) underscores an inherent need for an email system that integrates complete security and privacy from the very first stages of protocol and system design. By examining archives on mail servers or capturing SMTP packets in transit, network intruders can exploit compromised information that includes the identities of the sender and the recipient, the date, time, and length of the message, and perhaps even the actual contents of the message. This paper describes a secure email transport protocol and provides a detailed reference implementation of the design using the pattern-oriented Adaptive Communication Environment (ACE) framework, an object-oriented network programming toolkit. Integrating security and privacy deep within an email system generates concerns about computational feasibility since security functions require significant computational resources. The performance of the reference implementation is analyzed and compared with existing secure and insecure email systems. Metrics used in the comparison include computational resource usage, network resource usage, scalability and relative security.
POWER EFFICIENT, AD HOC WIRELESS NETWORK SECURITY AND ROUTING. Kinnell Tackett, undergraduate student, with Jack Tan, faculty, same department.

Current designs of ad hoc networks do not provide a high level of security and power-aware routing. Most view the network topology as one level where each node is able to communicate with every other node without having to travel between subnets. These designs are energy and processing power inefficient while creating massive network congestion. This paper proposes a secure energy-efficient routing model using a hybrid network with three types of nodes: master, gateway, and plain, each with specific responsibilities. We divide the network into subnets where each subnet has one master node that controls the subnet, zero or more gateway nodes that belong to two or more subnets, and a number of plain nodes. A Key Authority (KA) is used to control and distribute the encryption keys for each subnet and node. The KA provides keys to network nodes, to subnets (for subnet communication), and to every node on the network (for network-wide communication). This reduces the energy and time taken to build route tables.

SIDE-CHANNEL ATTACK AND DEFENSE TECHNIQUES FOR ACOUSTIC EMISSIONS FROM COMPUTING MACHINERY. Michael LeMay, undergraduate student, with Jack Tan, faculty, same department.

Many powerful techniques have been developed to capture information about the operation of a computer without directly interacting with the machine. The information usually targeted during these side-channel attacks includes the instructions being executed and the image on the CRT. Electromagnetic and thermal radiation are two sources of information that are often tapped using existing techniques to determine this information. However, acoustic emissions from computer equipment can also serve as another, largely untapped source of information. Initial research in this area has resulted in basic techniques to capture and analyze these emissions, and in our work we have developed new methods along these same lines. Specifically, we have developed new techniques for differentiating between noise and useful information, and for determining which types of instructions are being executed on a computer’s processor. It is our objective to both create practical processing systems to analyze acoustic emissions as well as techniques to protect that information from discovery, depending on the situation.

SYMPOSIUM SESSION ON CHALLENGES IN SOFTWARE ENGINEERING: DEVELOPING SOFTWARE IN NEW AND COMPLEX DOMAINS. Scott Lemke, undergraduate student, with Paul Wagner, faculty, same department.

Computer systems and software have become a basic tool in nearly every field and industry imaginable, including not only traditional business domains but also emerging complex fields and projects within natural and social science, art, and the humanities. Where computer systems go, so does the engineer. It is thus very likely that the software engineer
will have to create a solution in a field that he or she has little to no understanding about, possibly using tools developed for this field that they are not familiar with. For example, the presenters have been involved in projects with optical recording, molecular biology data and pattern matching, development of surveys for psychologists, and the storage and modeling of astronomical data. The purpose of this interactive discussion is to pool and share our collective knowledge to enable us to succeed and teach others how to succeed in this situation. Discussion topics and issues will include: 1) Where to start? 2) How can you prepare for this situation? 3) What techniques does the field of software engineering provide for these endeavors? 4) What resources do software engineers have in this situation? 5) How can software engineers develop a common language with the domain experts to encourage accurate communication? 6) How do we work with legacy algorithms, paradigms and codes, potentially written by domain experts who may not have been trained in current software development techniques? 7) How can we learn about these new domains quickly? 8) How can you test when you don’t know the answer? 9) How can you optimize a solution you don’t understand? 10) How can you lead a team in this situation? 11) How can we teach others to succeed in this situation?

**Computer Science/Geology**


Crystal growth in the natural environment is a poorly understood process. Recent measurements of chemical impurities preserved within natural crystals offer important clues toward understanding morphologic evolution during crystal growth. In natural hydrothermal quartz crystals, internal chemical heterogeneities define sector zones as individual growth faces trap different amounts of impurities. The concentration of impurities is a sensitive indicator of the kinetics of crystal growth and thus can serve as a speedometer of the growth rate of individual faces. We present a visual simulation that illustrates the morphologic evolution of a quartz crystal as it grows from hydrothermal solution. We show how growth on different crystal faces leads to chemically distinguishable sector zones inside a single crystal. Our simulations can generate the large differences in impurity concentrations across sharp sector zone boundaries that are observed in natural crystals. Our results constrain the relative growth rates of individual faces during crystal growth in the hydrothermal environment.

**Economics**

We conduct a contingent valuation (CV) survey to estimate the willingness-to-pay (WTP) for the switch to automated collection of solid waste and single stream recycling in Madison, WI. Because a large number of respondents were unwilling to vote in favor of the new program at no additional cost, we believe it is important to examine the factors leading to this result before using this information to estimate the WTP. Our findings suggest that the probability of supporting the new program was lower for individuals who stated that sorting their recyclables in the current system was convenient and for those over the age of fifty. On the other hand, support for the new program was more likely for individuals that identified with either the Democratic or Green Party. Moreover, we believe the majority of “no” responses to our initial vote question are not protest bids and therefore represent a true zero WTP.

**ADVERTISEMENTS, COMICS, AND WARS: GREEN LANTERN IN THE LATE 20TH CENTURY. Bobby Kuechenmeister, undergraduate student, with Joel Pace, faculty, same department.**


Comic books are cultural artifacts revealing historical events and innovations under a disguise of fiction. Using the “Emerald Twilight” story arc in DC Comics’ Green Lantern series in 1994, “Zero Hour” mini-series from 1994, and “Final Night” mini-series of 1996 combined with reports from the Associated Press and Time magazine, we will learn how story arc events reflect the historical events of the late 20th century: the first Gulf War, Tonya Harding versus Nancy Kerrigan, and the bidding war between QVC and Viacom over Paramount Pictures.

**CHRIST, ANTI-CHRIST, OR SUPER-HERO?: GREEN LANTERN IN THE LATE 20TH CENTURY. Bobby Kuechenmeister, undergraduate student, with Joel Pace, faculty, same department.**

25th Annual Southwest Texas Popular Culture and American Culture Associations Conference, San Antonio, TX, 7-10 April 2004.

Comic books are becoming recognized and studied as a literary genre with the birth and rise of cultural studies. Our project demonstrates how literary theory and religious studies may be applied to the medium. We explain the conventions of comics by drawing parallels to Aristotle’s conventions of Tragedy and uncover how these texts are cultural artifacts by using a New Historicist approach to indicate how comic book story arcs reflect religious themes. Our examples are the “Emerald Twilight,” “Zero Hour,” and “Final Night” storylines published by DC Comics from 1994-1996.

**COFFEE CONFECTIONS. Andrew Kerbel, undergraduate student, with Gloria Hochstein, faculty, same department.**


In the creative nonfiction piece “Coffee Confections,” I explore the topics of family, love, and loss through the Ponzo Illusion. I compare an elderly man’s oral history--his life and love loss--as he sits at the counter in a restaurant, and a memoir of one of my own love experiences, to the classroom and lecture about the systematic orbit of the moon. This piece
weaves in and out of multiple time frames and narration in order to show the universality of such experiences and nature’s movements.

MULHOLLAND DRIVE, SATURATED CHARACTERS, AND 1950s AMERICAN MYTH. Karline Koehler, undergraduate student, with David Jones, faculty, same department. 
*Midwest Modern Language Association, St. Louis, MO, 4-7 Nov. 2004.*

Details evocative of the American 1950s are a common thread among the films of David Lynch. In addition to specific cultural artifacts, many of Lynch’s saturated characters in films such as *Mulholland Dr.* suggest a particular myth in the popular consciousness. This mythical world that Lynch conjures up, with its one-dimensional, conservative representations, is one often presented in American culture as “the Fifties”—not the actual, historical time period, but the mythical Fifties as depicted in the television and other popular culture of the period. The recurrence of references to the Fifties throughout Lynch’s work suggests that the era as myth holds a significant place in the Lynchian universe. In the mythical Fifties, people have enough to get by and fit comfortably into stereotypes without any stirring of dissatisfaction. The inhabitants of the mythical Fifties do not desire because they are already satisfied. The Fifties myth works in American culture to mask the Real, the trauma of separation from the Other that produces desire. However, Lynch’s use of these images is always placed in the context of spectacle or performance. The ubiquitous red curtain in Lynch’s world works to point out the artificiality of the Fifties’ fulfillment, indicating that beyond the stage lies something unspeakable and incoherent. The context of spectacle also means that Lynch’s representations of women, which have been criticized as harmful and stereotyped, take on new significance as self-conscious spectacle. Lynch’s presentation of the conservative image of the female as spectacle enables the female viewer to deal with these issues not by ignoring and suppressing them but by placing them in full view.

READER RESPONSE JOURNALS IN AN INTRODUCTION TO LITERATURE CLASS. Jill Kotta, undergraduate student, with Carmen Manning, faculty, same department.

TWO POEMS: ‘YUM-YUM’ AND ‘PULLED UNDER’. Traci Thomas-Card, undergraduate student, with Gloria Hochstein, faculty, same department.
*Sigma Tau Delta International Convention, Daytona Beach, FL, 24-28 March 2004.*

Diversity education has become an important issue in recent years, as is evident in the development of national organizations such as Teachers Against Prejudice (2000), and a multitude of local organizations such as the Peer Diversity Educators in Eau Claire, WI (2001). Many of these organizations have developed programs that deal with diversity issues in United States culture. Still, most of the programs developed do not take into consid-
oration the specific needs of English Language Learners (ELLs). ELLs arrive in the United States with their own sets of prejudices and stereotypes, which can be quite different from those in mainstream American culture. TESOL professionals with multicultural classrooms can find that students’ multiple sets of prejudices lead to ethnocentrism, hierarchy, and cultural cliques within the classroom. It is easy for students in multicultural classrooms to believe that because they have come from different cultures, they have nothing in common. There is a need for diversity education programs that highlight each person’s unique culture, experiences, and positive qualities. With programs such as these, students learn that though they are unique, they have something in common with everyone in the classroom. In this workshop, individuals will participate in diversity education programs, which are designed to combat prejudice, promote intercultural understanding, and build unity in multicultural ESL classrooms. There will also be a focus on the integral role of debriefing, and its implications. Participants will leave with practical and useful programs that will foster harmony and solidarity and promote intercultural understanding in a multicultural setting.

THE COST OF EUROPEAN UNION EXPANSION. Justin R. Fleming, undergraduate student, with Martina Lindseth, faculty, same department.


The current European Union (EU) of 15 members is preparing for the largest, most important, and most diverse expansion in its history. The objective of this research is to investigate the implications of allowing additional members into the EU. This expansion, which will include countries such as Slovakia, Poland, Estonia, and Cyprus, will add about 30% more people and up to 12 new official languages to the EU, yet will have a minimal impact on the Gross Domestic Product (GDP) of the EU. This research follows from earlier research, which looked into the present problems of the EU translation services and the financial problems that adding another nine to 12 languages will create. In addition to the language component, an objective view of the political, commercial, economic, and cultural gains and costs of the EU expansion will be studied, and the future of the European Union will be addressed.

DEVELOPMENT OF INTERLANGUAGE PREPOSITION ACCURACY IN ADVANCED ESL WRITING VIA THE PROCESS OF WRITING APPROACH. Erin Flehmer and Elizabeth Peters, undergraduate students, with Kate Reynolds, faculty, same department.


This qualitative research study brings interlanguage theory to bear on the writing process, which refers to the pedagogical practice of teaching writing in which learners engage in brainstorming, outlining, drafting, editing, and revising in order to improve the quality of their written assignments. Patterns that emerged include evidence of native language transfer, possible structure fossilization, and a need for instruction in the process of writing. The study advances the field’s knowledge of interlanguage development by providing current information about preposition teaching and ESL writing instruction; therefore, it allows for an improved understanding of preposition development in interlanguage and therefore greater understanding of how to address the issues in learning accurate preposi-
tion usage and how to teach more appropriately. The interactive presentation will discuss interlanguage theory, the research methodology, the findings relevant to international students’ preposition use in the writing process, the connections to interlanguage theory, and the pedagogical ramifications.

EFFECTIVE PRACTICES FOR INCORPORATING COMMON READING TEXTS. Becky Olson and Megan Allen, undergraduate student, with Kelly Wonder, faculty, same department.

*International TESOL Conference, San Antonio, TX, 29 March-3 April 2005.*

It is becoming increasingly popular for Intensive English Programs (IEP) to incorporate common reading texts at all levels of proficiency. Common readings are fiction or nonfiction extended texts that all students read during the same academic term. In some IEPs the common reading is geared toward the level of the learners’ proficiency, while in others it is directly connected to the term’s theme. English as a Second Language (ESL) instructors find this is a rewarding and motivating mode of language learning, because it allows learners insight and depth in discussion of the theme and culture(s) while providing learners with extensive reading opportunities, contextualized vocabulary, grammar experiences, and literature analysis prospects. The techniques used in teaching common readings vary greatly; some techniques are more effective than others. This study was conducted in an action research paradigm in order to furnish teachers with evaluative perceptions into the most effective techniques for using common reading texts in IEPs. In this interactive session, presenters will discuss methods for including common reading texts that are received well by students, practical for the instructors, and useful in language learning. Those who attend the session will also leave the useful guidelines for text selection to ensure greater success in incorporating common readings.

EMICALLY BASED RESEARCH PERSPECTIVES IN TEACHER EDUCATION. Jean Peterson, undergraduate student, with Kate Reynolds, faculty, same department.

*39th Annual TESOL Convention, San Antonio, TX, 27 March-3 April 2005.*

In response to a necessity for “an increased emic (i.e., participant-relevant) sensitivity towards fundamental concepts [of SLA]” (Firth & Wagner, 1997), this colloquium demonstrates effects of the use of reflexive genres on professional development of pre-service and in-service teachers. Four presentations examine ways of promoting teachers’ abilities for self-analysis and evaluation of their own teaching practices (Kumaravadivelu, 2003). They analyze emic, micro-strategic approaches in the development of teachers’ professional self-awareness and personal intellectual growth.

INFORMING REFLECTIVE TEACHING PRACTICE: HOW STUDENT TEACHERS DEVELOP INTO TEACHING PROFESSIONALS. Heather Williams, undergraduate student, with Kate Reynolds, faculty, same department.


This action research project reflectively examined effective teacher preparation practices. Data collected included pre-service student teachers’ writings, performance assessments, surveys, and field observations. Initial findings reveal connections between theories of education and essential components of a TESOL teacher training program.
LATIN AMERICAN ECOLOGY: CULTURAL PRACTICES IN HOPE AND DESTRUCTION. Anna Baker, undergraduate student, with Analisa DeGrave, faculty, same department.

Whether in the rainforest, in the air, or within the waters of its coasts, the countries of Latin America are confronting a spectrum of critical ecological challenges. A variety of individuals and organizations throughout Latin America and the international community have articulated and continue to express their concerns regarding society, politics, economics, and their relation to the natural world. Because of the global and multidisciplinary reach of the topic this faculty-student research project has adopted a cultural studies approach to include a variety of articulations and practices regarding Latin America’s ecology and environment. With support from the University of Wisconsin-Eau Claire Summer Research Experiences for Undergraduates program, Anna Baker, a student of Spanish and Latin American Studies, and Analisa DeGrave, an assistant professor at UW-Eau Claire, have researched and analyzed an array of cultural articulations regarding Latin America and its environment. At the North Central Council of Latin Americanists conference we would like to give a PowerPoint presentation of our research. Our presentation will provide an overview and commentary of our research of the following topics vis-a-vis Latin American ecology: globalization, indigenous rights/movements, art, religion/spirituality, urbanization, technology, ecotourism, (sustainable) development, international solidarity movements and NGOs. We will make note of a number of cultural articulations such as manifestos, poetry, web-pages, comic strips, performance art, academic papers, advertisements, government leaflets, and news clippings.

REPRESENTATIONS OF TERRORISM IN CONTEMPORARY BASQUE LITERATURE. Megan E. Gooch, undergraduate student, with Carter Smith, faculty, same department.

During the past forty years, one of the most pressing domestic problems in Spain has been the existence of the violent terrorist group Euskadi ta Askatasuna (ETA). Originally formed as a response to Franco-era repression and known for lobbying for an independent Basque Country, ETA has remained active into the twenty-first century and continues to be a topic of much debate within Spain and around the world as part of a more general dialogue about terrorism. As terrorism becomes, increasingly, a more commonplace and important theme in the world today, literature has emerged as one way to study this phenomenon. The purpose of this research is to examine the representation of terrorism and the terrorist figure in contemporary Spanish fiction. The novels studied are by Basque authors and address the issue of ETA terrorism in the Basque Country, Spain. Common themes to be found that underline the representation of terrorism in these books include Freud’s ‘melancholia’ and Benedict Anderson’s concept of ‘imagined communities’. This research will examine the use of themes such as these in Basque literature and how the authors utilize these concepts to comment on the reality of nationalism and the existence of terrorism in Spain.
THE ADVERTISING RANGE OF WISCONSIN’S NORTHWOODS: A TEACHING TOOL FOR K-16 EDUCATORS. Tracey Gilbert and Mitchel Stimers, undergraduate students, with Lisa Theo, faculty, same department.

A constant struggle for teachers at all levels is finding ways to successfully teach students complex theories and concepts. Student comprehension is often enhanced by applying these theories and concepts to real-world situations. Following up on a pilot study conducted during November 1999, this project demonstrates an every day application of the Urban Geography concept of Central Place Theory by examining highway billboard signs along major highways entering Wisconsin’s Northwoods. In addition, the concepts of range, threshold, intervening opportunities, complementarity, and transferability are demonstrated. Using Global Positioning Systems (GPS), data management/processing programs (such as Microsoft Excel), and Geographic Information Systems (GIS), data was collected on the location, distribution, and type of establishment advertised. Using statistical and spatial analysis we demonstrated that the greater the distance (range) between a billboard and its advertised business, the larger the threshold (the minimum population necessary for a particular business to be successful). The data was used to create a series of maps and graphs applicable for multiple grade levels. A lesson plan was created for elementary school, middle school, high school, and post-secondary classes. These lesson plans will give teachers at each level a method for student collection of comparable data for their own analysis.


Ground-penetrating radar (GPR) surveys were conducted at several sites within the hillside town of Rennes-le-Château, France. The town is linked with many traditions and mysteries associated with the Templar movement and its treasure, including, according to some documents, the possible location of the Holy Grail. Key areas of GPR investigation were: the Tour Magdala, the Church of St. Mary Magdalen, and the surrounding gardens. The GPR survey at the Tour Magdala was carried out to image any cultural features (i.e., burial crypts, documents, currency, etc.) located beneath the tower floor or around its outer base. 2-D results indicate the tower is built on the local bedrock with possible surface and subsurface disruptions in the local GPR stratigraphy, while 3-D cubes show a hyperbolic reflection pattern, which may indicate the presence of a buried object. The GPR survey at the Church was carried out to image any cultural features that may be located beneath the Church floor. 2-D and 3-D images show a subsurface anomaly (hyperbolic feature) that extends along several parallel lines that may indicate a burial crypt. Utilizing industry standard software (pulse EKKO 3D, RockWare), 3-D visual modeling of data collated from the 2001 and 2002 research expeditions allowed for the creation of accurate 3-D animations of subsurface anomalies. Detailed animations from this investigation will be used to advise the government of France’s Archaeological branch where to excavate at Rennes-le-Château.

The Cultural Atlas of Wisconsin is a collaborative project between the UW-Madison Cartography Lab and the UW-Eau Claire Department of Geography and Anthropology. The atlas builds and expands upon the highly successful Cultural Map of Wisconsin published in 1996. The atlas identifies and describes over 1,000 places that are significant to Wisconsin’s history and culture. It will be published by the University of Wisconsin press.


This student-faculty collaborative project entails the mapping, collection, and recording of environmental data at Northstar Middle School in Eau Claire, WI to develop a nature trail and website that can be used by Northstar students, faculty, and the community. Four learning pods will be created along the nature trail where Northstar faculty can take their classes to and educate them on the natural ecology in their backyard. Each learning pod will be set in a different ecological setting; one will be in a grove of birch trees, one in an oak tree orchard, and two in a nest of pines. The trail and learning pods will also be accessible to the general public to use. The area was mapped using GPS and GIS with aerial photos and a Digital Elevation Model (DEM) was created to show proper elevation. In addition, the research was done on the flora and fauna in the area as well as data collected in the areas of soils, temperature, erosion aspects, and overall biodiversity. As well as this power presentation, a website will be created that the students and faculty of Northstar Middle School, as well as the community, will have access to in their classrooms and homes for their own ecological education.


Geophysical field data collection was undertaken at Tel Yavne, Israel during the summer of 2003. The primary tools of data collection were ground penetrating radar (GPR), electrical resistivity tomography (ERT), land survey, and aerial photography. My project involves the history at Tel Yavne along with the integration of the datasets to better understand the physical landscape and locate sites for archaeological excavations to begin. These datasets and subsequent interpretation will aid both archaeologists and historians in their plans for excavation. This project is significant to understanding and preserving the history about Jewish, Christian, and Muslim faiths. For many years historians, archaeologists, and scientists have been uncovering information that broadens our cultural understanding of
the past civilizations. The analysis and interpretation of the collected data can serve as the stepping stone to uncovering the past without destruction of artifacts, misguided excavations, and an improper use of volunteers.


Project aimed to determine if small stream valleys in Eau Claire County were an important aspect of settlement pattern. Also investigated the reasons why certain environmental variables such as soil type and vegetation are considered important aspects of settlement strategy and included in GIS models. Responsibilities included compiling the necessary layers for the GIS, data entry, analysis and presentation of results, and archaeological surveys.


While overwintering along the Oregon coastline in 1805, Lewis and Clark visited and mapped many locations, including a native village just south of the Clatsop River’s outlet to the Pacific Ocean. Investigations by previous researchers have been unsuccessful at finding the historical site, possibly due to the significant increase in sedimentation that resulted from jetty construction along the mouth of the Columbia River. After reviewing Lewis and Clark’s journals and maps, we selected a study area along the west shore of Slusher Lake, within Camp Rilea, near Warrenton, OR. Multiple ground penetrating radar (GPR) lines were collected using two antennae frequencies – 100 MHz and 225 MHz. Depths of up to 16 m were imaged, with a distinct water table interpreted on many of the profiles. GPR profiles run along the ridge west of Slusher Lake showed parallel to subparallel, semi-continuous reflection patterns, which are interpreted as representing a vertically accreting sand dune. A channel-form pattern was recognized northwest of Slusher Lake and is interpreted as the old, relict Clatsop River outlet originally mapped by Lewis and Clark. These significant results help narrow down the location of the historic native village and provide a foundation for future archeological investigations.

**THE HINTERLANDS OF MAJOR LEAGUE BASEBALL.** Travis Franz, Devon Disrude, and Eric Lynde, undergraduate students, with Tim Bawden, faculty, same department. 5th Annual UW-System Symposium for Undergraduate Research and Creative Activity—Poster Presentation, Oshkosh, WI, 27-28 April 2004. 2004 Centennial Meeting of the
Geographers have studied patterns in sports for over three decades, largely beginning with John Rooney’s 1969 pioneering article “Up from the mines and out from the prairies: Some geographical implications of football in the United States.” Rooney argued at the time, that “fan loyalties are probably among the strongest of human attachments, and their regional boundaries are well documented and functionally organized via major sports radio and television networks.” Since that time, media technology and professional sports in general have been dramatically transformed, which, in turn, has likely had an impact on the regional boundaries of the fan base of professional teams. This poster examines geographic patterns associated with Major League Baseball in North America. In particular, we first illustrate how major league baseball has expanded and evolved geographically during the past 30 years and discuss the ways in which media technology and media coverage has changed during that time. Second, we examine the size and location of teams’ fan base. Our data come from a 2002 online ESPN survey in which 40,000 respondents were asked a variety of sports-related questions including their favorite teams. The data were collected at the zip code level, allowing for fine scale analysis, and transferred to a GIS for further spatial analysis. Third, through a multiple regression analysis we identified several major factors that help explain the size of a team’s fan base including city size, age of the franchise, and media coverage.

IN SEARCH OF A MISSING CHILD: A GEOPHYSICAL (GPR) INVESTIGATION OF A CEMETARY. Jenifer Bode, undergraduate student, with Harry Jol, faculty, same department.

Due to both natural processes and anthropogenic changes, burials within the landscape can, in a short period of time, become very difficult to recognize on the surface. If a burial is not marked (e.g., mound, headstone) or properly recorded (e.g., sexton) and the surface expression is no longer apparent, it becomes difficult to locate the burial so that the site can be properly protected. Ground penetrating radar (GPR) provides a non-invasive and non-destructive geophysical tool that allows one to survey and image the shallow subsurface. In west central Wisconsin in the late 1950s, a young child was buried in an unmarked and unrecorded grave within St. Rose Cemetery in Cadott, Wisconsin. Initial site investigation included a visual inspection for depressions and comparison of marked graves to the sexton’s report. Burials with markers and burials without markers but recorded on the sexton’s map were found, however, two burials were found that were not noted on the sexton’s records and also had no marker or surface expression. GPR provides a non-invasive tool to locate unmarked and unrecorded burials allowing proper protection, or in this case, finality for an uncertain family.

INTEGRATION OF CAD AND GIS: MODELED CHANGES IN PERVIOUS/IMPERVIOUS SURFACES AND THE EFFECTS ON SURFACE RUNOFF AT THE UW-EAU CLAIRE. Sarah Knabel, undergraduate student, with Douglas Faulkner, faculty, same department.
The integration of CAD and geographical/spatial software products is a growing geographic field. The combination of software products addresses the shortfalls of each while examining the built environment and its interaction with the natural environment. CAD software strengths are modeling the built environment and GIS software strengths are displaying, categorizing, and analyzing objects in models. The combination of these products allows for analysis of space/land use over a time continuum, including past, present, and future. The University of Wisconsin-Eau Claire’s campus development is the focus of this research project. Space was divided into pervious (e.g. vegetation) and impervious (e.g. roofs, parking lots, sidewalks, streets) categories. The change between pervious and impervious surfaces since the university’s creation in 1916 to the present was collected, tabulated, and modeled. Also modeled and analyzed were the changes proposed under the campus development plan. Surface water runoff volumes were compiled using a weighted composite value based from the SCS-CN method. Analysis of the results include a discussion of the effects on water runoff volume over time and water quality based on the requirements created by the Stormwater Discharge Monitoring Program recently signed with the city of Eau Claire.

LOCATING A MAPPED LEWIS AND CLARK NATIVE ENCAMPMENT, OREGON: A GIS AND GPS DATABASE. Ryan Zahler (primary co-author) and Joel Stevens, undergraduate students, with Harry Jol, faculty, same department, and C. D. Peterson, Portland State University.

As part of a collaborative project, a detailed, multilayered GIS site map was created for current and future efforts in trying to rediscover a mapped Lewis and Clark native encampment along the Oregon coastline. According to the Lewis and Clark journals from 1805, the village was located along the southwest bank of the Clatsop River as it entered the Pacific Ocean. A survey grade Trimble ProXR differential Global Positioning System (dGPS) with sub-meter positional accuracy was used in creating a spatial database for a site map. The database also incorporates: 1) laser level stations which provide accurate topography, 2) soil core locations and descriptions, 3) ground penetrating radar (GPR) transects that map stratigraphy, 4) infrastructure, and 5) other historical pieces of data important to research conducted at the site. A high-resolution photo image was geo-referenced into the GIS to overlay the dGPS data. LIDAR data from recent coastal surveys will be incorporated into the database and provide a digital elevation model (DEM) of the research site. The GIS database and resulting maps will significantly aid our understanding of this historic site and provide researchers with the necessary tools to hopefully discover the encampment that Lewis and Clark originally mapped.

LOCATING A NATIVE VILLAGE VISITED BY LEWIS AND CLARK: LITERATURE REVIEW AND SUBSURFACE INVESTIGATIONS. Beth Guse (primary co-author) and Sabrina Hicks, undergraduate students, with Harry Jol, faculty, same department.

As part of a collaborative project, a detailed, multilayered GIS site map was created for current and future efforts in trying to rediscover a mapped Lewis and Clark native encampment along the Oregon coastline. According to the Lewis and Clark journals from 1805, the village was located along the southwest bank of the Clatsop River as it entered the Pacific Ocean. A survey grade Trimble ProXR differential Global Positioning System (dGPS) with sub-meter positional accuracy was used in creating a spatial database for a site map. The database also incorporates: 1) laser level stations which provide accurate topography, 2) soil core locations and descriptions, 3) ground penetrating radar (GPR) transects that map stratigraphy, 4) infrastructure, and 5) other historical pieces of data important to research conducted at the site. A high-resolution photo image was geo-referenced into the GIS to overlay the dGPS data. LIDAR data from recent coastal surveys will be incorporated into the database and provide a digital elevation model (DEM) of the research site. The GIS database and resulting maps will significantly aid our understanding of this historic site and provide researchers with the necessary tools to hopefully discover the encampment that Lewis and Clark originally mapped.
Lewis and Clark reached the Pacific coast of Oregon in 1805 where they visited a Clatsop village—the location of which is unknown. The poster is a part of a collaborative research project to locate this Clatsop village. Lewis and Clark’s journal documents the location of the village in primary coastal sand dunes, along the shore of the Clatsop River south of its outlet to the sea. Based on these and other journal entries we believe the village site is located on the western shore of what is now Slusher Lake (Camp Rilea, OR). We investigated the subsurface in this area using a sand auger and an Oakfield soil borer (21 cores, 6 m maximum recovery depth). No buried soils or cultural remains consistent with a Clatsop site were recovered, suggesting the deposits to be post Lewis and Clark in age. Therefore, the historic village is buried more than six m below the modern surface. Alternately, 100s of m of shoreline progradation has occurred since Lewis and Clark visited the site. Though the location of the Clatsop village remains unknown, we now know that future investigators will need methods capable of deeper subsurface investigations, such as hydraulic coring machines.

**RECENT HYDROGRAPHIC CHANGE IN THE TIFFANY BOTTOMS, CHIPPEWA RIVER, WISCONSIN.** Adam Lange (primary co-author), Ryan DeChaine and Theresa (Piper) Stiper, undergraduate students, with Douglas Faulkner, faculty, same department.  

Using ArcMap GIS, we quantified hydrographic change in the Tiffany Bottoms from old aerial photos. Open water decreased from 9.6 km$^2$ in 1939 to 1.8 km$^2$ by 1958. It then increased to 6.9 km$^2$ by 1992. Recent trends suggest open water may soon be as extensive as it had been.

**RECONSTRUCTING THE PRECONTACT CHIPPEWA RIVER VALLEY: LANDSCAPE RECONSTRUCTION USING GIS AND GLO TOWNSHIP SURVEYS.** Jennifer Freeland, undergraduate student, with Douglas Faulkner, Garry Running, and Robert Barth, faculty, same department.  
*American Association of Geographers, Denver, CO, 5-9 April 2005.*

The patterning of archaeological sites across the landscape provides valuable information about how past cultures perceived and utilized their environment. To be of any informational value, however, the settlement patterns must be related to the environment as it was when these cultures existed. Due to extensive modification associated with European settlement, the current landscape of the Chippewa River Valley bears little resemblance to that used by past American Indian cultures. As such, it is a poor baseline for understanding precontact settlement in the region. To provide a better context for interpreting site locations, GIS was used to assemble data from General Land Office (GLO) surveys conducted in the 1840s. A multilayered map was constructed, incorporating such environmental components as vegetation, stream patterns, and wetlands. The preliminary results of this project, presented here, indicate that such maps will be invaluable for reconstructing the precontact landscape of the Chippewa Valley and providing insight in past American Indian lifeways.


Tel Yavne, Yavne, Israel is an area of land with monumental religious and historical significance. Reasons for pursuing excavation in Yavne are to uncover and accurately teach the Jewish heritage. By uncovering the past truths the Jewish community can be further educated in understanding the Jewish roots and history. The geophysical survey of Tel Yavne conducted ground penetrating radar (GPR) data collection integrated with data collected from electro resistivity tomography (ERT). The combination of this data will allow the archaeologists to understand the resistivity of the underlying earth and give visual imagery of subsurface bedrock and sediment layering. Along with subsurface imagery are the applications of aerial photography to give a projected view for surface analysis. Elevation values are assigned through laser level survey techniques and are spatially referenced through the use of a total station. The total station references data to known land marks by latitude and longitude. Referencing the data is necessary to ensure future data collection will not be jeopardized due to incorrect coordinates. The Tel Yavne project is the integration of data collection methods. It is a means to aid the archaeologists, preserve artifacts, reduce excavation cost, and eliminate unnecessary destruction through geophysically understanding the earth.

SEARCHING FOR THE LOST RIVER AND VILLAGE: AN 1805 LEWIS AND CLARK SITE ALONG THE NW OREGON COAST. Jeremy Treague, undergraduate student, with Harry Jol, faculty, same department, and C. D. Peterson, Portland State University.


Lewis and Clark spent the winter of 1805 along the NW Oregon coastline. During their stay, they visited, mapped and described many locations, including a native village along the former Clatsop River. Several wooden structures south of the river’s outlet to the Pacific Ocean were noted in their map and journal records. Previous investigations by other researchers have failed to locate the historic site. After reviewing Lewis and Clark’s map and journal records, and speaking with local residents, a study area was selected along the west shore of Slusher Lake, near Warrenton, OR. Field research using ground penetrating radar (GPR) and other field methods was carried out in September, 2003. GPR profiles collected along the ridge west of Slusher Lake reveal parallel to subparallel, continuous to semi-continuous reflection patterns, which are interpreted as vertically accreting coastal sand dunes. A distinct channel-form reflection pattern noted on the GPR profiles northwest of Slusher Lake is interpreted as the historic Clatsop River outlet along which the village was located. Based on the results of previous research, a detailed subsurface investigation is in progress, which coincides with the Lewis and Clark Bicentennial and seeks to resolve the physical location of the Clatsop native village.
SOMALI IMMIGRANT SETTLEMENT IN SMALL MIDWESTERN COMMUNITIES: THE CASE OF BARRON, WISCONSIN. Jessica Schaid, undergraduate student, with Zoltan Grossman, faculty, same department. 

Tens of thousands of Somali refugees have settled in Minneapolis-St. Paul (the Twin Cities) since Somalia’s civil war erupted in 1991. Minneapolis-St. Paul has become the de facto “capital” of the Somali community in North America. Somalis have arrived directly from refugee camps, or in secondary migrations from other US cities, drawn by an attractive urban job market and refugee service agencies. More recently, many Somalis have begun to settle in smaller cities and towns around southern Minnesota and western Wisconsin. This diffusion is creating an “immigration hinterland” that increasingly resembles the ethnic make-up of the Twin Cities. They have been drawn by meat-processing plants (and other industries that do not require advanced English language skills) in small Minnesota cities such as Rochester, St. Cloud, Owatonna, Faribault, and Marshall, and the Wisconsin “turkey capital” of Barron. Much like Latino meatpackers before them, Somalis have faced racism and cultural gaps in previously monoethnic rural towns. However, these gaps are exacerbated by religious differences and a negative focus on Somali Muslim immigrants after the release of “Black Hawk Down” and September 11th. The study is using a survey to trace the migrations of refugees from Somalia to Barron, and contrast their experiences to urban Somali immigrants. The study also compares the policies of rural communities toward Somalis, and recommends proactively educating rural residents about the new immigrants.


Changes in housing costs and values can tell a great deal about a geographic region. This poster focuses on the changes in new housing costs and reported values from the US Census Bureau in the city of Eau Claire from 1981-2001. It shows the changing geographic patterns during this period and identifies factors associated with them, including the clustering of new housing developments. Factors associated with these geographic patterns include the age of housing, age structure of the population, and access to major highways. The analysis was conducted at the block group level, which represented advantages over other units of analysis because the boundaries have changed very little from the 1980 Census to the 2000 Census.

THE SPATIAL DISTRIBUTION OF BOUNDARY WATERS CANOE AREA WILDERNESS VISITORS. Britta J. Suppes, undergraduate student, with Brady Foust, faculty, same department.

The Boundary Waters Canoe Area Wilderness (BWCAW) in northern Minnesota is a widely used wilderness area for many different forms of recreation year-round: canoeing, kayaking, fishing, camping, hiking, and motor boating. Thousands of people from around
the country visit the BWCAW each year to partake in these activities. This project uses thematic mapping to analyze the spatial distribution of BWCAW users across the conterminous United States. Records acquired from the US Forest Service containing data on the total number of visitors for the year 2004 identify Minnesota residents using the BWCAW the most out of any other state in the country. The spatial distribution of the visitors within this region is displayed on additional maps using the number of BWCAW users from state zip codes. The zip code data in Minnesota is compared to the variables of median age and median household income within the state for analysis. The data from this project has been calculated in Microsoft Excel and added to ArcMap to create the presented visual representations. The result of this project is aimed to identify information and patterns of the BWCAW users within Minnesota.

A STUDY OF VEGETATION METHODS FOR NATUREMAPPING®: A CITIZEN SCIENCE-BASED PROGRAM. Erin Heidtke, undergraduate student, with Lisa Theo, faculty, same department.


In this research project, vegetation inventory methods were studied to determine a suitable protocol for use in NatureMapping®, which is a citizen science-based program. NatureMapping® was developed at the University of Washington and is a training program for average citizens to identify, locate, and inventory vegetation. The importance of NatureMapping® is that ecologists and other scientists can locate appropriate sites for further research. Fauna is the principle aspect that is being inventoried; whereas this work aims at adding a flora component. Currently, only Iowa’s NatureMapping® program employs a vegetative protocol, but only as an invasive plant species inventory. The amount of inventory methods existing is extensive and many can be complex, especially for citizens of various educational backgrounds. Thus, inventory methods were narrowed down to three choices: line transects, circle, and point quadrates. These methods were tested in four areas (lowland savanna, woodland transition area, highland woodland, and dense shrubland) at Beaver Creek Reserve in Fall Creek, Wisconsin. Six study sites were delineated: two in the lowland savanna as well as the woodland transition area and one study site in each of the highland woodland and dense shrubland habitats. Within these study areas the three vegetation inventory methods were conducted.

THREE-DIMENSIONAL SUBSURFACE GPR VISUALIZATION FOR AN ARCHAEOLOGICAL SITE (QUMRAN, ISRAEL) AND A GEOMORPHIC SITE (MICHIGAN). Jeremy Ticagoe, undergraduate student, with Harry Jol, faculty, same department, Timothy G. Fisher, University of Toledo, Richard A. Freund, University of Hartford, Philip Reeder, University of South Florida, Carl Savage, Drew University, and Paul D. Bauman, Komex, International, LTD.


To better understand archaeological and geomorphic sites, ground penetrating radar (GPR) has become a popular non-invasive, nondestructive, and time-efficient method of data collection. Increasingly, three-dimensional (3D) GPR datasets have been collected because their results significantly enhance the ability to view, analyze, and interpret the
subsurface. The results from several 3-D GPR visualization programs using data from two sites—an archaeologically significant site in Israel and a gravel dune in southern Michigan—will be presented. At Qumran, Israel, site of the Dead Sea Scroll discoveries, a tomb (#1000) or “mourning enclosure” was surveyed to investigate the possibility of a deeper burial. The site (3m x 4m) was gridded and data was collected with two antennae frequencies (225 MHz and 450 MHz). The GPR dataset and resulting 3-D visualization convinced the head archaeologist to initiate an archaeological dig. The excavation resulted in the discovery of a full human skeleton and associated artifacts. The position of the elaborate first century CE burial chamber suggests that a person of significant importance was buried here. The second site, Rockwell pit, is located in a shallow incipient tunnel channel along the distal side of the Kalamazoo upland (south-central Michigan). Its hummocky terrain, composed of boulder gravel and, above, a supraglacial melt-out till or flow till, has been described as a product of subglacial melt water processes. GPR data (20m x ~30m grid) was collected within the gravel pit using 100 MHz antennae. Interpretation of the 3-D visualization reveals that the hummocks are large-scale fluvial bedforms, gravel dunes, that would have been deposited subglacially in the tunnel channel. The results corroborate with previous suggestions that subglacial meltwater has played an important role in the evolution of the subglacial environment beneath the Saginaw Lobe in Michigan. The project demonstrates that 3-D GPR data collection and the application of 3-D visualization techniques should continue to play a significant role in contributing towards a better understanding of the physical environment.

**Geography and Anthropology/Geology**


The Crepeele Dune Field (CDF) is one of 18 late-Holocene parabolic dune fields in the Glacial Lake Hind Basin. Previous Study of Cultural Adaptations within the Prairie Ecozone(SCAPE) research shows that such localities are characterized by greater geomorphic and ecological complexity than the Canadian prairie region as a whole and were, therefore, important loci of pre-contact human activity. The purpose of this research is to determine the extent to which forest communities (oak savanna and aspen parkland) that dominate the CDF today were a part of that ecological complexity throughout the late-Holocene. Ten buried soil profiles were described in the walls of archaeological excavation units, their position and orientation relative to parabolic dunes were mapped using GPS and ArcView, and a POD indexes, a proxy for degree of podzolization, was determined for each. Podzol morphology is consistent with soil formation under forest vegetation. POD indexes range from 0 (no podzol morphology) to 4, a range consistent with the age and texture of the parent material. Seven of the buried soil profiles observed exhibit podzolic morphology (Ah-E-Bw horizonation). Soils with POD indexes of 2-4 are clustered near dunes and are usually associated with cultural materials. Non podzol soils are found in low landscape positions near the water table or high on dunes where wind erosion is frequent. The presence of buried podzolic soil profiles strongly suggests forest communities were
present within the CDF throughout the late-Holocene and that forest-related resources were an important factor in attracting humans to the CDF.


Lewis and Clark, legendary explorers of the western USA, spent the winter of 1805 along the Oregon coastline. During their stay, they mapped many locations, including a native village along the former Clatsop River. Several wooden structures south of the river’s outlet to the Pacific Ocean were noted in their journals. Previous investigations by other researchers have failed to located the historic site. This research coincides with the Lewis and Clark Bicentennial and seeks to resolve the physical location of the Clatsop native village and associated Clatsop River channel outlet. After reviewing Lewis and Clark’s map and journal records, and speaking with local residents, a study area was selected along the west shore of Slusher Lake, within the Camp Rilea Military Training Facility, near Warrenton, OR. Ground penetrating radar (GPR) equipment (PulseEKKO 100 and 1000 systems) was used to image the subsurface to depths of up to 16 m. An Australian bucket auger and Oakfield soil borer were used to collect 21 cores. A Trimble ProXR differential global positioning system (dGPS) and ArcGIS 8.3 were used to create a spatial database and site map that incorporates the locations of laser level stations, soil cores and descriptions, GPR transects, and surrounding site infrastructure. GPR profiles collected along the ridge west of Slusher Lake show parallel to subparallel, continuous to semi-continuous reflection patterns, which are interpreted as vertically accreting coastal sand dunes. A channel-form reflection pattern was noted on the GPR records northwest of Slusher Lake and is interpreted as the old, relict Clatsop River outlet originally mapped by Lewis and Clark. Core samples collected to a maximum depth of 6 m along the GPR profiles reveal no buried soils or cultural remains. This suggests that the village is located > 6 m below the modern surface. These results have helped constrain the physical location of the historic native village mapped by Lewis and Clark and are being used to plan a detailed subsurface investigation within the Slusher Lake study area. Future work will involve the use of GPR and hydraulic coring equipment to attempt to locate and sample cultural remnants dating to the time of Lewis and Clarks’ arrival.


Sediments exposed at Flintstone Hill in a Souris River cut-bank provide the most complete postglacial stratigraphic section in the Glacial Lake Hind Basin (GLHB), southwestern Manitoba. Four lithologic units, A-D, are observed: A1 (~2 m thick), glaciolacustrine silts and clays that grade upward to peat and record final regression of Glacial Lake Hind (~10 500-9300 BP); A2 (~1.5 m thick), low energy fluvial marl and silts grading to O-horizon(s) (by 6700 BP); B (1.5 m thick), dune sands that migrated from the southwest, contrary to the modern wind regime (after ~6700 BP); C (1.0 m thick), thin fluvial deposit between eolian sand sheets (~5500-3200 BP); D (up to 7 m thick), parabolic dune on the
modern landscape oriented consistent with the modern wind regime, blowouts suggest episodic dune reactivation (~3200 BP to present). Overall, Flintstone Hill deposits record draining of Glacial Lake Hind, establishment of the Souris River channel through the GLHB, mid-Holocene eolian activity / landscape instability greater than present, and a return to nearly modern conditions by ~5400 BP. Native inhabitants in the GLHB focused on exploiting wetlands and wet meadows before 9300 BP and a landscape similar to the present thereafter.


A sedimentary sequence spanning much of the Holocene is exposed in cut-banks of the Souris River in glacial Lake Hind Basin, southwestern Manitoba. Unit A, at the base of the sequence is a glaciolacustrine silty-clay with peat and logs (A1) grading upward to alluvium (A2), is overlain by Unit B, a fine- to medium-grained sand unit with steep foresets dipping east to southeast (mid-Holocene dune deposits). Unit B is overlain in turn by Unit C, a thin eolian sand sheet capped by a well-expressed buried soil profile(s), and Unit D, an upper fine- to medium-grained sand unit containing buried soil horizons (late Holocene dunes). At the Atkinson cut-bank, however, mid-Holocene dunes interfinger laterally with fluvial sediments that host rare mid-Holocene Gowen archeological material (radiocarbon age from charcoal: 5280±50 BP). The purpose of this study is to determine the nature of the relationship between mid-Holocene dunes (Unit B) and the adjacent alluvium (Unit A2) and to clarify the paleoenvironmental context of the archeological site. Cut-bank and core data combined with a topographic survey were used to develop a three-dimensional reconstruction of the stratigraphy of the study site. At the eastern end of the cut-bank, Unit B thins and terminates as it interfingers with a silty clay texture facies of Unit A, which is interpreted as overbank fluvial. Within Unit B, poorly expressed A-C buried soil profiles are developed on a few dune foresets where the lower 1 to 1.5 m of the foreset is draped with a millimeter-scale layer of silty sediment. Foresets displaying these characteristics are more closely spaced at the east end of the cut-bank, where the silty drapes extend laterally and merge into adjacent stream floodplain sediments. These observations indicate that during the mid-Holocene, the dune encroached onto the floodplain, but periodically stabilized, permitting soil formation on the dune surface and overbank stream flooding of the dune toe. The proximity of dune and stream environments provided a resource-rich habitat for mid-Holocene people. Except for more active dune migration, the landscape was similar to the modern setting. The apparent lack of Gowen archaeological sites in Manitoba may result from burial by late Holocene sediments rather than abandonment of the area in response to mid-Holocene aridity.

ORIGIN AND DISTRIBUTION OF FLUVIAL TERRACES ALONG THE SASKATCHEWAN AND SOUTH SASKATCHEWAN RIVERS: A GIS AND GPS APPROACH. Adam Lange, undergraduate student, with Garry Running, faculty, Geography and Anthropology, Karen Havholm, faculty, Geology, and Dion Wiseman, Brandon University, MB.
The project’s purpose is to provide archaeologists and geoscientists seeking sites suitable for their investigations with a model of terraces (number, location, and stratigraphy) and landscape evolution within the South Saskatchewan River Valley through postglacial time. Research conducted in 2002 revealed four terraces (T1-T4) and an active floodplain (T0) within the study reach. Terrace ages were determined, and their aerial extent was mapped. This year, more sites were sampled using a Geoprobe and mapped using dGPS. Elevation data, dGPS transects, was also collected. Terraces, including a newly identified terrace (T5) were remapped using aerial photographs constrained by dGPS elevation data. T3 through T5, previously mapped together, are cut into till or glaciolacustrine deposits and are graded to terminal late-Pleistocene levels of glacial lakes Saskatchewan and Agassiz. T1 and T2 (<500->2000 BP, and <4000 to ~9200 BP respectively) are composed of a silty vertical accretion facies with numerous thin, weakly expressed buried soil profiles over sand and gravel lateral accretion facies. Abandonment of T1 and T2 and subsequent incision resulted from adjustments to local base level changes controlled by glacial Lake Agassiz. Geoarchaeological investigations should focus on T1 and T2 where deeply buried, stratified archaeological sites are to be expected.

**Geography and Anthropology/History**

**ARCHAEOLOGICAL FAUNAL ANALYSIS AND THE BLACK DEATH. Jennifer Immich,** undergraduate student, with **Thomas Miller,** faculty, History, and **Robert Barth,** faculty, Geography and Anthropology.


Academics have generally identified the Black Death of the 14th century as the bubonic plague. Some historians and scientists now assume other diseases, predominately anthrax, as the actual cause. The inability to identify the biological agent of the Black Death through the historical record is due to the similar symptoms and transmission patterns of bubonic plague and anthrax in humans. Each disease, however, utilizes different animal carriers. The black rat is the primary carrier of the bubonic plague, whereas cattle and sheep both carry anthrax. To further the investigation of the biological identity of the Black Death, archaeological faunal evidence beginning in 1347, the date of entry into England, is analyzed. Through tracking increases and decreases of faunal remains for the above species, during outbreaks, it may be possible to isolate the biological agent of the Black Death in England. The specific target of this research is the epidemic’s entry point into southern England, modern day Hampshire. The results will determine if faunal analysis is a potentially productive approach to determining the true identity of the Black Death.

**Geology**

**ARSENIC METAL SPECIATION IN MINE CONTAMINATED LACUSTRINE SEDIMENT USING TEM/ HR-ICPMS AND CALIBRATED SEQUENTIAL EXTRACTION. Kelly Plathe,** undergraduate student, with **Robert Hooper** and **J. Brian Mahoney,** faculty, same department.

*American Geophysical Union 2004 Joint Assembly, Montreal, Quebec, 17-20 May 2004.*

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48 Center of Excellence for Faculty & Undergraduate Student Research Collaboration
Lakes in the lower CDA river system, Idaho, have been contaminated with high concentrations of metals from over 100 years of sulfide mining. To elucidate downstream variation in arsenic speciation, sediment cores from three different lakes (Killarney, Swan, and Thompson) were analyzed using HR-ICPMS on sequentially extracted (SE) samples and TEM. Unlike Swan Lake, whose only inlet is dammed, Killarney and Thompson are both connected to the main channel by distributaries, providing an inlet for sediment recharge during high water events. Arsenic SE patterns for Killarney and Thompson lakes are similar, showing increasing As in the exchangeable fraction with depth. TEM results show both Killarney and Thompson lakes having considerable As in both detrital (3.61wt%) and biogenic (1.91wt%) sulfidic phases. Near the premining surface, detrital sulfides become rare and biogenic sulfidic phases are the primary form of As sequestration. Swan Lake shows greater biogenic sequestration in the upper third of the contaminated column associated with ZnS and metal-rich sulfidic nano-particles up to 2.44wt% As. The differences in As speciation are presumably due to periodic oxygenation of sediment in Killarney and Thompson during low water level periods.


Exposed crystalline basement rocks provide the most detailed information available on the structure and evolution of the continental crust of the western United States. In the coming decade Earthscope and other regional- to continent-scale geophysical experiments will provide an unprecedented image of the deeper structure of the crust and mantle. The interpretation of these geophysical data will depend, to a large degree, on integrating large geophysical datasets with local to regional geologic mapping, structural observations, geochemical data, and geochronologic ages. The BASMAP project is designed to rapidly meet the pressing need for a consistent, dynamic, and extensible spatial database of crystalline basement rocks in the western US that is compatible with large geophysical datasets. The scope of the BASMAP project is crustal rocks throughout the western US although the prototype is limited to the southern Rocky Mountains of Wyoming, Colorado, and New Mexico. The initial implementation of BASMAP comprises: (1) an object-oriented database of structural, petrologic, geochemical, and geochronologic data, (2) a GIS spatial database with a range of scale/resolution, and (3) a set of tools for accessing, analyzing, and plotting data. The prototype incorporates geologic mapping at a variety of scales and demonstrates dynamic retrieval and plotting of structural, geochemical, and geochronologic, and geophysical data. Preliminary results of three geologic/geophysical applications of BASMAP are presented: (1) analysis of 40Ar/39Ar data from Colorado and New Mexico, (2) spatial relationships between pseudotachylyte and ultramylonite zones in the Homestake shear zone Colorado, (3) integration of geologic observations and geophysical data from the Continental Dynamics of the Rocky Mountains (CD-ROM) transect. Continued development and dissemination of BASMAP will facilitate geophysical interpretation of the crustal structure of the western US utilizing consistent and current geologic, geochemical, and geochronologic data.

Geochemical analyses of the Sweet Grass Hills intrusive suite (SGH) of northern MT show strong arc-like affinities similar to the high-potassic magmas that make up the Cretaceous Boulder and Idaho batholiths. This is striking, given the extreme eastern location of the SGH relative to the active arc at the time of their intrusion. We present whole-rock major and trace element analyses, mineral chemistry, and petrographic analyses of a variety of stocks and dikes from the SGH. The intrusive rocks of the SGH sample low-silica, high-alkalic magmas depleted in HFSEs and enriched in LILs, suggesting, at least, that they were derived from similar source material to that of the older batholiths. Our study includes analyses that share arc signatures with some alkalic magmas of similar age from central MT (e.g., from the Highwood Mountains, from the Shonkin Sag, and from Square Butte). Other Eocene alkalic magmas, such as the volatile-rich, ultramafic intrusion at Haystack Butte in central MT, have markedly different trace element signatures that are not tholeiitic and reflect derivation from a separate source. Clearly, at least two distinct sources are involved in the generation of the Eocene magmas. The ultimate cause of the widespread Eocene Cordilleran magmatism is vigorously debated today. Models of shallow slab subduction suggest devolatization as the mechanism for generating these magmas. However, these models cannot account for the concurrent production of two distinct alkalic magma types. Knowledge of the current structure of the lithosphere as illustrated by the LITHOPROBE and ACCRETE projects can be extended to provide insights into the nature and setting of magmatic activity in the Paleogene.


Remediating fluvial systems impacted by sulfide mining requires characterization of contaminant mobility and the pathways of trace metal transport. Variations in sediment mobility, mineral stability, organic content, redox conditions, microbial activity, and other factors between fluvial Subenvironments leads to complex metal sequestration patterns. Precise characterization of contaminants requires a detailed assessment of the physical characteristics of mineral species together with an understanding of the chemical stability of these species under various conditions. An integrated analytical methodology including calibrated sequential extraction and electron microscopy (SEM and TEM) provides unprecedented insight into metal speciation and behavior in different fluvial subenvironments. Three transects, including river channel, levee, wetland and Lacustrine environments, along the 30 km length of the lower Coeur d’Alene (CdA) River valley demonstrate both the lateral consistency within various fluvial subenvironments and the dramatics variations between subenvironments.
DEGLACIATION HISTORY OF THE CHINA LAKE AREA, SOUTH-CENTRAL MAINE, BASED ON GLACIOMARINE SEDIMENTS AND NEWLY OBTAINED C-14 AGES. David P. Mans, undergraduate student, with Kent Syverson, faculty, same department. 

The China Lake 7.5' quadrangle, south-central Maine, was glaciated by the late Wisconsinan Laurentide Ice Sheet. The area experienced late-glacial marine submergence and has marine sediments exposed well above present sea level. The authors mapped the surficial geology of the quadrangle as part of the STATEMAP co-op between the Maine Geological Survey and USGS. Prior to mapping, aerial photographs, topographic maps, well logs, and soils mapping (Faust and LaFlamme, 1978) were used to create a preliminary sediment map. The authors then conducted field work for four weeks in the China Lake area describing sediments in road cuts, gravel pits, auger cores, and collecting in-situ marine shell fossils. The stratigraphic succession of Pleistocene sediments in the study area includes till, eskers, submarine fans, deltas, glaciomarine silt and clay (Presumpscot Fm.), and subaerial outwash. Several glaciomarine deltas with gravelly foreset beds up to 10 m thick are present south of China Lake, including the Meadow Brook delta. At the top of the Presumpscot Fm., in-situ shell fossils were collected. Two new radiocarbon ages (uncorrected for the marine-reservoir effect) have been obtained: Palermo site, 11,980 +/- 230 yrs BP, GX# 31328, Mytilus edulis, elev. 73 to 76 m, UTM 460,593mE 4,926,820mN; and E. Vassalboro site, 13,400 +/- 70 yrs BP, GX# 31329, Portlandia arctica, elev. 58 to 63 m, UTM 450,750mE 4,923,230mN. Marine sediment is present at elevations up to at least 90 m a.s.l. in the quadrangle, and this represents a minimum elevation for late-glacial sea level in the China Lake area. The Meadow Brook delta has a surface elevation of approximately 96 to 98 m, but the topset-foreset contact was not visible. Deglaciation of the study area occurred by approx. 13,400 C-14 yrs BP (E. Vassalboro site). This age correlates well with published deglaciation isochrons (Retelle and Weddle, 2001; Borns and others, 2004). The Palermo radiocarbon age is much younger than expected based on an analysis of relative sea-level change and postglacial uplift by Retelle and Weddle (2001). By 11,980 C-14 years ago relative sea level should have been much lower in the area. This large age discrepancy is poorly understood at this time, but the large error bar in this date might be an indicator of poor accuracy.

GEOCHEMICAL CHARACTERISTICS OF GLACIOGENIC SEDIMENTS, PUGET LOWLAND, WASHINGTON. Sarah Prindiville, undergraduate student, with J. Brian Mahoney, faculty, same department, and Kathy Goetz Troost and Derek Booth. University of Washington.

Quaternary sediments in the Puget Lowland comprise a complex succession of intercalated glacial, glaciofluvial, and glaciomarine sediments deposited during repetitive glacial and interglacial periods. The primary source regions include crystalline rocks from the southern Canadian Cordillera (SCC) and volcanic strata from the Cascade Range and Olympic Mountains, but the relative contribution from each source varied through time. In gen-
eral, major glacial advances provided sediment from the SCC, and interglacial periods were dominated by locally derived Cascadian/Olympic detritus, but complex interfingering facies, diachronous sedimentation and intrabasinal reworking make basin-wide correlation and comprehensive basin analysis difficult. Major and trace element geochemistry from both Quaternary sediments and modern stream drainages from throughout the Puget Lowland suggest that it is possible to discriminate glacial and interglacial sedimentation events through bulk sediment composition. Major glacial advances, such as the Vashon advance, yield sediment that is high in SiO2, Ba, Sr, Cr, Ni, and Cr/V, and low in TiO2, Nb, Ce, V, La, Zr and Th/Sc. These values suggest derivation from exposed continental arc plutons in southern British Columbia, combined with detritus from ocean melanges such as the Bridge River terrane. Conversely, sediments deposited during interglacial periods were derived from Cascade volcanic rocks, and are correspondingly higher in TiO2, Nb, Ce, V, and La. However, simplistic interpretations are dangerous, as sediment mixing, elemental partitioning during weathering and transport and post-depositional elemental mobility can produce non-intuitive geochemical signatures (such as high SiO2 and Cr values in the same sample). However, geochemical provenance assessment based on multiple geochemical indicators permits discrimination between glacial and non-glacial sediments, and may be useful tool in stratigraphic correlations in complex Quaternary sediments of the Puget Lowland.


Throughout the Twentieth Century, human activities have heavily impacted coastal wetland environments. Drainage and filling, clearing of vegetation, and pollution are a few of such activities that have contributed towards the loss of these habitats. Cumbebin Swamp is a low-lying, estuarine/alluvial flood plain that is situated southwest of the township of Byron Bay along the northern New South Wales coastline. It is remnant of what was once a regionally-significant wetland system. The dominant lithological groups present in the Cumbebin Swamp area are of Quarternary origin and overlie Paleozoic metamorphic bedrock. Soil types present in Cumbebin Swamp include massive black and gray coastal clays that have been derived from a combination of alluvial materials originating from basalts, sandstones, metamorphic rocks, and marine sediments. Some areas of the swamp contain overlying acidic peats. The purpose of this study has been to determine the geological origin and evolution of Cumbebin Swamp, and to provide a geological framework for carbon sequestration studies. Vibracore equipment was used to collect a 53 cm-long, 12 cm-diameter wetland core. Swamp sediments were characterized in terms of thickness, location within the swamp stratigraphy, and environment of deposition. Detailed geology and soils maps of Cumbebin Swamp and surrounding coastal plain were compiled using NSW Department of Mineral Resources data and ArcView 8 software. Aerial photography reveals evidence of older, relict coastal embayments, and the kidney-shaped appearance of the swamp suggests that it may correspond with an estuary or lagoon environment. Eight distinct layers of sediment have been identified throughout the wetland core. Acidic, water-saturated, oxygen-poor conditions are responsible for peat deposition since the last high sea level (which peaked 1 m APSL and occurred 6.5 ka), and this sediment was found up to
20 cm below the swamp surface. The presence of a reddish-brown, oxidized layer of sand 10-17 cm in depth suggests that two periods of peat deposition may have taken place. Fine-grained quartz sand was found 20-34 cm below the swamp surface and overlies a 6-cm thick bed of angular quartz gravel. This material may represent weathered Paleozoic rocks. A 10 cm-thick layer of impenetrable coffee-rock was found at the base of the core.

**LATE MESOZOIC-CENOZOIC EVOLUTION OF THE NORTH AMERICAN CORDILLERA: LITHOSPHERIC RESPONSE TO PLUME-SLAB INTERACTION.** James Watkins, Breck Johnson, and Jesse Bernhardt, undergraduate students, with Phillip Ihinger, faculty, same department. 

Throughout the late Mesozoic and Cenozoic eras, western North America experienced widespread deformation and volcanism. The nature and extent of this activity does not fit conveniently into the plate tectonic framework for crustal evolution. To date, there is no satisfying explanation that integrates the Laramide Orogeny, Basin and Range extensional activity, and the rise of the Colorado Plateau with the voluminous Tertiary volcanism including Eocene high-K magmatism, the mid-Tertiary ignimbrite ‘flare-up’ in and around the Great Basin, and the more recent outpouring of the Columbia River flood basalts (CRB). In fact, the unusual spatial and temporal relationship between the CRB and the on-going, time-progressive basaltic and rhyolitic volcanism associated with the Yellowstone hot spot track has led some researchers to question whether upwelling plumes do indeed exist. We note that magmas produced in western North America throughout the Cenozoic were derived from two compositionally distinct source regions: the subcontinental lithosphere (representing $>$95% of the magmatism) and the OIB source region ($<$5%). The two magma types occur at the same place and time throughout the province. We propose that the impingement of the positively buoyant plume head of the Yellowstone hot spot with the underside of the negatively buoyant, subducting Farallon plate at 80 My is responsible for the widespread Tertiary deformation and magmatic activity in the North American Cordillera. The dynamics of mantle flow required to accommodate the mutual passing of the two bodies led to a crisis in the normal mantle flow regime. Upwelling of the plume head was accommodated by shallowing both the Farallon slab and the overlying mantle wedge. This activity drove the subsequent tectonic of the overriding continental lithosphere for nearly 80 My. We argue that this model is consistent with existing geological, geochemical, and geophysical observations of the Cordillera; it provides a new framework in which to view several present-day features of the Cordilleran province, including the observed broad regional uplift, high heat flow, and the anomalous slow propagation of P and S waves through the underlying upper mantle.

**ORIGIN AND EVOLUTION OF LAKE AINSWORTH, NORTHEASTERN NEW SOUTH WALES, AUSTRALIA: COASTAL FLUCTUATIONS IN THE SOUTHERN HEMISPHERE.** Kevin Gostomski, undergraduate student, with Steve Abbott, Southern Cross University, Australia. 
*Annual Meeting of the Geological Society of America, Denver, CO, 7-10 Nov. 2004.*

Lake Ainsworth is a freshwater coastal dune lake in northeastern New South Wales. In its close proximity to the ocean, it may have been intermittently open to the sea in the past. The regional geologic setting includes the alluvial flood plain that Lake Ainsworth is settled
on, which is a collection of marine, estuarine, and alluvial deposits of Pleistocene and Holocene age. The Lake Ainsworth site has been subjugated to changing sea levels. Since the last interglacial sea level high stand 120,000 years ago, inner and outer barrier systems have been preserved. During Holocene time, seas peaked again at 1 meter above present sea level, but preserved 4-6 metres above modern sea level, indicating 3-5 metres of uplift. This study was designed to interpret map and core information to deduce the origin and evolution of the lake. A Vibracore machine was used to gather core data from the area surrounding Lake Ainsworth. The coring information was used to discover amounts of past marine influence, while looking at the stratigraphy to give insight to possible origins of the lake. GIS mapping and the use of ArcView 8 were used to compile information into maps and diagrams. The core data showed the first 16-20 cm was peat, and the remaining meter of the cores was alternating clay and fine-grained sand. There was no evidence of shells or marine deposits. Based on these cores, Ainsworth was not likely formed by ocean interaction, and has no evidence of a marine environment. Instead, the data from aerial photos show an ancient estuarine system that could have connected with the lake in the past. Other ideas of formation include the erosion of a Pleistocene barrier during a storm surge, or as the sea levels rose to their present day heights, the groundwater rising with it, leading to the formation of the lake in a depression.


The Antarctic Peninsula is an area where climate change has caused glacier ice to thin rapidly. Gilbert and others (2003) propose that the large Greenpeace Trough was scoured subglacially during the Last Glacial Maximum as an ice stream flowed northeastward across the inner shelf. As the ice sheet thinned, probably during the late Pleistocene or early Holocene, the high Seal Nunataks area west of Robertson Island became a barrier that diverted flow from the Antarctic Peninsula to the southeast across the shelf and Greenpeace Trough. The Seal Nunataks separated the thinning ice sheet into the partially floating Larsen A and B Ice Shelves in the Weddell Sea. Till lithologies should be a useful tool to determine if this flow-pattern hypothesis is correct. Bedrock lithologies vary in the region. Upper Cretaceous, thinly bedded siltstones with concretionary horizons exist at Cape Marsh on Robertson Island. To the west, the Seal Nunataks contain late Cenozoic olivine-rich basalt. Farther west, rocks of the eastern Antarctic Peninsula contain granitoid intrusive rocks and middle Jurassic to lower Cretaceous basalt-andesite-rhyolite assemblages with abundant pyroclastic rocks. Upper Paleozoic to lower Mesozoic marine siltstone and shale are located on the eastern side of the peninsula and also within the Greenpeace Trough. If Gilbert and others (2003) are correct, older till lithologies should be locally derived (basalt and siltstone), and younger till units should reveal more distal lithologies (andesite, rhyolite, granitoids). Glacial till samples were collected from the eastern edge of the Robertson Island Ice Cap at Cape Marsh. Sieving was performed to obtain the greater-than-63 micron sand and gravel fractions. In order to determine till provenance, the lead author will perform petrologic analyses of the Robertson Island/Cape Marsh glacial till samples. A binocular microscope will be used to identify and count shale, feldspar, quartz, mafic and
felsic igneous, and metamorphic rock grains in the sieved sand and gravel fractions. The authors predict that the youngest till on Cape Marsh should have more variable, distal lithologies than older till. Preliminary results will help determine if further study is warranted.

**RECONCILING OBSERVATIONS OF THE YELLOWSTONE HOTSPOT WITH THE STANDARD PLUME MODEL.** James Watkins and Breck Johnson, undergraduate students, with Phillip Ihinger, faculty, same department.  

The Yellowstone hotspot represents the type example of plume magmatism in the continental setting. The propagation of large silicic magmatic centers along the Snake River Plain independently tracks the southwestward trajectory of North American plate motion over the last 13 My. Structural deformation associated with the hotspot track is consistent with thermal upwelling, and tomographic studies image a well-defined cylindrical conduit at least down to the mantle transition zone. Furthermore, the high 3He/4He signatures suggest a deep mantle origin for Yellowstone magmas. Yet, there are several observations of the Yellowstone region that do not fit the standard plume model for hotspot magmatism. These include: 1) prevalent coeval magmatism in and around the hotspot track that continued well after passage of the underlying plume, 2) significant bimodal magmatism that occurred throughout the Great Basin during this time, and 3) the outpouring of the Miocene Columbia River flood basalts (CRFB) well north of the hotspot track. These features have led a number of researchers to favor a shallow upper mantle origin for Yellowstone hotspot activity controlled by structural weaknesses in the continental lithosphere. Here, we propose that the observations listed above conform to the standard plume model by considering interaction of the Yellowstone plume with the descending Farallon Plate beginning at 80 Ma. Anomalous geologic activity occurred throughout the Cenozoic Era in the North American Cordillera (NAC) and must be addressed in any model for the origin of magmatism in the western US, including the Yellowstone hotspot. In particular, extensive field and geochemical studies document a pronounced eastward migration of deformation and magmatism throughout the NAC from 80 to 40 Ma. Most researchers attribute this activity to shallowing of the Farallon slab beneath NA at this time. In addition, geochemical studies in the NAC document a transition in magmatism from predominantly calc-alkaline (associated with ancient slab-derived fluids within the subcontinental lithosphere) to predominantly tholeiitic (with distinctive OIB signatures). This transition has been attributed to the eventual foundering of the shallow slab with replacement by ‘asthenosphere’. Here, we document that magmas with OIB affinity are observed throughout the Cenozoic in the NAC, often before a documented ‘transition’. We show that these magmas are primarily binary mixtures of two well-known mantle plume components EMI and FOZO. In our model, we propose that the Yellowstone starting plumehead impinged beneath the subducting Farallon Plate at 80 Ma and spread laterally while continuing to ascend. Magmas with OIB affinity erupted only after penetration of the plume through the cold, rigid Farallon slab. In this way, the CRFB, at only 10% of the eruptive volume of typical flood basalt provinces, represent partial melting of only a fraction of the original Yellowstone starting plumehead. Evidence of additional leakage of the plume is found in the Chilcotin flood basalts in BC, the Crescent Terrane volcanics in the Pacific Northwest, and kimberlites, diatremes, and widespread basaltic flows found throughout the NAC.
Collectively, the magmatic features that seem to oppose the plume hypothesis can be reconciled by considering a broader context for the origin of the Yellowstone hotspot. Indeed, the ‘anomalous’ geologic activity observed within the NAC is anticipated by the standard plume model; the frequency of hotspots observed on Earth demands that some starting plumeheads will encounter destructive plate margins and generate significant uplift, deformation, and magmatism within a broad region of the overriding lithosphere(s).


The Late Cretaceous Boulder Batholith of southwestern Montana represents a voluminous early phase of the eastward migration of calc-alkaline magmatism into the foreland of the pre-existing Mesozoic arc. The relationship of this magmatism to adjacent, contemporaneous ‘thin-skinned’ fold-and-thrust deformation remains enigmatic. The intrusive complex comprises 15 major plutons and numerous satellite stocks. Early geochemical and isotopic studies of the intrusions distinguished two separate magmatic suites, a main potassium-rich series and a peripheral sodium-rich series. In an attempt to constrain the origin and evolution of the two series, we have undertaken a detailed geochemical and geochronological study of 45 samples from 14 separate plutons and 8 samples from 4 individual satellite stocks. Preliminary analyses of most major and trace elements show predictable magmatic fractionation trends that are continuous and overlap one another. Rather, the two series are only distinguishable in the abundance of elements that show significant mobility in subsolidus, hydrothermal processes.


The Disturbed Belt of western Montana describes a series of east-vergent Late Cretaceous folds and thrust faults that have imbricated Precambrian strata of the Belt Supergroup with Paleozoic miogeoclinal strata and Mesozoic sedimentary rocks of the Rocky Mountain foreland. Deposition of the Elkhorn Mountain volcanics and emplacement of the coeval Boulder Batholith and associated satellite plutons were roughly synchronous with structural deformation. The genetic relationship between deformation and regionally extensive magmatism during the Late Cretaceous is a matter of debate. The Devils Fence anticlinorium is a thin-skinned deformational system within the hanging wall of the Lombard thrust plate of the Helena salient within the Disturbed Belt. The anticlinorium was mapped in the late 1940s and early 1950s as part of a regional investigation into the geology and mineral deposits of the Boulder Batholith. New 1:24,000 scale geologic mapping of the region, undertaken under the auspices of the USGS EDMAP program, in association with Montana Bureau of Mines and Geology, will produce an updated series of 7.5 minute quadrangle maps, detailed cross sections, and a significant amount of new geochemical and geochronological data. Our aim is to document the genetic relationship between Late Cre-
taceous contractional deformation and magma emplacement. Detailed mapping in conjunction with geochemical and geochronological analysis will allow us to produce an accurate assessment of the timing of deformation and magma emplacement within the Devils Fence anticlinorium. New mapping has confirmed the basic framework established in earlier studies and has identified a number of previously unrecognized subsidiary contractional structures on the flanks of the main anticlinorium. Deformed sedimentary strata are intruded by a compositionally diverse suite of stocks, dikes, and sills including pyroxene diorite, hornblende granodiorite, and andesite porphyry, presumably related to the emplacement of the Cretaceous Boulder Batholith. New geochronologic constraints on the timing of deformation and magmatism are provided by U/Pb ages from the Doherty Mt and Sagebrush Park stocks as well as the basal member of the Elkhorn Mountain volcanic package.


The Phillips 7.5’ Quadrangle, west-central Maine, is underlain by Devonian intrusive and phyllitic rocks of the Appalachian Mountain belt and is located above the Wisconsinan marine limit. The Sandy River flows approximately east-west through the Phillips Quad. Mt. Abraham, a topographic high with 960 m of relief, is directly north of the Phillips Quad. Spruce Mtn. and Day Mtn. are NE-SW-trending ridges that rise 370 m above surrounding areas in the southern part of the quad. Striae in the highest parts of the area indicate that Late Wisconsinan ice covered the entire landscape. We measured 81 groove, striae, and crag and tail sets in the Phillips Quad region during summer 2002 to study topographic effects on ice-flow directions during deglaciation. Striae data were sorted into four size categories, ranging from large grooves to small, inconspicuous striae, and also separated into two geographical categories (either north or south of the Sandy River). In the northern section, rose diagrams show an ESE trend (116° azimuth vector mean) for the largest grooves/striae that formed during ice-flow maximum. Smaller striae show a more easterly flow direction of 102°. In the southern area, grooves and the largest striae have a mean orientation of 133°, more typical of the regional ice-flow direction in this part of Maine. Smaller, less distinct striae indicate ice flow more toward the east (vector mean of 108°, and some striae indicate flow to the ENE). From this data we infer that during the Late Wisconsinan glacial maximum, some ice flowed SE directly over Spruce and Day Mountains. However, Mt. Abraham to the north and Mt. Blue, Spruce Mtn., and Day Mtn. to the south also funneled ice eastward down the east-west-trending Sandy River valley during the glacial maximum. As ice thinned and wasted back, flow was deflected around the mountains. Cross-cutting striae indicate a 47° change in flow direction from SE to ENE on the northeastern flank of Spruce Mtn. Thus, flow indicators record the increasing impact of land-surface topography on ice-flow directions as deglaciation progressed. The smallest striae would have formed beneath active ice that was moving slowly (perhaps at rates of a few meters per year) near the end of the deglaciation sequence.

Hydrothermal quartz crystals from the natural environment contain systematic variations in defect abundances. Using high-resolution FTIR, our group has shown that natural quartz crystals are composed of six sector zones characterized by distinct concentrations of hydrous species, including AlOH, HOH, and LiOH (Ihinger & Zink, 2000). The sector zones are regions within the crystal that correspond to crystallization on the six rhombohedral growth faces. Using micro-IR on samples from Mexico, China, and Brazil, we present measurements that define classic diffusion profiles (with decreasing abundance in impurities toward the six prism faces) superimposed upon otherwise homogeneous concentrations within individual sectors. In all crystals, LiOH exhibits greater diffusive loss compared to HOH, which in turn exhibits greater diffusive loss than AlOH, demonstrating relative mobility in the order LiOH>HOH>AlOH. Analyses from successively younger regions of crystals document progressively lesser diffusive loss, suggesting that diffusion occurs as the crystals are still growing. With accurate knowledge of the temperature dependence of the diffusivity of hydrous species, our measurements may constrain quantitatively crystal growth rates and the temperature evolution of hydrothermal systems.


The western edge of the North American continent has experienced an unusual history of prolonged magmatism and deformation over the last 80 million years. In particular, significant calc-alkaline magmatism and structural deformation are found well inboard of that found at typical continental arc margins. Researchers have documented other curious features in the magmatic and deformational record of the distended province, including: 1) ‘thin-skinned’ deformation of the Sevier orogeny; 2) basement uplift associated with the ‘thick-skinned’ Laramide orogeny; 3) extension in the hinterland contemporaneous with Laramide deformation in the foreland; 4) early Tertiary production to two-mica granites; 5) coeval eruption (same time and same place) of arc-like magmas and magmas with OIB trace element and isotopic signature throughout the province from 50 My to today; 6) basin and range extension during the mid-Tertiary with concurrent production of significant bimodal basalt-rhyolite volcanism; 7) massive outpouring of the Columbia River flood basalts in the Miocene; 8) divergence of the ‘Yellowstone’ hotspot track at ~15 Ma to form the coeval ‘Newberry’ track; and 9) continued active mafic and felsic volcanism. Many of these features have been attributed to the shallowing of the subducting Farallon plate beneath western North America between 80 and 50 My, and substantial evidence supports this hypothesis. Subduction of progressively younger oceanic crust and/or a warm oceanic plateau, and accelerated westward motion of the North American plate are plausible mechanisms already proposed to generate this shallowing, but they fail to account for features 3-9 listed above. We posit that impingement of the positively buoyant starting plume head of the Yellowstone hot spot with the underside of the negatively buoyant, subducting Farallon
plate beginning at ~80 My resulted in massive uplift of the slab, the overlying mantle wedge, and the continental lithosphere. Increased heat flow, uplift-induced pressure release, and fluids released from devolatization led to large-scale melting of the subcontinental lithosphere and crust. Our model is consistent with geophysical measurements of the present-day Cordilleran province, including a seismically anomalous upper mantle, high heat flow, and broad regional uplift.


Several features of the Yellowstone magmatic system appear to contradict a thermal plume model for its origin. These include eruptions of basalt and rhyolite in and around the hotspot track that do not fit the spatial and temporal progression expected for an upwelling plume conduit preceded by a starting plumehead. We show that the unusual features in and around the Yellowstone hotspot track are, in fact, unusual features observed throughout the entire North American Cordillera (NAC). When viewed collectively, these features are best explained as resulting from a single, prolonged tectonic event that impacted the NAC throughout the Cenozoic Era. Our ideas are motivated by consistent geochemical variations of Tertiary mafic NAC magmas that show involvement of two mantle source regions: ancient, isotopically evolved, subcontinental lithosphere (SCL) and the ocean island basalt (OIB) source region found in every oceanic hotspot track. Convergent margin magmas are not dominated by either of these sources, and the presence of OIB argues strongly for contributions from a thermal plume. All NAC magmas with OIB signature have radiogenic isotopic compositions that lay on a binary linear mixing array, a defining characteristic of nearly every hotspot system. A transition from predominantly SCL to OIB source has been documented throughout the NAC, and is consistent with progressive uplift, deformation, and melting of the lithosphere followed by penetration of plume-derived magmas. We cite emergence of five distinct massive outpourings of mafic lava within the NAC during the Tertiary that are similar in character, if not scale, to the huge outpourings of flood basalt observed at the inception of several classic hotspots. We postulate that magma from these provinces was derived from a single starting plumehead that impinged upon the descending Farallon slab in the Late Cretaceous. The prolonged duration and wide spatial distribution of the magmas reflect the time involved in uplifting the cold slab while displacing material in the mantle wedge and the overlying lithosphere. The Yellowstone plumehead and its interaction with the Farallon Plate is thus viewed as the cause of the current topographic high, the current elevated thermal state, and the atypical geologic activity that occurred within the NAC throughout the Cenozoic.


Gertrude Ederle was one of the first female sports heroes in America. Through her athletic achievements she helped make the idea of the “New Woman” more visible to the public. Her triumphs occurred during the 1910s and 1920s, a time engrossed in the conflict between old and new and the changing roles of women. Women were bobbing their hair, raising their hemlines, listening to jazz, driving roadsters, and even participating in athletics. In 1926 Gertrude defied the odds and broke gender barriers when she became the first woman to swim across the English Channel. Not only was she the first woman, she completed the swim two hours faster than any man. During that same year America voted Gertrude the most popular athlete, pulling in more votes than Yankees’ baseball star Babe Ruth. This paper examines her accomplishments and shows how Gertrude helped fuel the equalization process between the sexes in sports. She proved that men are not the only athletes who possess strength, courage, and determination. She opened doors in both sports and society for generations of women who followed in the wake of her achievements.

CHIPPEWA LUMBER AND BOOM CO.: THE ECONOMIC AND SOCIAL IMPACT OF A LOGGING OPERATION ON CHIPPEWA FALLS IN THE LOGGING ERA AND BEYOND. Patrick Tracy, undergraduate student, with Patricia Turner, faculty, same department.


After the demise of the fur trade in the early 19th century, the economy of the upper Midwest declined precipitously. In Chippewa Falls, Wisconsin, and throughout the “Great Northwoods,” this gap was filled by the logging industry. First established in 1836, the Chippewa Lumber & Boom Co. emerged as the most prominent logging enterprise in the Chippewa Valley and at one time operated the largest sawmill under one roof in the world. Created for the website of Chippewa Falls Museum of Industry and Technology, this research project examines the logging industry—and the Chippewa Lumber & Boom Co. in particular—in a local context, using articles from the local newspapers, the Chippewa Lumber & Boom Co. archives located at the Minnesota State Historical Society, and various photographs and maps from local archives and the Chippewa Valley Museum. These sources have been used to create an online exhibit that documents the direct effects of the rise and decline of the logging industry in the Chippewa Valley and the impact that this industry had on the local economy, labor force, and agriculture well into the 20th century.

GLITZ & GLAM: THE MOVIE PALACE LEGACY IN EAU CLAIRE, WISCONSIN 1920-1935. Juli M. Pitzer, undergraduate student, with Jason Tetzloff, faculty, same department.


Recent research conducted in the small city of Eau Claire showed that there were over
twenty-two thriving motion picture houses from the late 1880s until now. Throughout the Roaring Twenties movie houses were designed as ‘palaces’ filled with the newest technological innovations and aesthetically pleasing architecture. This strong heritage in entertainment and motion pictures revealed Eau Claire followed this popular trend nationwide. The two movie palaces were the Wisconsin Theatre and the State Theatre. These theatres were followed through the shift from silent to talking films and black-and-white film to Technicolor. Modern conveniences also focused on marketing visits to the movies as an event for the entire family. These two theatres were significant in Eau Claire because they set the standards for future theatre house design. However, they still remain the most elaborate theatres ever built in the city. The legacy of movie palaces was short-lived throughout the country, but during its momentous peak it was a marvel to each city in which it was bestowed.


In October, 2001, the Stockbridge-Munsee Historical Committee hosted a conference on the topic, “Many Trails of the Mohican Nation.” Twenty presenters, some academic historians, some tribal historians, gathered on the Stockbridge-Munsee Indian Reservation in Shawano County, Wisconsin to discuss Mohican history, culture, and tribal sovereignty. The Tribe’s Historical Committee is working to publish the presentations in a volume. Student cartographers from UW-Eau Claire have designed maps to supplement and highlight the text. In addition, a modified version of the work of the UW-Eau Claire student cartographers will be featured in a forthcoming book by UW-Eau Claire faculty member James Oberly. The book, titled “A Nation of Statesmen: The Political Culture of the Stockbridge-Munsee Mohicans, 1815-1974,” will be published by the University of Oklahoma Press. The modifications to the 2001 maps were made to ensure the integrity of the manuscript.


In popular memory, the 1960s and 1970s are often associated with images of liberated women and long-haired hippies. While those groups are certainly worthy of scholarly attention, their less radical counterparts are equally deserving of a place in the historical record. This paper presents the case of a rather conservative women’s organization whose story seems to counter depictions of the 1960s and 1970s as decades marked only by social change. The Students’ Wives Club of the University of Wisconsin-Eau Claire, which existed from 1963 to 1980, served the social needs of the young wives of married students, needs that were largely unmet by the University itself. Although young marriage was becoming increasingly less common at the national level during these years, members of the Club continued to embrace youthful marriage and childrearing for a variety of reasons. An examination of the Club’s membership and activities suggests the need to address social change as a phenomenon that occurs at the individual and local levels, as well as the broader national level.
RECOVERING THE SOCIAL: PEASANT GRIEVANCES AND L'ETAT SOCIAL PRIOR TO THE FRENCH REVOLUTION. Emily Cramer and Jessica Verschay, undergraduate students, with Patricia Turner, faculty, same department.

In a recent issue of the American Historical Review (February 2003), Rebecca Spang critiqued recent literature on the French Revolution, arguing that the current focus on cultural discourses by philosophes, novelists, and urban “planners and pedagogues” has privileged the French Revolution as a watershed of modernity, while neglecting or rendering “static” the mentalities and experiences of the “poor and the powerless.” To “find the long-lost ‘social,’” Spang challenges us to “return to the archives,” to recover rural narratives that may shed a different light on “how people’s lives were changed by their experiences of the revolutionary period itself.” This paper takes up Spang’s challenge by re-examining what the largest (and consequently most studied) extant record of rural popular opinion prior to the French revolution—the primary cahiers de doléances drawn up by rural parishes in response to the convocation of the Estates-General. For the initial phase of our study, we utilize the computer database of grievances collected by Gilbert Shapiro and John Markoff for their exhaustive content analysis of the cahiers. In their analysis of peasant protest and grievances, Shapiro and Markoff note that while the parish cahiers reflect the same “openness to change” as those of the Nobility and Third Estate, rural people appear “minimally interested in political structures” and uninterested in “civil liberties.” In short, if the reputation of the Revolution as the harbinger of modernity and modern political structures rests on the transformation of French subjects into citizens, the peasantry would appear in 1789 to be politically and psychologically unprepared. Or are they? Grievances may reveal more than political attitudes and material demands for reform; they can also reflect underlying beliefs and expectations about what Alexis de Tocqueville referred to as l'etat social. Tocqueville argued that democracy is not rooted ultimately in political assemblies or written constitutions, but in a “democratic social state” based on an “equality of conditions.” In Democracy in America, he traced the emergence of a democratic social state to the birth of the colonies in New England, and to the attitudes and expectations of emigrants who “had no idea of any superiority whatsoever of some over others.” Their outlook would hardly seem analogous to that of the French peasantry in 1789, burdened by and acutely aware of the social and economic inequities legitimated by aristocratic privilege. But can we discern in their often radical demands for reform important shifts in their expectations about their social state and status, both vis-à-vis those above them—King and seigneurial lord—and those below—the poor and indigent? By using the Shapiro and Markoff database to locate and analyze the rural cahiers within their representative sample which contain grievances related to the King, the seigneurial regime, and the poor, this paper examines in detail the social rationale behind these grievances. We argue that while French peasants may not have conceived of themselves as political actors, nor have articulated demands that reflect modern political conceptions of citizenship and popular sovereignty, their grievances nonetheless reflect dynamic and incipiently modern expectations about the French état social on the eve of the French Revolution.
COMORBID DIAGNOSIS AND CONCOMINTANT MEDICAL TREATMENT FOR CHILDREN WITH EMOTIONAL AND BEHAVIORAL DISORDERS.

Kristina Hall, Krista Bowman, Melissa Irwin, and Katie Ley, undergraduate students, with William Frankenberger, faculty, same department.


The purpose of the current study is to determine the types of psychiatric disorders and corresponding medications prescribed to children enrolled in the elementary Emotional Behavioral Disability (EBD) programs. The project will employ a questionnaire that will be distributed to elementary level EBD teachers to determine the percent of children identified with Attention Deficit Hyperactivity Disorder, anxiety, depression, and any other psychiatric disorders. In addition, the project will determine the number of children treated with multiple psychiatric medications. Additionally, the research will assess the attitudes of EBD teachers concerning the use of psychiatric medication to treat elementary level children. Due to the minimal amount of research existing concerning this subject, the current study aims to gather information to increase public awareness and understanding of the current level of psychiatric disorders and corresponding treatment among elementary level EBD children.

INTERDISCIPLINARY TEAM IMPACT ON IMPRESSIONS AND BELIEFS ABOUT INTERDISCIPLINARY TEAM PROCESS. Tasha Alexander and Erin Marsh, undergraduate students, with La Vonne Cornell-Swanson and Linda Carpenter, faculty, same department.


Interdisciplinary team education is an increasingly important topic in an age when interdisciplinary teamwork is a fact of professional life. In many health, education, and social service settings, teams combine the expertise of individuals with specialized training in various professional disciplines. The objectives of this project are to examine the impact of participation in the interdisciplinary team instructional program associated with clinical practicum in the Human Development Center (HDC) Assessment Clinic on students’ beliefs about teamwork, examine the extent to which participation in the program facilitates attainment of specified student learning outcomes, and explore differences in beliefs and outcome attainment as a function of students’ professional discipline. Data for this study was collected through two survey instruments. These surveys were adapted from the Index of Interdisciplinary Collaboration (Bronstein, L. R. 2002), which requires respondents to indicate, using a 5-point Likert scale, the extent to which they agree with 49 statements about interdisciplinary teamwork. All students from communication disorders, curriculum and instruction (reading/literacy studies), family health nursing, school psychology, and special education who participated in the interdisciplinary assessment teams during the fall 2003 semester served as subjects for this study.

This project uses a questionnaire to examine social workers’ (a) knowledge, (b) attitudes, and (c) experiences regarding the use of stimulant medication for the treatment of attention deficit-hyperactivity disorder (ADHD). The questionnaire will be sent to five hundred social workers from School Social Workers Association of American (SSWAA). Once the surveys are collected, the results (taken from a Likert-scale format) will be used to assess the knowledge, attitudes, and experiences of social workers regarding stimulant medication to treat ADHD. This study will then compare the results to what research on ADHD and using stimulant medications for treatment has shown, as well as to similar studies performed recently in other disciplines. These issues are of interest for several reasons. First, there has been an increasing use of psychoactive medications to treat children with ADHD and the larger issue of psychiatric treatment of school-aged and preschool children is one of the most important and controversial issues facing schools in the US today. Finally, this nascent trend towards pharmacological treatment of the youth of our country must be assessed in an effort to empirically determine its risks and benefits.

MANAGEMENT INFORMATION SYSTEMS


Computer viruses evolved from an academic curiosity to a persistent problem and are now being written for almost every computing platform. They have become a costly threat to the security of computer systems worldwide. A computer virus is software that copies itself from computer to computer and then does some kind of damage. Computer users must understand how to protect against viruses. This study investigated the state of the art in anti-virus measures. The research consisted of finding, evaluating, and integrating a wide variety of sources of anti-virus information and technology into one cohesive resource for computer users. Windows®-based systems were emphasized, but the information applies to other operating systems as well. The paper will be a chapter in The Internet Encyclopedia, edited by Dr. Hossein Bidgoli of California State University at Bakersfield, to be published by John Wiley & Sons. Dr. Hilton and Ms. Ali are co-authors. The paper presents current information about the different types of viruses and methods to control them. The presentation will summarize anti-virus measures from the paper. Audience members will thus be better equipped to use their computing resources safely and effectively.

This talk deals (in two different ways) with finding a hypersphere for which a given surface becomes a tangent surface.

LEAST IS BEST: ENVELOPE FOLDING PROBLEM. Lori Scardino and Chee Yang, undergraduate students, with Veena Chadha, faculty, same department. *Mathematics Association of America, UW-Washington County, WI, 15-16 April 2005.*

Given a right triangle with perpendicular sides, a and b, suppose we fold the right angle over to some point on the hypotenuse. What is the minimum possible area of the folded triangle? Using trigonometry and computers, we shall show a clever, non-calculus solution to this problem.


Lie algebras are nonassociative algebras which play a fundamental role in both mathematics and physics. The classification of Lie algebras is a difficult but interesting endeavor, which uses cohomology as a basic tool. As a by-product of a study of more general objects called infinity algebras, we are obtaining a more complete picture of the space of Lie algebras. The condition for a product to give a Lie algebra structure is called the Jacobi relation, which are quadratic relations. These quadratic equations can be represented as a product of two matrices, which makes it possible to study the Jacobi relations using linear algebra methods. Similarly, by representing the Lie algebra structure as a coderivation of the symmetric algebra of a vector space, we can use linear algebra techniques to study the cohomology. Thus, by an elementary approach, we can classify Lie algebras and study their deformations.

POISEUILLE’S LAW—SHOWING THAT $\dot{\alpha}$ IS INVERSELY PROPORTIONAL TO $R^4$ USING THE SHELL METHOD. Rachel Georges, undergraduate student, with John Drost, faculty, same department. *AMATYC Review 25.2 (Spring 2004): 11-15.*

Poiseuille’s Law – Showing that $\dot{\alpha}$ is inversely proportional to $R^4$. Using the shell method of integration, we show that $\dot{\alpha}$ is inversely proportional to $R^4$, specifically $\dot{\alpha} = K \frac{L}{R^4}$. 


SPECTRAL METHODS IN MATHEMATICAL PHYSICS. Darin Mohr, undergraduate student, with Simei Tong, faculty, same department.  
*Mathematical Association of America Wisconsin Annual Meeting, West Bend, WI, 15-16 April 2005.*

In operator theory, there are two ways to solve the equation \( Lf = g \) where \( g \) is a given function, \( L \) is an operator, and \( f \) is an unknown function. If an inverse of \( L \) exists, we can solve the equation. We can also solve the equation by finding the eigenfunctions of \( L \). If the eigenfunctions span the space are orthonormal, then the solution of the equation can be written as a linear span of these eigenfunctions. This method of solving \( Lf = g \) is called the Spectral Method. We are interested in understanding the spectral method and how limit conditions affect the nature of the operator. We will also consider a brief application to the diffusion equation.

TEMPERATURE PROFILE OF POLYMER FLOW WITH VISCOUS DISSIPATION INSIDE A PIPE. Darin Mohr, undergraduate student, with Mohamed Elgindi, faculty, same department.  
*New Perspectives for Boundary Value Problems and their Asymtotics, University of Texas-Pan American, Edinburg, TX, 15-20 May 2005.*

In this project, we present the mathematical equation that governs heat transfer in a polymer melt flowing in a circular tube with constant ambient temperature, taking into account the viscous dissipation effects. This leads to a nonlinear parabolic partial differential equation. It is shown that the exact solution of a linearized version of the governing equation can be presented in terms of a special function known as the Whittaker function. A finite difference scheme is then used to produce an approximate solution of the linearized problem. This numerical solution is shown to be a good approximation to the exact solution found in terms of the Whittaker function. The results of this project are a starting point toward the development of a finite difference scheme for the solution of the full nonlinear equation governing heat transfer in molten polymer flowing in a circular tube with viscous dissipation, which will be considered in a future project.

LEAST RESISTANCE OF A SOLID OF REVOLUTION MOVING IN A RARE MEDIUM. Alex Kruse, undergraduate student, with Simei Tong, faculty, Mathematics, and J. Erik Hendrickson, faculty, Physics and Astronomy.  
*Mathematical Association of America—Wisconsin Section, Platteville, WI, 16-17 April 2004.*

Algebraic and geometric analyses are used to obtain the least resistance of a solid of revolution moving in a rare medium. The results were tested by using aluminum models in water.
CONCERT BY BASSICALLY BRASS. Andrei Strizek, Liz Soules, Kyle Peterson, Brian Plank, Mike Vallez, Aaron Hammerman, Jesse Orth, Josh Lee, David Temple, Becky Soules, Andrea Miller, Douglas Gile, and Matthew White, undergraduate students, with Jerry Young, faculty, same department. *International Tuba/Euphonium Association Regional Conference, Bloomington, IL, 17-19 Feb. 2005.*

MASTERCLASS. Robert O’Connor, undergraduate student, with Namji Kim, faculty, same department. *Oberlin International Piano Competition and Festival, Oberlin, OH, 28-31 July 2005.*

Oberlin Piano Festival provides students with intensive, in-depth opportunity to expand their knowledge of music history, theory and pedagogy, and its vital connection to on-stage performance. Lectures, master classes, and recitals are given by Oberlin Conservatory faculty members and distinguished guest artists.


TAP FUSION. Anna-Lisa Bjorklund, undergraduate student, with Toni Poll-Sorensen, faculty, same department. *Hawaii International Conference on Arts and Humanities, Honolulu, HI, 7-12 Jan. 2004.*

Tap Dance is an American art form whose popularity overpowered other styles of dance in the first three decades of the 20th century. This project, Tap Fusion, is an example of student/faculty collaborative research in which Tap Dancing styles are first examined, then applied in a performance environment, and finally documented for dissemination. The research will begin with a survey of the history of Tap, clarifying how Tap started as an outgrowth of the rhythms of African slaves and the folk dances of European Immigrants. The research then continues to look at the ways Tap evolved into the different styles that are known to us today. As a culmination of this research, a concert will be prepared to include six to eight tap dances that will showcase the different styles of Tap Dance. The concert will then be adapted into a multimedia lecture demonstration format consistent with the research on the history of tap. The presentations will be designed to show how Tap is a fusion of sounds from the machine age combined with the sensuality of the jazz age, and its evolution includes everything else in-between.


**NURSING SYSTEMS**


**PHILOSOPHY AND RELIGIOUS STUDIES**


The purpose of this study is to explore the representation of the perfection of the Virgin Mary as presented from both a traditional and contemporary Roman Catholic standpoint with particular emphasis on the work of radical Catholic theologian Kathleen Kaveny. Dr. Kaveny suggests that the character Buffy the vampire slayer is presented in the seven-year hit television series as an exemplar of the virtues of the Virgin Mary and a model for Catholic womanhood. The questions to be addressed are these: is Buffy in fact a liberating role model for Catholic womanhood? Is Dr. Kaveny’s argument simply an example of an institutional co-option of a popular icon to be used as a tool of cultural terrorism and hegemonic oppression as might be suggested by Gramsci, Tompkins, and others? Are there identifiable cultural indicators that help us to judge the extent of the Buffy influence on the spirituality or view of religion developed by individuals who were teenagers during its initial screening and what can they tell us? This paper will be informed to a large extent by an approach suggested by Eco in the essay “The Myth of Superman,” (Eco, Umberto. The Role of the Reader. Bloomington. Indiana Univ. Press. 1979: 107-24). We will view the *Buffy: The Vampire Slayer,* as presented in the seven-year hit television series in Eco’s terms as a “closed text.” For purposes of comparison, references will also be made to the Buffy spin-off-series, *Angel.*
STUMPING FOR FREE SPEECH: AN EXAMINATION OF WISCONSIN’S FREE SPEECH TRADITION DURING THE CIVIL WAR. Joseph J. Braun, undergraduate student, with Timothy Shiell, faculty, same department.  
6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI. 29 April 2005.

Among other things, the First Amendment of the United States Constitution guarantees freedom of speech. Yet, despite the steps taken by the framers of the Constitution, many people do not understand what free speech is and why it is important. This tradition has only recently begun to be acknowledged by scholars, including the long and proud free speech tradition in Wisconsin. In part, this philosophical and historical oversight is due to the work of Zechariah Chafee, whose influential work implicitly suggests that there was no meaningful discussion of free speech prior to World War I. Examining the history of free speech in Wisconsin is a valuable undertaking because it further exposes the inaccuracies in Chafee’s work, while showcasing a previously unnoticed free speech tradition. Carl Schurz, a German immigrant who settled in Watertown, is of particular interest because of his progressive understanding of free speech and its value, and because of his principled advocacy for free speech prior to and during the Civil War. Further research into the history of free speech will undoubtedly continue to demonstrate the inaccuracy of Chafee’s claims, while also adding previously undiscovered arguments and events to the history of free speech.

PHYSICS AND ASTRONOMY

ANALYSIS OF DIRECT X-RAY IMAGES IN A CHANDRA OBSERVATION OF THE CYGNUS OB2 ASSOCIATION. Justin Reiter, undergraduate student, with Nathan Miller, faculty, same department.  

We have obtained an X-ray observation of Cygnus OB2 using the orbiting Chandra Observatory. This stellar association serves as a laboratory for using the violent wind structures of hot stars. The instrument used for this observation records both images and spectra simultaneously. The spectra come in two forms: high-resolution dispersed spectra, and low-resolution spectra from the direct images of the stars. Only the four brightest stars resulted in measurable dispersed spectra; we have analyzed and published those spectra previously (Astrophysical Journal 616, 542). In continuing this project, our goal is to determine what can be learned from the direct images of the fainter stars. We have been able to detect roughly a dozen X-ray sources in the instrument’s field of view (many never previously observed in X-rays), but many of them proved difficult to analyze due to their low numbers of photo events. Nonetheless, we have proceeded to cross-identify these sources with previously known sources in the field and extracted their low-resolution spectra. Analysis of the spectra is ongoing.

FORCES AFFECTING THE TRAJECTORIES OF PARTICLES IN SATURN’S E-RING. Tiffany Black, undergraduate student, with Paul Thomas, faculty, same department.  
Saturn’s E-ring spans an area of three to eight Saturnian radii and is composed of small micron-sized blue particles. Its existence cannot be explained by the ring formation theories. Saturn’s satellite Enceladus is considered the source of E-ring particles. Using Enceladus as the source, the trajectories of µm sized particles with various initial speeds and directions were plotted using a Maple worksheet that models the various forces acting on these particles. Forces included were the gravity of Enceladus, the gravity of Saturn, Coriolis force, centrifugal force, the gravity of the Sun, and the gravities of Saturn’s other satellites. It was discovered that many of these forces had small but not negligible effects upon the trajectory and that the gravity of Enceladus accelerates the expansion of the ring.

**HIGH-RESOLUTION X-RAY SPECTRA OF THE BRIGHTEST OB STARS IN THE CYGNUS OB2 ASSOCIATION.\(^{1}\) Justin Reiter, undergraduate student, with Nathan Miller, faculty, same department, W. L. Waldron, University of Cambridge, J. J. McFarland, Armagh Observatory, and J. P. Cassinelli, University of Wisconsin-Madison. \(^{1}\)**


The Cyg OB2 association contains some of the most luminous OB stars in our Galaxy, the brightest of which are also among the most luminous in X-rays. We obtained a Chandra High Energy Transmission Grating Spectrometer observation centered on Cyg OB2 No. 8A, the most luminous X-ray source in the association. Although our analysis focuses on the X-ray properties of Cyg OB2 No. 8A, we also present limited analyses of three other OB stars (Cyg OB2 Nos. 5, 9, and 12). Applying standard diagnostic techniques as used in previous studies of early-type stars, we find that the X-ray properties of Cyg OB2 No. 8A are very similar to those of other OB stars that have been observed using high-resolution X-ray spectroscopy. From analyses of the He-like ion fir emission lines (Mg XI, Si XIII, S XV, and Ar XVII), we derive radial distances of the He-like line emission sources and find that the higher energy ions have their lines form closer to the stellar surface than those of lower ion states. These fir-inferred radii are also found to be consistent with their corresponding X-ray continuum optical depth unity radii. Both of these findings are in agreement with previous O star studies and again suggest that anomalously strong shocks or high-temperature zones may be present near the base of the wind. The observed X-ray emission-line widths (HWHM~1000 km s\(^{-1}\)) are also compatible with the observations of other O star supergiant stars. Since Cyg OB2 No. 8A is similar in spectral type to zeta Pup (the only O star that clearly shows asymmetric X-ray emission-line profiles with large blueshifts), we expected to see similar emission-line characteristics. Contrary to other O star results, the emission lines of Cyg OB2 No. 8A show a large range in line centroid shifts (~-800 to +250 km s\(^{-1}\)). However, we argue that most of the largest shifts may be unreliable and the resulting range in shifts is much less than those observed in zeta Pup. Although there is one exception, the H-like Mg XII line, which shows a blueshift of -550 km s\(^{-1}\), there are problems associated with trying to understand the nature of this isolated large blueshifted line. To address the degree of asymmetry in these line profiles, we present Gaussian best-fit line profile spectra from zeta Pup to illustrate the expected asymmetry signature in the chi\(^2\) residuals. Comparisons of the Cyg OB2 No. 8A best-fit line profile residuals with those of zeta Pup suggest that there are no indications of any statistical significant asymmetries in these line profiles. Both the line shift characteristics and lack of line asymmetries are very puzzling results. Given the very high mass-loss rate of Cyg OB2 No. 8A (approximately 5 times larger than previous Chandra-observed O supergiants), the emission lines from this star should display a significant level of line asymmetry and blueshifts as com-
pared to other OB stars. We also discuss the implications of our results in light of the fact that Cyg OB2 No. 8A is a member of a rather tight stellar cluster, and shocks could arise at interfaces with the winds of these other stars.

**INTERFACIAL REACTIONS AND DETERMINATION OF DIFFUSION COEFFICIENTS AND ACTIVATION ENERGIES OF THIN Mn FILMS ON GaAs (100).**

Shanthi Spanton, undergraduate student, with Matt Evans, faculty, same department.


Ex-situ post-growth anneals of Al(50Å)/Mn(2000Å)/GaAs(100) structures at temperatures of 200, 300, 350, 500, and 500°C for time ranges of 1-30 hours were performed to characterize the intermixing of Mn with GaAs substrates. Prior to annealing, Mn films on GaAs appeared polycrystalline from high energy electron diffraction and x-ray diffraction (XRD) data. Also, pre-anneal Rutherford Backscattering Spectrometry (RBS) indicated no extensive interfacial reactions occurred during the growth of the Mn film. After anneals above 200°C, RBS data indicated significant Mn-Ga-As reactions and the formulation of a region of Mn$_{0.6}$Ga$_{0.2}$As$_{0.2}$ composition. Higher temperature anneals resulted in the dissociation of this region into a MnGa-like region near the surface and a Mn$_2$As-like region near the substrate. RBS measurements of the reaction layer thickness for various annealing times at 300°C indicated the interfacial reactions to be diffusion controlled. Utilizing the relationship between reacted layer thickness and time, Mn-GaAs diffusion coefficients at specific temperatures were determined. Once the diffusion coefficient over a range of temperatures was established the activation energy of the Mn-GaAs system was calculated.

**MICRO-WIRE INTERCONNECT FABRICATION USING MAGNETRON/DC-TRIODE SPUTTERING.**

Benjamin J. Sykora, undergraduate student, with Kim Pierson, faculty, same department.


Micro-wire interconnect technology has become a limiting component of modern Integrated Circuit fabrication. As Integrated Circuits become more advanced and the number of components placed on each Integrated Circuit gets larger, the space allotted for micro-wire interconnects becomes very limited. The limited space available for micro-wires has brought forth many new problems in interconnect fabrication that must now be solved. By modifying a Magnetron thin film deposition system to include a DC-Triode ion source, we are able to investigate fabrication techniques not possible with other systems. Preliminary experimentation shows that the DC-Triode makes a significant impact on the quality of thin film deposited during the micro-wire interconnect fabrication process. The DC-Triode bombards the deposited metal film with ions and prevents the formation of voids in the micro-wires, thus preventing open circuits. During further experimentation, we intend to devise a procedure by which the Magnetron and DC-Triode can be simultaneously used to make Micro-Wire Interconnects most efficiently. If successful, this technique will make production of Integrated Circuits cheaper and less complex.

**MODELING COMET AIRBURSTS IN TITAN’S ATMOSPHERE.**

Darin Mohr, undergraduate student, with Paul Thomas, faculty, same department.

Over the history of the solar system, the impacts of comets and asteroids have changed the shape of the planets and moons in the solar system. Low density atmosphere have little resistance to the passage of asteroids and comets, and so surface impacts are frequent occurrences. However, planets and moons with substantial atmospheres often experience a unique physical phenomenon called airbursting. Airbursting is a result of ablation and deformation on a hypersonic object. In an airbursting event, almost the entire kinetic energy of the incoming object is deposited in a narrow range of altitudes. The atmosphere of Saturn’s largest moon, Titan, has a surface pressure of 1.5 bars and a scale height of up to 40 km (compared to 8.1 km for Earth). This thick atmosphere is probably subject to airbursting events similar to the 1908 Tunguska explosion over Siberia. By using recent spacecraft data and a model that has been successfully applied to the Tunguska explosion, we analyze the fate of comets entering Titan’s atmosphere. The results of this model are used to determine the extent of cratering on the surface of Titan.

**TEMPERED DEPOSITION STUDY OF CO ON AS-RICH GaAs(001) c(4×4).**

Shantih Spanton, undergraduate student, with Matt Evans, faculty, same department, Kathy Lüdge, Technische Universität Berlin, and B. D. Schultz and C. J. Palmstrøm, University of Minnesota.


Previous studies on Co/GaAs(001) by K. Lüdge et al.,

1 concluded that at a deposition substrate temperature over 150°C, the formation of the Co,GaAs interlayer at the Co/GaAs interface no longer acted as a significant diffusion barrier for Co and GaAs intermixing. Thus, at a deposition substrate temperature of 225°C, Co deposited on As-rich GaAs(001) appears to diffuse through the Co,GaAs interface layer. None of the deposited Co forms a metal Co overlayer. Scanning tunneling microscopy (STM), low energy electron diffraction (LEED), and reflection high energy electron diffraction (RHEED) analysis of such Co/GaAs(001) samples showed that increasing deposition temperatures leads to atomically smooth surfaces of good crystalline quality. Vibrating sample magnetometer (VSM) measurements showed a decrease in the magnetic anisotropy as the growth temperature increased. While an atomically smooth surface is industrially desirable, the lack of elemental individuality on the sample surface and loss of unique elemental properties, especially those magnetic properties, is not. To make an atomically abrupt interfacial region, necessary for such a product to be viable in spin based devices, Co/GaAs(001) growth techniques must minimize intermixing between the ferromagnet and the substrate yet still create a smooth template for growth upon the surface. This study attempts to accomplish the former by performing two separate depositions during growth. Cobalt was grown on GaAs(001) c(4×4) at a substrate temperature of room temperature and annealed at 200°C. Subsequent additional depositions of Co onto the Co/GaAs(001) sample surfaces were performed at room temperature and 150°C in amounts ranging from 0.5ML to 40ML consecutively. All stages of the experiment were characterized with X-ray photoelectron spectroscopy (XPS) to observe the chemical composition and determine the chemical intermixing.\(^1\) K. Lüdge, B. D. Schultz, P. Vogt, M. M. R. Evans, W. Braun, C. J. Palmstrøm, W. Richter and N. Esser, J. Vac. Sci. Technol. B 20(4) (2002).
CAESAR OR NERO? PUBLIC OPINION OF THE IMPERIAL PRESIDENCY.

Steven Kerbaugh, undergraduate student, with Geoffrey Peterson, faculty, same department.


The concept of the imperial presidency is well-established in political science literature. As presidents have become increasingly powerful in both foreign and domestic policy, many scholars have bemoaned this concentration of authority. They feel that overly-powerful presidents have so dominated the political agenda and policy process that these scholars see a serious threat to the separation of powers and the system of checks and balances. Less understood are the views of the public on this matter. We propose to examine how the citizens of the United States view this transfer of authority away from Capitol Hill. Using a variety of public opinion surveys from Gallup and Roper over several decades, we will examine whether the public recognizes the existence of the power transfer, their opinions on a more powerful chief executive, and the implications of these opinions. We believe that most Americans either do not realize the extent to which Congress has abrogated their authority, or they endorse the transfer, seeing a strong leader as a desirable goal.

CYBER BULLYING: AN EXPLORATION OF ELECTRONIC AGGRESSION.

Adam C. Hinz, undergraduate student, with Justin W. Patchin, faculty, same department.

6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI, 29 April 2005.

Over the past two decades, social science and education research has documented the numerous detrimental effects of bullying. The recently identified relationship between bullying and acts of extreme school violence prompted a vast array of studies concerned with traditional bullying. However, since the advent of the Internet and other mobile communication devices, bullying now occurs not just on the schoolyard, but in the digital realm of today's technological society. Due to the pervasive and prolonged use of such technology by children both in and out of school, their victimization potential increases dramatically beyond the schoolyard. The present study focuses on two forms of aggression capable of electronic transmission—verbal and psychological. While researchers have just begun to explore electronic harassment, very few have explored the electronic extension of bullying. The present study empirically documents the extent to which cyber bullying occurs, and develops a profile of cyber bullies and their victims. Present findings have application in determining how bullies and victims interact in the fast-growing society of electronic communication. Such electronic interactions are compared to those of traditional schoolyard bullies and victims in terms of frequency and effect.

THE IMPACT OF EXTRA-NATIONAL ORGANIZATIONS ON ELECTIONS.

Mark Rasmusson, undergraduate student, with Geoffrey Peterson, faculty, same department.


An examination of the impact of supranational organizations on voter turnout in national elections.
PUBLIC OPINION ON THE IMPERIAL PRESIDENCY. Steven Kerbaugh, undergraduate student, with Geoffrey Peterson, faculty, same department. *Midwest Political Science Association, Chicago, IL, 6-10 April 2005.*

A common theme in political science research surrounding the balance of power in federal governance is that the president has become more powerful at the expense of congressional power. This has led scholars to label the executive office as “imperial.” We examine scholarly research surrounding this phenomenon and undertake an examination of the general public’s views on the relative balance of power in Washington.

ANIMAL MODELS OF GAMBLING. Eric Ewan, Lesley Baird, Robert Bourgeois, Kasey Stephenson, Wayne Chen, Mark Remiker, and Sarah Tillman, undergraduate students, with Gregory Madden, faculty, same department. *Mid-American Association for Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004.*

BEHAVIORAL ECONOMICS OF RELATIVE REINFORCER EFFICACY: FOOD AND BOOZE (EXPERIMENTAL ANALYSIS). Carla Lagorio, Mark Remiker, Robert Bourgeois, Nicole Zeug, John Smethells, Travis Smith, undergraduate students, with Gregory Madden, faculty, same department. *Association for Behavior Analysis 31st Annual Convention, Chicago, IL, 5-7 May 2005.*

Demand curves were examined in 12 rats responding for either food or alcohol. Relative consumption at each fixed ratio value was used to predict behavior in a concurrent choice condition. The purpose of the study is to test the behavioral economic prediction regarding reinforcer efficacy.

COMPARING CONSTANT TIME DELAY AND SIMULTANEOUS PROMPTING PROCEDURES ON SKILL ACQUISITION FOR CHILDREN WITH AUTISM. Sara Czekalski, Nicole Zeug, and Julie Ackerlund, undergraduate students, with Kevin Klatt, faculty, same department. *6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI, 29 April 2005. 31st Association for Behavior Analysis Convention, Chicago, IL, 26-31 May 2005. Mid-American Association for Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004.*

Teaching communication, play, social and academic skills to children often involves using procedures to transfer stimulus control from the teacher’s prompt to the discriminative stimulus. A constant time delay procedure has been successfully used to transfer stimulus control in many studies. More recently, a simultaneous prompting procedure has been demonstrated to successfully transfer stimulus control, but in many cases with fewer trials, sessions, training time to criterion, and errors than the constant time delay procedure. The purpose of this on-going study is to investigate whether differences exist in using these two procedures when teaching skills to young children diagnosed with autism. Preliminary results have shown little difference between the two procedures.
A COMPARISON OF TEACHING SKILLS TO ACCURACY VERSUS FLUENCY FOR CHILDREN WITH AUTISM. Elizabeth Alden-Anderson, undergraduate student, with Kevin Klatt, faculty, same department. Association of Behavior Analysis 30th Annual Conference, Boston, MA, 27 May-1 June 2004.

The effects of teaching skills to fluency versus accuracy on generalization, retention of skills, discrimination, endurance, and stability (the ability to perform in the presence of a distractor) were measured. The participants were young, typically developing children. Skills not already in the child’s repertoire were identified and taught, one at a time, to 100% accuracy, defined by ten correct trials in one session. Generalization, retention, discrimination, endurance, and stability were probed and recorded after the subject met criterion on the skills. Fluency training followed. Fluency training consisted of practicing the skill until the child could perform both quickly and accurately, and was measured as frequency of correct responses per minute. After the child could fluently perform the skill (at a predetermined rate per minute, depending on the skill) generalization, retention, discrimination, stability, and endurance were once again probed and recorded. Reliability was recorded by two data collectors sitting at opposite sides of a long table in the same room as the child. Data were recorded and graphed to compare the two conditions. Results will be shown along with a discussion of the implications.

CORRELATION OF ACKNOWLEDGMENT IN ASSOCIATION WITH GENDER AND AGE. Tara Delong and Lindsay LiVecche, undergraduate students, with Blaine Peden, faculty, same department. Psi Chi Midwestern Psychological Association Convention, Chicago, IL, 4-7 May 2005.

The major purpose of this study was to explore whether age or gender indicated who gave an acknowledgment to a front desk employee at a fitness center when leaving the building after being confronted with a comment by the worker. Although not much research is out there, one study by Martin and Adams (1999) observed employee acknowledgment, in contrast to ours. They concluded that younger employees were less likely to comment a customer when they left than older employees. They also found that women acknowledged more so than male employees. Although different, it was the only study found that observed acknowledgments.

DELAY DISCOUNTING OF (ALL) REAL AND HYPOTHETICAL REWARDS: STEADY-STATE ASSESSMENTS. Carla Lagorio and Wendy Lyman, undergraduate students, with Gregory Madden, faculty, same department. Mid-American Association for Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004.

DISSOCIATIVE IDENTITY DISORDER AND STUDENTS’ PERCEPTIONS.
Justine Majeres, undergraduate student, with Marie Crothers, faculty, same department.
Midwestern Psychological Association Annual Meeting, Chicago, IL, 28 April-1 May 2004.

Deviant behaviors often lead to arrest and incarceration. In cases involving crimes committed by mentally ill individuals, juror perspectives of mental illness take on critical importance. A mentally ill individual accused of a crime can choose among several possible pleas, including “guilty,” “not guilty,” “not guilty by reason of insanity,” or “guilty but mentally ill.” Most research to date has focused on mock jurors’ perceptions of individuals with schizophrenia. However, little is known about perceptions of Dissociative Identity Disorder (DID), and studies have not asked participants to assume the role of the defense attorney. The present study instructed participants to take on the hypothetical role of an attorney defending a mentally ill individual with a diagnosis of DID. Participants were asked to describe their opinions regarding DID and to state how they would guide their “client” to plead. The study investigated how gender and education about mental illness and criminology affected participants’ responses. Procedure: Participants will be presented with a case and asked to imagine they are the defense attorney defending the client in the vignette. Participants will be educated about the possible pleas the mentally ill client could take. The definition and possible punishment range for each plea will also be described. Participants will then read a vignette about a man diagnosed with dissociative identity disorder killing a female. In one interview the man said this woman was his girlfriend and in another he said he had never seen the woman before. Participants will be asked about their educational background in mental illness and criminology. They will also be asked to answer intermittent questions as they read through the vignette. Questions will explore participants’ feelings about the disorder and participants will be asked to recommend a plea and explain why they chose that plea. Expected Results: It is hypothesized that females and individuals less educated about mental illness and criminology will be more likely to recommend that the individual plead “guilty,” whereas males and individuals with more education regarding mental illness and criminology will be more likely to recommend that the individual plead “guilty but mentally ill.”

DO RETIREES (RETIRED BREEDING MALE PIGEONS) AT A ‘SLOT MACHINE’ CONFORM TO THE PREDICTIONS OF UNIT PRICE? Carla Lagorio, Julie Slowiak, and Michael K. Paul, undergraduate students, with Gregory Madden, faculty, same department.
Association for Behavior Analysis, Boston, MA, 28 May-1 June 2004.

This study examined the prediction of unit price that a cost:benefit ratio determines consumption. Four pigeons earned food according to a fixed-ratio three schedule in a closed-economy (23-hour sessions, no supplemental food, no cap on consumption). In one condition three 45 mg pellets were delivered when the FR was completed. In the other condition, an average of three pellets were delivered. Unit price predicts no difference in response output or consumption per session across these conditions. No difference was observed. Further data will be collected on increasing unit prices to test the demand law. Implications of these findings for understanding gambling will be discussed.
DO SUCROSE AND SACCHARIN BEHAVE IN A MODEL OF HUNGER?
Sarah Weis, Justine Majerus, and Valerie Jonjak, undergraduate students, with David Jewett, faculty, same department.

Subjects (Sprague-Dawley rats) were trained to discriminate between two and 22 hrs of acute food deprivation in an operant choice task. During generalization tests, acute food deprivation produced time-dependent increases in 22 hr responding. During other tests, subjects were food restricted for 22 hrs and responded appropriately. When subjects were then given access to food for 20 mins and again placed in the operant test, subjects reliably selected the lever associated with two hours food deprivation, indicating that food consumption eliminates discriminative stimuli associated with 22 hrs food deprivation. Under similar test conditions, saccharin (0.032–3.2%) and sucrose (0.3 – 32%) consumption did not alter the discriminative stimulus effects of 22 hrs food deprivation when given subjects were given 20 mins access and then placed in the operant chamber again. The purpose of the current study is to determine if saccharin (0.032–3.2%) or sucrose (0.3 – 32%) given one to two hours prior to the session alters the ability of subjects to recognize 22 hrs food deprivation.

DOES MARITAL NAME CHOICE INFLUENCE PERCEPTIONS OF FEMALE AND MALE PARTNERS? PERCEPTIONS OF MARITAL NAME CHOICE: A STUDY UTILIZING VISUAL TECHNOLOGY. Tesa Zimmerman and Jessica Pinch, undergraduate students, with Blaine Peden, faculty, same department.

Marriage traditionally results in a name change for the female partner, even though other name options (e.g. woman retains surname or man alters surname) are available to both partners. Zimmerman, Pinch, and Peden (2003) found that a woman taking her husband’s name upon marriage is perceived to be the most traditional, personally and socially desirable. Research in this area by Dion (1987) and Takiff, Sanchez, and Stewart (2001) has revealed differences in perception of people does exist based on titles or names. This study attempts to replicate and extend previous studies to determine if surname choice results in different perceptions of personality traits. A Midwestern University sample of 160 students was utilized. Participants rated personality traits and life outcomes for a man or woman who had taken a nontraditional or traditional name change, depicted in a vignette. We used a three-factor ANOVA to evaluate sex of participant, sex of marriage partner, and marital name choice based on semantic differential and Likert ratings. Significant effects were found for the polar semantic differential scale items, secure, good, independent, intelligent, usual, important, and rational, and several of the life outcome ratings, such as has a career and desires no children, also produced significant results.

EATING DISORDER PATTERNS AT DIVERSE UNITED STATES UNIVERSITIES. Sara Nolta, Kimberly Masters, Samantha Cook, and Megan E. Green, undergraduate students, with Allen Keniston, faculty, same department.
The proposed study has several objectives: 1) Expand on a previous study conducted at the University of Wisconsin-Eau Claire (UWEC) titled “Eating Disorders on Campus: Prevalence Rate and Correlates” (Masters, Marsh, & Lonsdale, 2003) to include both males and females, include relevant demographic variables, and include college campuses from different regions in the United States; 2) Identify characteristics of students at-risk for developing an eating disorder; 3) Help assess the need for treatment and/or prevention services on college campuses; 4) Investigate the correlates of region and type of university on disordered eating attitudes and behaviors; 5) Collaborate with other regional universities to assess the generality of results. Researchers will obtain a copy of and permission to use the Eating Attitudes Test (EAT-26; Garner, 1997), as well as its scoring and interpretive information, from http://www.eating-disorder.rog/eat26.test.html, which will serve as the basis for our data collection. Faculty members at ten universities throughout the United States will be contacted about collaborating on this project based on the universities’ regional location. At least one faculty member and one undergraduate student will be enlisted to assist in the completion of this study from each corresponding campus.

EFFECT OF PERSONALITY TRAIT “OPENNESS” ON DEVELOPMENTAL TRENDS IN COLLEGE STUDENTS’ THINKING ABOUT EIGHT CORE ISSUES OF PERSONALITY. Justine Majeres, Rebecca Ringersma, Luke Howard, Eric Lee, and Robin Panske, undergraduate students, with Lori Bica, faculty, same department.
Annual Meeting of the Midwestern Psychological Association, Chicago, IL, 4-6 May 2005.

A trend from dualistic to relativistic thinking occurs during the college years (Perry, 1970). That is, younger college students have a greater tendency to divide information, values, and authority into right and wrong, good and bad, and we and they, whereas students in the later years of college view knowledge as embedded in a framework of thought. Older students are willing to give up the possibility of absolute truth in favor of multiple truths, each relative to its context. We investigated this developmental trend in relation to undergraduate students’ beliefs about eight core issues of personality (e.g., conscious-unconscious). Also investigated was the personality trait “openness” in relation to the aforementioned trend. Individuals high on this trait are imaginative, creative, original, and curious (Costa & McCrae, 1992) and a measure investigating beliefs about eight core issues of personality. As a general developmental trend, older students are expected to demonstrate greater relativistic thinking about the core issues than younger students. Within this general trend, participants across all four years of college who score higher on “openness” are expected to demonstrate greater relativistic thinking than students with lower scores.

Annual Meeting of the Midwestern Psychological Association, Chicago, IL, 4-6 May 2005.

A trend toward relativistic thinking occurs during the college years (Perry, 1970). Younger students tend to divide information, values, and authority into right and wrong, and good and bad, whereas older students are willing to give up the possibility of absolute truth in favor of multiple truths, each relative to its context. We investigated this develop-
mental trend in relation to students’ beliefs about eight core issues of personality and whether questionnaire format would affect responses. Participants (N=200) completed one questionnaire that contained 16 items, two questions for each of the eight personality issues. For example, the internal-external issues was measured with: “I actively control my own personality” and “My personality is largely determined by factors outside of my control.” The second questionnaire used wording identical to the first, but contained one question for each issue presented as a dichotomy (“. . . factors outside of my control” as the right pole and “. . . actively control my own personality” as the left pole). Younger students are expected to demonstrate greater dualistic thinking about the issues than older students. Within this general trend, participants across all four years who complete the dichotomous measure are expected to demonstrate greater dualistic thinking than students who complete the non-dichotomous measure.


Previous studies have consistently shown that agouti-related peptide (AgRP), ghrelin, and neuropeptide Y (NPY) increase eating in Sprague-Dawley rats; however, many of these studies did not discuss if all the drugs had an effect on motivation. The purpose of this study is to find out if AgRP increases motivation like previous research has found for ghrelin and NPY. Recent studies demonstrated ghrelin significantly increased the break points (a quantitative measure of motivation) under PR 1 and PR 3 reinforcement schedules. NPY increased break points under a PR 1 reinforcement schedule. This study evaluated the behavior of Sprague-Dawley rats trained to lever press in order to obtain food on a progressive ratio (PR 1) reinforcement schedule. Once baseline break points are stable, rats will be cannulated in the lateral ventricle. Following recovery, under PR 1 reinforcement schedule. Data will be analyzed to determine to what extent AgRP, ghrelin, and NPY increase food-maintained behavior. It is expected that AgRP will produce similar effects to the effects of ghrelin and NPY, as determined in the literature.

THE EFFECTS OF A COMBINED TASK CLARIFICATION, GOAL SETTING, FEEDBACK, AND INCENTIVE INTERVENTION PACKAGE TO IMPROVE TELEPHONE CUSTOMER SERVICE IN MEDICAL CLINIC ENVIRONMENT. Julie Slowiak, undergraduate student, with Gregory Madden, faculty, same department. Association for Behavior Analysis Convention, Boston, MA, 28 May-1 June 2004.

Appointment coordinators at a Midwestern medical clinic were to provide exceptional telephone customer service. This included using a standard greeting, speaking in the appropriate tone of voice during the conversation, and using a standard closing to end the call. An analysis suggested performance deficiencies resulted from weak antecedents, poor training, and weak performance contingencies. An intervention package consisting of task clarification, goal setting, feedback, and incentive was designed to improve customer service behaviors of four participating appointment coordinators. An ABAB reversal design was used, and overall performance of all four participants increased during intervention phases. This study indicates that a multicomponent intervention may be an effective strategy to increase telephone customer service behavior in the workplace.

This study investigated the effects of enthusiasm on learning new skills for children with autism. Various skills were taught by several teachers to children with autism. Differences between enthusiasm and non-enthusiasm conditions were determined by ratings from professionals and parents. In addition, social validity measures were taken between the two conditions. Results indicate little differences between the two conditions although professionals and parents prefer the enthusiastic condition.


Participants (N=67) were recruited from introductory psychology classes at a mid-sized, Midwestern university. Students in these classes were assumed to not have a background in psychological disorders. Media sources (readings versus videos) with different content (personal narrative versus informational facts) were investigated in terms of effect on students’ views of persons with psychological disorders. During session 1, participants completed a modified version of the Attribution Questionnaire (Corrigan et al., 2002) measuring attitudes towards persons with psychological disorders (pretest). During session 2, participants were divided into four groups. Participants in the personal narrative condition read a narration by a man with schizophrenia. Participants in the facts condition read information on psychological disorders. Participants in the personal narrative video condition watched a video about a woman with schizophrenia. Participants in the facts video condition watched a video discussing information about disorders. Participants completed the modified AQ again (post-test). The Elaboration Likelihood Model was the theoretical basis for this study (Petty & Cacioppo, 1986a, 1986b). Participants in the reading condition(s) were hypothesized to have significantly more positive attitudes at post-test than those in the video condition(s). Repeated measures ANOVA will be used; results are pending analysis of pre- and post-tests.

AN EMPIRICAL ANALYSIS OF HYPOTHETICAL REWARDS IN THE STUDY OF IMPULSIVITY: ARE THESE PROCEDURES ADEQUATE OR IS THE FIELD BEHAVING IMPULSIVELY? Carla Lagorio, undergraduate student, with Gregory Madden, faculty, same department. Association for Behavior Analysis, Boston, MA, 28 May-1 June 2004.

Human research in delay discounting has omitted several procedures typical of animal studies: forced-choice trials, consequences following each response, and assessment of stable response patterns. The present study manipulated these procedures across two conditions in which real or hypothetical rewards were arranged. Six college students partici-
participated in daily sessions, in which steady-state discounting of hypothetical and real rewards was assessed. No systematic effects of repeated exposure to hypothetical rewards were detected when compared with first day assessments of discounting. Likewise, no systematic effect of reward type (real versus hypothetical) was detected. When combined with previous research failing to detect a difference between hypothetical and potentially real rewards, these findings suggest that assessing discounting of hypothetical rewards in single sessions is a practical and valid procedure in the study of delay discounting.


FATHER-DAUGHTER RELATIONSHIPS AND WOMEN’S EXPERIENCE OF DOMESTIC/PARTNER ABUSE. Wendy Lyman and Sara Nolta, undergraduate students, with Blaine Peden, faculty, same department. Psi Chi Midwest Psychological Association (MPA), Chicago, IL, 28-29 April 2004.

This study is a continuation of a prior study on women’s perceptions of domestic/partner abuse. It will examine the association between the father-daughter relationship quality and two measures: the incidence of domestic/partner abuse in an adult women’s life, and her perception of abuse severity. Women will respond to Likert-scale items and will rate vignettes of abusive situations. The hypothesis is that father-daughter relationships will negatively correlate with incidence and with perception of severity of abuse. Results will potentially be useful for counseling centers and domestic abuse shelters, as well as provide a basis for future studies.

FIXED VS. RANDOM REINFORCER AMOUNT SCHEDULES: PREDICTIONS OF UNIT PRICING. Eric Ewan and Julie Slowiak, undergraduate students, with Gregory Madden, faculty, same department. Mid-American Association for Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004.


Ghrelin increases food intake under a variety of conditions. We wondered if Ghrelin would increase food-reinforced operant responding. We trained seven rats maintained at 85% of their free-feeding weights to lever press under a progressive ratio 1 (PR 1) reinforcement schedule. Initially, a single lever press resulted in delivery of a 45 mg food pellet. One additional lever press was required for each additional food pellet. Sessions continued until 10 minutes elapsed without earning an additional food pellet. Break point (the number of lever presses emitted to earn the last food pellet during the daily session) served as a quantitative measure of motivation. When performance stabilized, a cannula was surgically implanted in the right lateral ventricle. Following recovery and restabilization...
of PR 1 performance, rats were given free access to food. After a stability criterion was achieved under free feeding conditions, rats were injected with saline (5 µl), Ghrelin (0.1 – 3 nmol/5 µl, 2 hr pretreatment), or Neuropeptide Y (NPY; 5 µg; 30 min pretreatment) prior to the daily PR 1 sessions. Ghrelin (0.3 – 3 nmol) produced a significant 2-3 fold increase in break point compared to saline. Shorter pretreatment times (30 min and 1 hr) did not enhance ghrelin’s (1 nmol) effects under the PR 1 schedule. NPY increased break points 4-5 fold. These findings indicate that Ghrelin not only increases eating when food is freely available, but also increases motivation to eat.


Children raised by homosexual parents are no more likely to be homosexual than if they are raised by heterosexual parents; nevertheless, children of homosexual parents are stigmatized by the association with their homosexual parents. We studied student perceptions of prospective roommates. Our primary independent variable was the parents portrayed in a written scenario as a heterosexual couple, a lesbian couple, or a gay couple. We measured various aspects of acceptance and social stereotypes of the prospective roommate based on the parent sexual orientation. We found that children of gay parents were less accepted than children of either heterosexual or lesbian parents. The ratings of stereotypes were greater for prospective roommates of both types of homosexual parents compared to heterosexual parents. Overall female participants were more accepting than male participants, regardless of the type of parents. This study provides evidence that could be used by future researchers to explore the controversial issue of social acceptance of gay adoptions.

HAPPY BABIES MAKE MEN MORE ATTRACTIVE: EVIDENCE FOR FEMALE PREFERENCES FOR PARENTAL-INVESTING MEN. Meghan Swanson, Mark Remiker, Nicole Zeug, and Andrew Rohloff, undergraduate students, with April Bleske-Rechek, faculty, same department. Human Behavior and Evolution Society, Austin, TX, 1-5 June 2005.

The logic of Parental Investment Theory implicates adaptations in women devoted to the assessment of males’ willingness to invest in offspring and adaptations in men designed to detect women’s fertility status and seek sexual variety. In keeping with this logic, La Cerra (1994) found that young women perceived a male stranger interacting with a child as more attractive than a male stranger ignoring a child, whereas men rated a female stranger as attractive regardless of context. In two studies, each with a different set of stimulus photos of a male and female pre-rated as slightly-to-moderately attractive, we replicated La Cerra’s original research findings. Further, we extended her research by (1) utilizing a between-subjects rather than within-subjects design and (2) investigating potential moderators of sensitivity to cues of parental investment, including sociosexual orientation and egalitarian sex-role attitudes.
INVESTIGATING THE IMPULSIVITY OF TYPICALLY DEVELOPING CHILDREN. Nicole Zeug, Sarah Tillman, Sara Czekalski, and Julie Ackerlund, undergraduate students, with Kevin Klatt, faculty, same department. Mid-American Association of Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004.

MEDIATING VARIABLES IN CHANGING PSYCHIATRIC STIGMA. Laura Carter and Cassie Lubich, undergraduate students, with Lori Bica, faculty, same department. Psi Chi Midwestern Psychological Association Annual Meeting, Chicago, IL, 29 April-1 May 2004.


Rats were trained to discriminate between 2 and 22 hrs of acute food deprivation in an operant choice paradigm. Rats (n=8) learned the discrimination (mean=58 trails; range 30-133). During generalization tests, acute food deprivation produced time-dependent increases in 22 hr responding. During other tests, rats were food restricted for 22 hrs and responded appropriately. When rats were then given access to food for 20 mins (mean consumption=5.7 g; SD=1.3 g) and again placed in the operant test, rats reliably selected the lever associated with 2 hrs food deprivation, indicating that food consumption eliminates discriminative stimuli associated with 22 hrs food deprivation. Under similar test conditions, saccharin (0.032-3.2%) consumption did not alter the discriminative stimulus effects of 22 hrs food deprivation. During other tests, rats were food restricted for 2 hrs and responded appropriately. Rats were then injected with neuropeptide Y (NPY), ghrelin, or saline in the PVN. NPY and ghrelin produced dose-dependent increases in 22 hr-appropriate responding indicating NPY and ghrelin produced effects that are recognized as similar to those of acute food restriction. These findings suggest that discriminative stimuli produced by 22 hrs food deprivation are mimicked by neurochemicals administered into brain areas important for the feeding regulation. These effects may be sensitive to factors altering food consumption and may serve as a model to examine dietary and neurochemical factors that alter internal states associated with eating.

OBSERVING PIGEONS UNDER CONCURRENT SCHEDULES OF REINFORCEMENT (EAB). Daniel Hehli, Mikhail Koffarnus, Michael K. Paul, and Ryan Rowe, undergraduate students, with Gregory Madden, faculty, same department. Association for Behavior Analysis Convention, Boston, MA, 28 May-1 June 2004.

According to Herrnstein’s (1970) matching law, organisms will allocate their behavior proportional to the amount of reinforcement obtained on each alternative under concurrent schedules of reinforcement. Research has shown that humans only conform to the matching law when they are required to report the key in which reinforcement was earned. The attempt of the current study was to try to replicate what has been observed with human subjects, in that matching only occurs when the schedule correlated stimuli are observed. White carneaux pigeons served as subjects for this study. The experiment consisted of two phases, one in which the pigeons were given the schedule correlated stimuli for free (they did not have to peck any keys) and one in which they had to peck the center key in order to
illuminate the stimuli for 10 seconds. Results indicated that pigeons that “observed” the stimuli, by pecking the center key or when given the schedule correlated stimuli freely, more closely conformed to the matching law than those that did not observe the stimuli. These results support the conclusion that the observing schedule correlated stimuli is an important variable in determining the extent to which organisms will conform to Herrnstein’s matching law.

ON THE EFFECTS OF READING EROTIC LITERATURE: MANIPULATIONS OF MEN’S AND WOMEN’S EMOTIONAL AND SEXUAL RELATIONSHIP SATISFACTION. Mark Remiker and Katie Ley, undergraduate students, with April Bleske-Rechek, faculty, same department. Human Behavior and Evolution Society, Austin, TX, 1-5 June 2005.

Research on contrast effects has documented various intriguing findings. Exposure to centerfolds, for example, has been shown to lower men’s attraction to their partner. Evolutionary logic suggests that stimuli that highlight another couple’s emotional connection may be detrimental to women’s perceptions of their mateship. As part of this study, men and women read one of two literature excerpts dealing with a sexual encounter between a committed couple. One excerpt depicted a high degree of sexual novelty in the relationship, and the other a high degree of emotional intimacy. We thus tested the hypothesis that men’s sexual relationship satisfaction is more influenced than is women’s by stimuli that highlight sexual novelty, and the hypothesis that women’s emotional relationship satisfaction is more influenced by stimuli that emphasize emotional intimacy. Our results implicate a need for research on the effects of media consumption on people’s relationship commitment and satisfaction.


One of the distinctions between open and closed economies is the presence and absence, respectively, of response-independent (free supplemental) feeding outside the experimental chamber. Behavioral economists (e.g., Hursh, 1980) have held that these supplemental sources of income decrease motivation to work for food during the session (these findings have been likened to the effects of welfare as a variable that decreases recipients’ motivation to seek out a job). Previous research conducted by Timberlake and colleagues, however, has shown that animals discount the value of delayed response-independent feedings such that these feedings do not affect motivation to work for response-contingent food. Specifically, Timberlake et al. (1987) reported that supplemental feedings occurring 32 minutes or more after the session had no effect on progressive-ratio breakpoints. A shortcoming of the Timberlake studies is that they were not conducted in a closed economy. That is, Timberlake’s studies have, with the exception of one rat for eight days, always included supplemental feedings (they simply varied the time to these feedings). In our study, pigeons worked under PR schedules with no supplemental feedings. Baseline consumption under the PR maintained the subjects at approximately 80% of their free-feeding weights. In subsequent conditions, the number of food pellets delivered per session was the same as that obtained in the stable baseline sessions, but any pellets not earned under the
PR were delivered response independently across delays ranging from 4 to 64 minutes. Consistent with behavioral-economic predictions, PR breakpoints were consistently lower when unearned pellets were delivered response-independently.


This study evaluates the effect of source of information and type of therapy on the strength of college students’ opinions of appropriateness of method of therapy for assault issues and alcohol and drug abuse. The sample population consisted of 65 (25 male and 40 female) students at a Midwestern university. Each participant was given a packet of either scientific or website information about online therapy via block randomization. F-tests indicate a significant interaction between type of information and type of therapy on perceptions of the most appropriate type of therapy for treating assault issues $F(1, 63) = 10.45, p < .01$, and alcohol and drug related disorders $F(1, 63)=4.91, p < .05$. Findings indicate that source of information and type of therapy influence people’s perceptions of the appropriateness of treatment via traditional and online methods of therapy. Future studies are necessary to determine the effectiveness of online therapy.


The focus of the present study is to evaluate the difference between a paper and pencil survey method of data collection, and a more interactive, computer-based method, to extract perceptions of marital name choices. Recent research has begun attempting to determine such differences. Tourangeau, Couper, and Steiger (2003) have researched differences in participant responses by using a computer-based version, differing in areas such as personalization or interaction. A face-to-face as well as Internet sample will be utilized. For the Internet version, each participant will provide ratings of personality traits and life outcomes for a man or woman who has taken a nontraditional or traditional name change, portrayed by an actor or actress via streaming video. An ANOVA will analyze personality traits based on semantic differential ratings and life outcome ratings based on Likert ratings. Computer technology is growing at a fast rate. The utilization of such technology may produce more accurate results by more adequately portraying real persons making different name choices at marriage. Computerized methods of data collection are growing in popularity, and this study seeks to find whether such methods replicate paper and pencil results.

Contemporary theories of intellectual development and perspectives on the place of history in the psychology major suggest that the course is ideally suited as an integrative capstone to the major. At the same time, however, many theorists fail to appreciate the notion that the history of psychology also provides opportunities to teach contents, skills, and applications of psychology that facilitate the integration of knowledge. This research describes the importance of incorporating history vigorously throughout the curriculum, for a liberal education relies on the dialectical interplay of history and intellectual development: history, it is argued, provides context, depth, and background to otherwise seemingly disconnected ideas and actions and leads to more extensive knowledge, understanding, and critical insight—thus, to intellectual development; intellectual development, in turn, leads to a greater appreciation for, acceptance of, and interest in history, thus perpetuating the dialectal cycle of growth and development characteristic of liberal education.

PROCESS IMPROVEMENT IN A CLINIC SETTING: AN APPLICATION OF OBM. Chelsey Sutton, Karin Rasmussen, and Valori Berends, undergraduate students, with Gregory Madden, faculty, same department. 
*Association for Behavior Analysis 31st Annual Convention. Chicago, IL, 27-31 May, 2005.*

Research clearly indicates that the appropriate conveyance of expectations and goals is a necessary factor in the ability of an organization to perform at its highest level. The current study analyzed the influence of standardized forms and feedback on the improvements in work output, speed, and accuracy in a medical clinic setting. The goal of the study was to increase the speed with which lab orders were processed relative to the time in which they were ordered. The use of standardized lab order forms as well as regular feedback on progress made was utilized to determine their effects on the accuracy and speed of lab request processing. The effects of the intervention were evaluated using a multiple-baseline design across departments.

PROMOTING BEHAVIOR ANALYSIS ON CAMPUS: BEHAVIOR ANALYSIS CLUBS AND THEIR ACTIVITIES. Carla Lagorio, undergraduate student, with Ankhhesenamun Ball, California State University-Fresno, and Bethany R. Raiff and Kathryn A. Saulsgiver, University of Florida. 
*Association for Behavior Analysis, Boston, MA, 28 May-1 June 2004.*

Behavior analysis clubs are one way of promoting greater student involvement in behavior analysis at both the undergraduate and graduate levels. A number of behavior analysis clubs currently exists on university campuses around the country. The history, organization, purpose, and activities of three such clubs will be described in a panel discussion. This format will also allow an opportunity for an exchange of ideas regarding potential club activities and provide information to those wishing to form a behavior analysis club on their campus.

RESPONDING TO A HYPOTHETICAL EXTRA-PAIR INVOLVEMENT: SEX DIFFERENCES IN THE NOMINATION OF CUES OF SEXUAL INFIDELITY. Nalee Xiong, undergraduate student, with April Bleske-Rechek, faculty, same department. 
*Human Behavior and Evolution Society, Austin, TX, 1-5 June 2005.*

In a novel test of the hypothesis that men’s jealousy more than women’s focuses on signals of sexual (vs. emotional) infidelity, we asked 158 young adults to list pieces of
evidence that would lead them to believe that their partner was involved with someone else. The nature of the extra-pair involvement was intentionally ambiguous, under the expectation that if men more than women focus on cues of sexual infidelity, then men should be more likely than women to nominate sexual cues as evidence of extra-pair involvement. As predicted, men’s first cue involved explicit sexual evidence (e.g., catching her having sex with someone else, finding used condoms) more frequently than did women’s. Further, despite that men nominated fewer cues, on average, than did women, a greater proportion of men’s cues referenced sexual behavior. Because this study did not rely on the forced choice method, the findings provide original support for the existence of an evolved sexual jealousy adaptation in men.

STATISTICS STUDY GROUPS LED BY UNDERGRADUATE TEACHING APPRENTICES. Katie Ley, undergraduate student, with Beverly Dretzke, faculty, same department. 

_Council of Teachers of Undergraduate Psychology, Chicago, IL, 29 April-1 May 2004._

Undergraduate Teaching Apprentices (TAs) for an introductory statistics course facilitated weekly study groups in which they assisted students with homework and exam preparation. Group members rated TAs highly with respect to their knowledge and explanations. Especially appreciated were the TA-prepared exam-taking tips, study guides, and practice exams.

TEACHING VOCAL IMITATION TO CHILDREN WITH AUTISM. Amanda C. Besner, Kelli B. Capocasa, Christine S. Benedict, Heather A. Petersen, undergraduate students, with Kevin Klatt, faculty, same department. 

_6th Annual UW-System Symposium for Undergraduate Research and Creative Activity, Oshkosh, WI, 29 April 2005. Mid-American Association for Behavior Analysis, Indianapolis, IN, 30 Sep.-2 Oct. 2004._

Children diagnosed with autism have developmental delays in communication, play, and social skills. Poor communication skills are most problematic because they are necessary for learning many social and play skills. Therefore, developing communication skills, especially verbal competence, is extremely important. Teaching verbal skills to nonverbal children requires first teaching the child to imitate vocal sounds. In this study, vocal imitation was taught to two young children using a discrete trial procedure. Three nonverbal children ages 2.5, 2.5, and 4 were taught to imitate various combinations of vowels and consonants. Results show an increase in vocal imitations across most categories of vowels and consonants.

TOWARD AN ANIMAL MODEL OF HUMAN PATHOLOGICAL GAMBLING. Eric Ewan, undergraduate student, with Gregory Madden, faculty, same department. 

_Association for Behavior Analysis 31st Annual Convention, Chicago, IL, 27-31 May 2005._

UNDERGRADUATE TEACHING ASSISTANTS AND ETHICS. Meghan Swanson, undergraduate student, with Blaine Peden, faculty, same department. 

_Psi Chi Midwestern Psychological Association, Chicago, IL, 5-7 May 2005._

Keith-Spiegel et al. (2001) noted that graduate teaching assistants (GTAs) “occupy an ambiguously delineated territory within higher education” (p. 133) because they are neither “just students” nor “independent educators.” In such cases of ethnically ambiguous role
boundaries, there is a genuine concern regarding the potential for various kinds of ethical infractions by GTAs. Many of the same concerns and issues also apply to undergraduate teaching assistants (UTAs). To date, the only study that examined the ethical sensitivities of UTAs (Scannell, 2000) was limited, the sample size was small, and the data unavailable for reanalysis. The study will collect (a) demographic information about students serving as UTAs, (b) evaluate their ethical training both in the sense of having taken ethics courses as well as receiving ethical instruction with regard to TAing, (c) assess their interest in the ethics of practice, research, and teaching, and (d) compare and contrast self-reported versus actual knowledge about ethical dilemmas confronting UTAs (after Branstetter & Handelsman, 2000; Keith-Spiegel, et al., 2001). In addition, the study will employ the critical incident technique (Fly, van Bark, Weinman, Kitchener, & Lang, 1997; Goodyear, Crego, & Johnston, 1992).


Textbooks are a major tool in the education of students at all levels. Various kinds of research explore how textbooks can best assist students in learning about difficult topics. One major topic concerns the use of different kinds of graphics. Peden and Hausmann (2000) found that data graphs in psychology textbooks were mainly line and bar graphs and also suggested that teachers must ensure students understand these graphs. Textbooks, however, contain other kinds of graphics. The current study reports a content analysis of introductory psychology textbooks for the presence of Box and Arrow Diagrams (BNADs). The goal is to discover whether BNADs are used to display causal models (i.e., cause-and-effect relationships) or other information. We expect our results to reveal a need for explicit and perhaps specialized emphasis regarding the teaching of causal relationships and the interpretation of causal BNADs. This report will extend a preliminary study that examined 10 introductory psychology textbooks for BNADs. The preliminary results supported the hypothesis that more intellectually stringent textbooks as rated by Griggs (1999) had a higher percentage of causal BNADs. The preliminary study also suggested that few BNADs in textbooks illustrate either feedback loops or strength indicators.

USING MICROSOFT EXCEL IN INTRODUCTORY STATISTICS. Katie Ley and Emily Hynek, undergraduate students, with Beverly Dretzke, faculty, same department. Midwestern Psychological Association/Council of Teachers of Undergraduate Psychology, Chicago, IL, 6-8 May 2005.

Students learn how to use Microsoft Excel for statistical analyses in the introductory statistics course required of psychology majors and minors. This is a one-semester course with a typical semester enrollment of 120 students and a typical class size of 30. The majority of the students are sophomores. Excel issued to construct frequency distribution tables, graphs, and correlation matrices, to obtain descriptive statistics, and to carry out one-sample t-tests, paired-sample t-test, independent samples t-tests, one-way ANOVA, and regression analyses. Instructional emphasis is place on interpretation of output, including p-values and critical values for one- and two-tailed tests. Students completed questionnaires on their use of Excel in the introductory statistics course. A majority indicated that it was fairly easy for them to learn statistical applications of Excel. A majority also indicated that they thought
using Excel helped them learn statistical concepts.

**YEARS ONE AND TWO OF A SEXUAL ASSAULT PREVENTION PROGRAM: EVALUATIVE DATA.** Zachary Wedge, Doug Flashinski, Ashley Cole, David Parker, Lisa Nackers, and Alyssa Moore, undergraduate students, with Lori Bica and Marie Crothers, faculty, same department.


One in four women is sexually victimized during her college years, usually by a male peer (Koss & Oros, 1982). Freshmen are at particularly high risk during their first weeks on campus, creating a significant need for active prevention programming. Given that neither attitudes nor intentions are powerful predictors of behaviors, the literature suggests that the future efforts focus on behavior change. The program, now in its second year, was designed to incorporate effective elements and recommendations from existing literature. Six residence hall wings made up the program group (N=85) and six similar wings comprised the comparison group (N=79). A pretest was administered to all participants to determine previous sexual experiences and behaviors that might be linked to sexual assault. Session I examined the nature/scope of the sexual assault problem, Session II involved exploring issues specific to each gender, and Session III provided participants the opportunity to practice the protective skills/behaviors they learned via role-playing. Post-tests will be administered to all participants at the conclusion of each semester until graduation. Program participants' evaluative comments from both years will be compared.

**PUBLIC HEALTH PROFESSIONS**

**ASSESSMENT OF COMMUNICATION, ON-TASK BEHAVIOR, AND PREFERENCE FOR MUSIC OR PLAYTIME IN CHILDREN WITH AUTISM.** Erin Paschke, undergraduate student, with Lee Anna Rasar, faculty, same department.


Research suggests that music therapy is effective with children with autism. However, specific and clearly defined procedures and demonstrations of music’s efficacy in a controlled study with this population are severely lacking in the literature. The purpose of this study was to replicate a pilot study implemented in New York in 2003, thereby creating more validity and reliability for the results that strongly indicated music therapy was effective in increasing the communication skills of children with autism. Four children with autism participated in 10 sessions over the course of five weeks. Twice weekly the researcher conducted a one-to-one 30-minute session with each participant. Each session was divided into two 15-minute sections, one consisting of music time and one consisting of play time. The two variables (either music time or play time) were randomly drawn from a hat before each session and then counterbalanced so that over the course of five weeks the number of times music time was first and play time was first were equal. Both preferred instruments and toys (as assessed in session one) were made available in the treatment room for the participant to see. The researcher encouraged music if music time was first, and vice versa. If the participant presented up to three requests for the activity that was not
being done, the researcher stopped redirecting to the designated task and instead granted the request of the child and offered the requested activity. If the child requested an activity or item longer than five seconds, the request was also granted, despite which variable the researcher was trying to conduct. All sessions were videotaped and reviewed by the researcher and two trained research assistants privately and at separate, individual times. This study yielded significant results in favor of music time over play time to increase communication in children with autism. Of 40 sessions across the four participants, on-task and requesting behavior were greater during music time than during play time on 38 occasions. This study confirmed that music interventions increase communication and on-task behavior while decreasing off-task behaviors in children with autism. It is hoped that, through the revelation of therapeutic changes from the observed baseline, this study will help to provide support and to justify the inclusion of music therapy services for children with autism in New York and benefit other programs as well.

ASSESSMENT OF EFFECTS OF HARP ON DEVELOPMENT SKILLS OF EARLY CHILDHOOD STUDENTS WITH SPECIAL NEEDS. Jacquelyn Petroni, Amber Johnson, Susan Sundly, and Sara Ries, undergraduate students, with Lee Anna Rasar, faculty, same department.


Harp lessons will be provided to 25 four- and five-year-old students with special needs in the Menomonie School District by student Music Therapists Jacque Petroni, Sara Ries, and Amber Johnson under the supervision of Paula Smith and Lee Anna Rasar. Music therapy students will see each student with special needs to teach the student how to play harp and will complete an assessment of baseline skills in the areas of motor coordination, language/speech skills, cognition, attention span, ability to engage in purposeful, meaningful behavior, emotional status, and social interaction. Following the assessments, goals of focus will be established for each student and will complement the IEP goals developed by the speech therapists, occupational therapists, physical therapists, classroom teachers and the School Psychologist. Petroni, Ries, and Johnson would work with Rasar and Smith to develop these goals following the assessments. Each student with special needs will receive weekly harp lessons for a period of six weeks following the assessment. Another assessment will be completed for each student following the six-week period of harp lessons. Session notes will document each student’s responses in each harp lesson, and videotaping will be used to show physical responses and possibly to document emotional responses. Additional information about any changes noted in emotional, social, behavioral and physical health of each student during this time period will be collected by school staff and families of each student. Student music therapists will collate this data in chart format and may also use videologs.

ASSESSMENT OF THE EFFECTS OF MUSICAL RESPIRATORY INTERVENTIONS FOR PATIENTS ON VENTILATOR SUPPORT. Susan Sundly, Jacquelyn Petroni, and Sara Ries, undergraduate students, with Lee Anna Rasar, faculty, same department.


Patients on ventilator support who are able to use Passy Muir values were instructed
how to play harmonica and were led in singing exercises daily for two months. A baseline was recorded for each patient to note the number of seconds patient was able to sustain single pitches on harmonica, and to note the number of seconds the patient was able to play harmonica in one breath. Prior to and after each musical intervention, pulse oximetry for each patient was measured, as well as the number of seconds each patient was able to sustain a single pitch on harmonica, both inhaled and exhaled. Harmonica and singing trials occurred daily for four weeks. Adaptations for pre-test and post-test were made for a patient who is blind and has a developmental disability. A harmonica holder was utilized by a patient who is paralyzed from the neck down. Comparisons were made across time to note any changes in the ability of each patient to sustain single pitches on harmonica, in the number of seconds each patient could play in one breath, and in pulse oximetry. Individualized programs for harmonica and singing were developed for each patient based on responses during the project.

ASSESSMENT OF THERAPEUTIC MUSIC ACTIVITIES FOR USE IN ATTACHMENT DISORDERS PROGRAMMING. Christina Hanschke, Catherine Hennessy, Jacquelyn Petroni, undergraduate students, with Lee Anna Rasar, faculty, same department.
52nd Annual Great Lakes Region of American Music Therapy Association Conference, Milwaukee, WI, 3-6 March 2005.

This presentation examines the development and assessment of therapeutic music activities for effectiveness in developing emotional regulation and healthy anger management skills for people with attachment disorders. Specific focus is given to: effectiveness in developing healthy trust and decreasing need to control in people with attachment disorders, effectiveness in helping foster parents increase ability to emotionally detach when foster children emotionally escalate, effectiveness of therapeutic music activities in developing coping skills in children with attachment disorders, improvement of healthy use of leisure time, increase in healthy social interaction, and effectiveness of therapeutic music activities designed to support addictions programming for children with attachment disorders. A video training program on use of therapeutic music activities to target these goals of the Attachment Disorders program was developed. Percussionist and music therapy student Catherine Hennessy assisted with integration of percussion activities to target therapeutic goals. Music Therapy student Jacquelyn Petroni prepared the videotape training segments for successful activities. Music Therapy student Christina Hanschke worked with Lutheran Social Services In-Home Therapist Mike Bauer to develop activities and provide programming for clients with attachment disorders in the Family Preservation Program of LSS. Faculty member Lee Anna Rasar served as faculty mentor and clinical supervisor.

EFFECTS OF HARP ON DEVELOPMENTAL SKILLS OF STUDENTS WITH DISABILITIES. Amber Johnson and Jacquelyn Petroni, undergraduate students, with Lee Anna Rasar, faculty, same department.

EXPLORING QUALITY PRACTICES OF STEP II AHCA BALDRIGE APPLICANTS. Stefanie Ojibway, undergraduate student, with Douglas Olson, faculty, same department.
5th Annual UW-System Symposium for Undergraduate Research and Creative Activity—

LEADERSHIP FOR QUALITY: TODAY & TOMORROW. Stefanie Ojibway, undergraduate student, with Douglas Olson, faculty, same department, and Bernie Dana, Evangel University. 

The relationship of effective leadership to meeting and exceeding customers’ expectations in long-term care and the achievement of Quality First objectives will be discussed. Participants will learn some of the management and leadership skills that are essential to achieving a culture of empowerment and systematic quality in a LTC facility.

LEADERSHIP TODAY AND TOMORROW. Matt Mauthe, Amy King, and Catherine Pappas, undergraduate students, with Douglas Olson, faculty, same department. 
Life Services Network, Chicago, IL, 21-22 April 2005.

During this presentation we: share some key leadership and management foundations, and explore the impact of research findings and creative approaches in the field, and their relationship to leadership practices; examine the current trends and statistics related to individuals entering the aging services profession, and explore the relationship and influence of trends with a successful health care leadership program; recognize the critical need for growth in our profession and why we must take an active role today; engage in a facilitated discussion focusing on approaches for building career interest in the aging services field.

PUBLIC HEALTH PROFESSIONS/NURSING SYSTEMS

A SURVEY OF DIRECTORS OF NURSING IN LONG-TERM CARE. Laura Weiss, undergraduate student, with Mary Zwygart-Stauffacher, faculty, Nursing Systems, and Douglas Olson, faculty, Public Health Professions. 

The goal of our research project, A Survey of Directors of Nursing in Long-Term Care, is to gather information about the role of the director of nursing (DON) in nursing homes. Long-term care facilities are extremely challenged with a seemingly endless list of pressures: changing consumer preferences, staffing shortages, and financial constraints. With difficulties such as these, an excellent leadership team is needed for the nursing home. One of the key ingredients for this team is the DON. Over the years, the definition and role functions of the DON has become broader to include greater authority, responsibility, and range of control. A survey instrument was created to assess the present roles and responsibilities of this position. The survey was distributed to all DONs in Wisconsin and Minnesota nursing homes. There were 460 respondents and a response rate of 56%. The survey results were analyzed using quantitative and qualitative measures. To be highlighted in this presentation to satisfaction is resident and family relations. Rather than implying the new definition and roles of this position, our in-depth survey describes what is going on inside the walls of a long-term care facility regarding the pivotal role of a directory of nursing.
**Sociology**

**DOES THE DEVELOPMENT OF AN IDENTITY AS “CARDIAC SURVIVOR” INCREASE ADHERENCE TO MEDICALLY PRESCRIBED CARDIAC REHABILITATION PROGRAMS?** Meghan McDonald, undergraduate student, with Jeff Erger, faculty, same department.


This research tests the connection between a social identity as a “cardiac survivor” and adherence or nonadherence to a medically prescribed cardiac rehabilitation program (CRP). The goal is to see if those who develop a primary identity as “cardiac survivor” adhere to treatment at higher rates than those who do not. This tests a major theoretical claim in the medical sociology literature on the relationship between identity and adherence (Burton and Hudson, 2001). The research took place at two hospitals’ CRPs. The research employed a two-stage survey, with phase 1 at the start of cardiac rehabilitation, and phase 2 three months later. We hypothesized that greater identity salience as a “cardiac survivor” and an increase in the salience of that identity would improve adherence. Results of the study indicate a potentially strong link, but show that further research is needed.

**“I BETTER GET OUT OF BILL’S CHAIR”: ENFORCEMENT OF FORMAL AND INFORMAL RULES AT A COFFEE SHOP.** Nicholas B. Harberg, undergraduate student, with Jeff Erger, faculty, same department.


This research investigates the enforcement of formal and informal rules by customers and employees at a local coffee shop. This study looks at the process that people go through when learning these rules, highlighting the universal as well as unique aspects of the process. By employing a combination of document analysis and covert participant observation techniques, the researchers looked for incidents of rule violations, responses to those violations, and the outcomes of the “rule contesting process” at a local coffee shop. The use of various “discourses of domination” (drawing on Foucault) are found to be key in the transformation of new entrants into “regulars.” Key in this process is the internalized social control shown by regulars. By looking at social control not only as an external constraint on people, but as something that people employ on themselves, this research expands our knowledge of the multidimensionality of the social control process.

**GRADUATE STUDENTS**

**ADULT HEALTH NURSING**

**SPIRITUALITY, QUALITY OF LIFE, AND HEALTH IN PEOPLE WITH CHRONIC MENTAL ILLNESS.** E. Marie Allison and Patricia Schulz, graduate students, Emily Bastian, Laura Ludwig, Adrienne Sween, undergraduate students, with Joan Stehle Werner, faculty, same department.

*2004 Mayo Spiritual Care Research Conference, Rochester, MN, 4-5 Nov. 2004.*
The aim of the present study, currently being implemented, is to explore spirituality, health, and quality of life from the perspective of people with chronic mental illnesses. This study employs a descriptive/correlational and exploratory design with triangulation of methods and investigators. The final sample will include at least 30 people with a verifiable chronic mental illness, residing in the community, for the quantitative portion of the study, with from 10 to 20 of these persons continuing on to complete an interview. Settings include community gathering places/agencies for people with chronic mental illnesses. The phenomena that are being measured quantitatively using well-accepted instruments are everyday spirituality (Daily Spiritual Experiences Scale), self-perceived health (Short Form-36), and subjectively perceived quality of life (Quality of Life Scale). Participants who agree to a follow-up interview will be interviewed using a schedule containing open-ended questions focusing on meaning in life, health, and life-satisfaction. Six participants were included in the pilot study: findings indicated great variations in responses. In addition, the researchers found that all instructions and instruments were understandable to participants and tools were able to be completed with or without assistance in 80 minutes or less.

**Biology**

**BREEDING BIRD COMMUNITIES IN UNBURNED AND BURNED JACK PINE-ASPEN FORESTS, ST. CROIX STATE PARK, MN. Matthew S. Berg, graduate student, with Paula Kleintjes, faculty, same department.**


Fire was reintroduced to St. Croix State Park, Minnesota with the management goal of maintaining and expanding current jack pine (_Pinus banksiana_) barren fragments. We examined the response of the breeding bird community to these controlled burns. We conducted breeding bird censuses and habitat assessment in four burned and four unburned, 10-ha jack pine–aspen (_Populus_ spp.) plots that contained residual barren fragments. Of 45 habitat variables measured, jack pine density and relative dominance, shrub density, percent canopy cover, trees 23-30cm dbh, and dead jack pine were significantly associated (_P_ < 0.050) with unburned plots. Burned plots had significantly more trees 8-15cm dbh and dead aspen. Total breeding territorial males/ha were higher (_P_ = 0.020) in unburned plots, but evenness (_P_ < 0.001) and diversity (_P_ = 0.019) were higher in burned plots. Results of ordination analysis (NMDS) indicated strong correlation between the bird community and vegetative structure (_r_^2_ = 0.957) with fire being the strongest predictor of plot location. The American Redstart, Chestnut-sided Warbler, Ovenbird, Golden-winged Warbler, Nashville Warbler, and Scarlet Tanager were indicator species of unburned plots. Least Flycatcher, Eastern Bluebird, House Wren, Common Yellowthroat, Eastern Towhee, Indigo Bunting, and Baltimore Oriole were indicators of burned plots. Unburned stands had significantly (_P_ < 0.050) more canopy and ground-nesting species and insect gleaners while burned stands had more cavity-nesting species, insect air salliers, ground foragers and omnivore lower-canopy foragers. Our results suggested that prescribed burning primarily benefited shrub land and habitat generalist species, whereas species associated with barrens were absent from the treatment area two years post burn. If management goals include using fire to restore barrens avifauna, perhaps burning larger contiguous patches would attract more species.

There is growing interest in the contribution of mycorrhizal fungi to the control and maintenance of plant diversity and community composition. Until recently, ecologists have used the fungicide benomyl to experimentally reduce root colonization by mycorrhizal fungi. As benomyl has been de-listed and is no longer available for use, we tested an alternative fungicide, chlorothalonil (in granular form), in order to assess its suitability as a benomyl replacement. We measured the effects of various dosages of chlorothalonil on mycorrhizal inoculum potential in experimental plots in an old field. The dosages included control, 24 g chlorothalonil (Bravo Ultrex) m$^{-2}$, and 108 g m$^{-2}$; these were applied over the course of one growing season. Within the treatment plots, we are investigating the effects of chlorothalonil and soil nutrient additions on biomass distribution to roots and shoots in Andropogon gerardii and Aster laevis; soil used to assess inoculum potential was taken from plots that did not receive nutrient amendments. We grew 10 replicate seedlings of Andropogon gerardii in pooled soil collected from these experimental plots. After 28 days of growth in the greenhouse, the plants were harvested, roots were cleared, stained, and root colonization by vesicular-arbuscular mycorrhizal fungi was counted. The lower dosage reduced root colonization by 72%, while the higher dosage reduced it by 85% (one-way ANOVA p < .0001). These results suggest that chlorothalonil can have strong effects on mycorrhizal inoculum potential and is suitable for experimental use. In addition, it comes in a granular form, which eliminates the problem of additional watering that was the case with benomyl.

BUSINESS COMMUNICATION

TECHNOLOGY AND THE ENTRY-LEVEL EMPLOYEE. Se-Hyung Oh, graduate student, with Keith Stearns, faculty, same department. Association for Educational Communications and Technology Conference, Denton, TX, 17-19 June 2004.

COMMUNICATION DISORDERS


This poster will present results of a study about developmental apraxia of speech (DAS). Speech-language pathologists who work in school and medical settings in Wisconsin were randomly selected from the WSHA membership and surveyed by mail regarding their preparation about DAS and their practices with children so diagnosed. Although clinicians’ exposure to DAS was scattered across their undergraduate and graduate education, they derived benefit from continuing education programs and their pre- and in-service preparation seemed adequate to support their professional practice. Differences in practice were noted between settings with school-based professionals expressing greater discomfort than non-school professionals about working with children diagnosed with DAS.

**ROLE-PLAY ASSESSMENT TOOL FOR NON-NATIVE SPEAKERS.** Jenique Musil and Julia Murphy-Antczak, graduate students, with Linda Carpenter, faculty, same department.  

A role-play assessment tool for use with adults who are nonnative speakers of English was developed. The tool is based on Cummins’ (1981) model of language proficiency and Prutting and Kirchner’s (1987) parameters of conversational discourse. The presentation will display the tool, pilot data, and planned next steps. **Learner Outcomes:** 1) Learners will be able to describe the four quadrants in Cummins’ model of language proficiency. 2) Learners will be able to name at least three pragmatic functions assessed using the Role-Play Assessment Tool. **Intended Audience:** The intended audience is speech-language pathologists who work with adult nonnative speakers of English. There are no prerequisites for enrollment. **Content, Activities, Materials:** The Role-Play Assessment Tool (RA˚T) is a criterion-referenced measure based on Cummins’ (1981) framework of English proficiency, which is comprised of two continua: the contextual support dimension runs horizontally and ranges from “context embedded” to “context reduced;” the cognitive demand dimension runs vertically and ranges from “cognitively undemanding” to “cognitively demanding.” These continua intersect to create a four-quadrant matrix, with each quadrant characterized by unique features of support and demand. The RA˚T includes a total of 16 role-play scenarios, with four in each quadrant. The RA˚T’s communicative focus allows for evaluation of a speaker’s use of language in context. Scoring considers pragmatics of conversation, and protocols draw on the work of Prutting and Kirchner (1987), McTear (1985), and Damico (1980).

**THEORY TO PRACTICE: CHILDREN WHO STUTTER AND SHOW DisORDERED PHONOLOGY.** Sarah Bender, graduate student, with Linda Carpenter and Lisa LaSalle, faculty, same department.  
*2004 Special Interest Division 4 Clinical Leadership Conference, Portland, OR, 22-24 July 2004.*

We will summarize theory, research, and practice (published and preliminary) on children who stutter and who disordered phonology. Preliminary findings suggest that onsets and rimes of CVC words in a sentence imitation task can predict stutter-like disfluencies in normally fluent youngsters. Such information can be useful in treating stuttering children.
ENGLISH

CHILDREN’S WRITING CONTEST, A PROCESS TO HEAR THE MELODIES OF YOUNG WRITERS. CHAIN OF BREAKOUT SESSIONS. FUNDRAISING PRESENTATION AT LEADERSHIP WORKSHOP. Traci Thomas-Card, graduate student, Rachael Amundson, Daniel Hardy, Andrew Kerbel, and Bethany Lauterbach, undergraduate students, with Gloria Hochstein, faculty, same department. International Convention of Sigma Tau Delta, Kansas City, MO, 16-20 March 2005.

Each year for many years now, our chapter has run a writing contest for the children in grades K-8 in the schools in a fifty-mile radius surrounding the University of Wisconsin-Eau Claire. We assemble a list of the names of the language arts teachers, put out a call for submissions in late January, and invite students to submit original poetry, short fiction, and essays. In late March, the works are assembled by grade, and the university students in our chapter spend many nights reading through the submissions to select two outstanding pieces in each grade. We then invite the young authors, their teachers, and their families to the university for a reading of the winning works. The young writers themselves read their pieces during the annual English Festival. The reading ceremony is quite an event. The winning authors are also presented with a bound volume of all of the winning submissions and another book appropriate to their grade level. Several of our chapter members will explain the stages in this process so that other chapters could use our experience to start similar writing forms, our reviewing process, etc., all the way through to sample bound volumes, the reading, ceremony, and the reception following.

FOREIGN LANGUAGES

RURAL COMMUNITY REACHES OUT TO MEXICAN IMMIGRANTS. Sue Alice Shay and Terri Leal, graduate students, with Kate Reynolds, faculty, same department. International TESOL Convention, San Antonio, TX, 29 March – 2 April 2005.

Through photographs and narrative, two ESL teachers document how community volunteers met with Mexican immigrant families, promoted intercultural understanding, provided reading materials, and helped immigrant children with reading skills. The poster targets teachers interested in family literacy and multicultural awareness.

SOMALIS ON THE ROAD TO BECOMING AMERICANS. Lynn Emmons, graduate student, with Kate Reynolds, faculty, same department. International TESOL Convention, San Antonio, TX, 29 Mar.-2 April 2005.

GEOGRAPHY AND ANTHROPOLOGY

SPATIAL DIFFERENCES IN WOMEN’S PROGRESS AND PROSPERITY IN WISCONSIN: THE LIEUTENANT GOVERNOR’S WISCONSIN WOMEN EQUALS PROSPERITY INITIATIVE. Melisa Cushing Davis, graduate student, Jennifer Immich, Hannah Lott, Barbara Featherly, Emily Szajna, and Lisa Davis, undergraduate students, with Lisa Theo, faculty, same department. Annual Meeting of the Association of American Geographers, Denver, CO, 5-9 April.
2005.

Despite leading the nation in women’s rights earlier last century, Wisconsin women have not advanced as quickly as many of their counterparts in other states. There has been some progress. As a state we have our very first elected woman lieutenant governor, and she is determined to improve the status of Wisconsin women. Based on research conducted by the Institute for Women’s Policy Research (IWPR), Lieutenant Governor Lawton is using the Status of Wisconsin Women Report (IWPR, 2002) as a starting point for policy initiatives. Four task forces were formed addressing the issues of: 1) Leadership and Political Participation, 2) Health, Safety and Well Being, 3) Educational Achievement, and 4) Economic Sufficiency. In collaboration with a research team from the University of Wisconsin-Madison’s LaFollette Institute for Public Affairs, UW-Eau Claire student researchers collected all necessary data, entered the data into a statistical software package, analyzed the data, and created maps using Geographic Information Systems (GIS). The student researchers then analyzed the maps to determine spatial anomalies not apparent in the statistical analyses. This research was used by local, regional, and state leaders at the March 2005 Wisconsin Women Equals Prosperity Convention to initiate policy initiatives.


From Suzie Homemaker to Rosie the Riveter and back again. . . During the era of World War II American women were drawn en masse into industry, then “urged” to return to home at war’s end. In between, the seeds of independence were sown for many, inspiring a new confidence borne of necessity. And whether they remained in the workforce or retired to their homes as expected, the perspectives of these women were forever changed, reflected in their growing civic activism, as the 1940s gave way to the 1950s. Created in conjunction with the Chippewa Falls Museum of Industry and Technology, this online exhibit examines the larger historical events of World War II in a local context, using a variety of media, including oral interviews, documentary photographs, and colorful prints and posters. Methods of recruiting women, conditions women faced on the job, and the consequences of reconversion are all examined. The women of the Chippewa Valley continued to impact their community long after their war work ended. Determined to create a better, freer world, far from being shackled to their kitchens, these women swelled the ranks of civic organizations, culminating in a growing social activism that would manifest itself in the 1960s.
EVALUATION OF A TUTOR/MENTOR PROGRAM. Sarah Wiinamaki, graduate student, with William Frankenberger, faculty, same department. 

This poster will present a model of a program used to intervene with at-risk elementary students as well as a model of a program evaluation. The evaluation will consist of formal measures (student report cards, Social Skills Rating Scale) and informal measures (researcher-designed surveys and self-concept measure) used to determine if enrolled students increase their levels of academic achievement, increase their level of self-esteem, and improve their social skills. It will also assess teacher, parent, tutor, and student satisfaction. The Tutor/Mentor program was initiated in 1995 as a joint effort between elementary schools and a university in a Midwest town. This program takes an early prevention approach to decreasing later high school dropouts by providing support for elementary students who are at risk for academic failure by helping to set them on a trajectory for success throughout school and life. Undergraduate and graduate student tutor/mentors assist at-risk elementary students with homework and work with the children on the development of appropriate social and peer interaction skills. Participants will gain ideas of methods to conduct program evaluations, learn about the benefits of one intervention program used with at-risk students, expand their ideas of intervention/prevention programs for dropouts to include reaching at-risk students at an early age, and increase their awareness of the importance of social-emotional interventions.

PSYCHIATRIC DIAGNOSES AND CONCOMITANT DRUG TREATMENT IN SPECIALIZED CHILD POPULATIONS. Sara J. Totten, graduate student, Katie Ley and Tessa Root, undergraduate students, with William Frankenberger, faculty, same department.

The purpose of this study is to determine the types of psychiatric disorders and the corresponding medications prescribed to children enrolled in Early Childhood Special Education Programs. Data from the study will be used to determine the number of psychiatric diagnoses associated with children enrolled in Early Childhood Special Education Programs, specific medication(s) prescribed for children with psychological diagnoses, the number of children receiving multiple medications for their diagnoses, possible adverse drug interactions among children receiving multiple psychiatric medications, as well as the attitudes of teachers with regard to the use of psychiatric medication(s) in children enrolled in Early Childhood Special Education Programs. The data was collected via a survey disseminated to five hundred Early Childhood Special Education teachers in Wisconsin, Minnesota, and Iowa.

This study compared varying populations that are either at risk of dropping out or have already dropped out to identify any potential similarities. Students who were considered habitually truant were compared with students in an alternative program to complete their high school diploma and students who had dropped out of school and were currently enrolled in a General Equivalence Diploma program. Past school records were analyzed along with a current questionnaire concerning feelings toward school and goals for the future. Questions were formatted to allow for personal insight and understanding of how students who are potential or actual dropouts feel about school and how it may be changed. This research was conducted in order to gain further knowledge about how to enable students to prosper in school settings and how best to serve students at risk of dropping out.

MANAGEMENT AND MARKETING


When businesses, especially small owner-operated businesses, are operating in a stable, familiar environment, it is easy to slip into a routine way of doing things. Innovation and change are somewhat frightening, and there is little perceived need to make any significant changes. Sometimes it takes an unexpected and disruptive shock to force business owners to take a new look at their business processes. This is what happened to the tourism industry following September 11, 2001. The motorcoach-based segment of the tourism industry provides an example of the need to reevaluate existing processes and to implement changes that are needed for companies to recover from such a catastrophic event. The following research documents the efforts being made within the motorcoach-based tourism segment to respond to and recover the effects of September 11. It is not uncommon for sectors of the business community to become complacent, feeling little impetus to adopt new technologies. The general mindset appears to be that things are going along in a satisfactory manner and there is no need to adopt new practices and/or technologies. Such was the case with the motorcoach-based tourism industry. Word-of-mouth and customer loyalty were considered to be sufficient to promote the individual small companies. Barring severe economic or natural disasters, individual firms had little incentive to venture into the electronic commerce arena.

On February 4, 1989, the Worker Adjustment and Retraining Notification Act took effect. The primary purpose of the so-called W.A.R.N. Act was to ensure employees, their families, and communities received adequate advance notice in the case of corporate downsizing. Although most human resource professionals are quite familiar with the 60-day notification requirement, some provisions of this legislation appear to be confusing to many organization leaders. Further, a number of individual states have passed similar versions of the W.A.R.N. Act during the past 15 years that have added complexity to compliance. Our goal in this article is to highlight portions of this Act that may be particularly unclear and to review the additional legal requirements on the state level which are frequently unknown.

**MANAGEMENT INFORMATION SYSTEMS**

INFORMATION SYSTEMS ETHICS INoman, South Korea, and the USA. Se-Hyung Oh, graduate student, with Thomas Hilton, faculty, same department. *Information Systems Education Conference 2004, Newport, RI, 4-7 Nov. 2004.*

A 30-item, three section IS ethics questionnaire was completed by a convenience sample of 520 bank employees, 129 in the western USA, 176 in the Sultanate of Oman, and 215 in the Republic of South Korea. Section 1 concerned employee use of employer IS resources for personal entertainment, section 2 concerned employee use of employer IS resources for personal gain or the gain of family or friends, and section 3 concerned employer monitoring of employee use of employer IS resources. ANOVA yielded statistically significant differences among the samples on 28 items in all three sections; 14 of these represented different degrees of commitment but overall agreement on the ethicality of the behavior described; 12 represented actual disagreement as to whether a behavior was ethical or not. Of the 12 actual disagreements, 6 were in section 1 and concerned after-hours use of IS resources, two were in section 2 and concerned printing and storing personal documents, and four were in section 3 and concerned giving prior notice to employees when monitoring them. In sections 1 and 2, all three samples gave relatively conservative responses, favoring employer rights of ownership over employee rights of possession and use. In section 3, only the US sample answered conservatively; this section generated differences of the greatest magnitude among the three samples. The US sample was the most conservative on 25 items, the Omani sample was most conservative on four items; the South Korean sample was most conservative on only one item.

**NURSING SYSTEMS**

ALL THE VOICES IN THE ROOM: INTEGRATING HUMANITIES IN NURSING EDUCATION. Susan Timm, Sylvia Mews, Sharon Hydro, Michelle Bailey, and Robyn Smith, graduate students, with Cécile Zorn, faculty, same department, and Margret Lepp, Boras University College-Sweden. *Nursing Education Perspectives 25.6 (2004): 278-83.*

Participatory action research was used to link the humanities with a deeper level of teaching and learning. Planning, action, reflection, and evaluation steps were collaboratively implemented by two nurse faculty researchers and five graduate nursing education students in a midsized, comprehensive, public midwestern university. Planning involved a literature review of the use of humanities in nursing education. Action entailed an essay assignment.
and an artwork-exhibition workshop. Written appraisal of the workshop provided data that were analyzed phenomenographically in the reflection step. Two categories, with descriptive subcategories, emerged: “Feelings” and “Learning Evaluation.” Implications for nursing education leading to the generation of practical knowledge are discussed.


The rapidly expanding use of instructional technology requires faculty openness to new teaching and learning situations. This study compared two instructional methods of conducting clinical conferences for baccalaureate nursing students: online versus face-to-face. Quantitative and qualitative data were collected from 77 students in 10 clinical sections of a senior capstone nursing course. Mean scores for all eleven items on the Clinical Evaluation Tool were higher for students who conferenced online compared to those in face-to-face conferences. Four of the 11 items were statistically significant, reflecting greater participation and convenience for online participants. Online students also reported greater opportunities to reflect on ethical issues. There were no significant differences in quiz scores between the groups when students were tested on content covered in their clinical conferences. Students identified advantages including opportunities for flexibility and equal participation. Barriers included unfamiliarity with technology and lack of face-to-face contact. The findings suggest that students are able to successfully achieve the intended purpose of clinical conferences through the use of an online instructional technique. Ongoing research in the use of technology is necessary to meet student needs, enhance student learning, and support evidence-based practice in nursing education.


Reflection, a process grounded in distancing from the self to enhance self-awareness, can be used as a pedagogic activity to promote students’ transition to a greater authenticity and professionalism and, therefore, improve patient care and nursing practice. In this international educational project (implemented in 2001) using interactive videoconferencing technology (IVC), Swedish and U.S. nursing students and faculty incorporated reflective journaling, drama in education, photolanguage, and off-air meeting discussions to enhance personal and professional development. Highlights from the literature, a description of the project, and student and faculty appraisals are presented.

INVITING VOICES THROUGH ART IN NURSING EDUCATION. Susan Timm, Sylvia Mews, Sharon Hydo, Michelle Bailey, and Robyn Smith, graduate students, with CeCelia Zorn, faculty, same department. Chicago Institute for Nursing Education-5th Summer Institute, Chicago, IL, 19-21 June 2003.

Recording memories of World War II is an intervention that can humanize geriatric care in addition to the historical significance provided. Participants in this oral history project described memories of World War II and expressed themes of patriotism, loss, tense moments, makeshift living, self-sufficiency, and uncertain journey. Their ethnic roots were primarily Scandinavian, Dutch, German, and English. The nursing home participants were slightly older than the community participants (mean ages: 85.5 and 82.4 years, respectively). More women (58%) than men (42%) participate, and 35% of the participants were veterans (eight men and one woman). Nursing home and community residents participated in this project and reciprocal benefits were experienced by participants and listeners alike. Memories of World War II provide a meaningful topic for oral histories. Listening and valuing oral history supports, involves, and validates elders. Oral history has reciprocal benefits that can create a culture to enhance a therapeutic environment.

PSYCHOLOGY


The purpose of this presentation is to examine how the implementation of new testing standards in accordance with the No Child Left Behind legislation affects teachers in the following areas: a) attitudes toward state-mandated testing programs; b) the effects of testing on instruction of content; c) the effects of testing on instruction of test-taking skills and strategies; d) the degree to which changes in instructional practices are correlated with student demographics. Results come from a survey of 4th and 10th grade teachers in Wisconsin. Teachers are on the front line when it comes to feeling pressure to meet the new testing standards. Participants of this presentation will gain an understanding of teachers’ attitudes toward group standardized testing. This information will help serve as a guide for school psychologists to more effectively consult with and offer support to teachers in the high stakes testing climate.

PUBLIC HEALTH PROFESSIONS

TOXICOKINETICS OF MTBE IN HUMAN SUBJECTS. Julie Freidhoff, graduate student, Alison Deneen and Ashley La Casse, undergraduate students, with Crispin Pierce, faculty, same department. 2004 Association of Schools of Public Health (ASPH) Environmental Health Conference, Minneapolis, MN, July 2004.

Millions of people are exposed to the gasoline additive MTBE (methyl tertiary butyl ether) while filling their gas tanks and through ground water in contact with leaking under-
ground storage tanks, in all 50 US States. The Congress is currently debating an energy bill with a provision to indemnify MTBE producers from lawsuits claiming health damages from exposure. Moreover, this bill contains price supports for Midwest farmers to produce ethanol, as an alternative fuel additive. With such attention, an understanding of how the human body handles MTBE is crucial. Concentrations of MTBE, another fuel additive, ETBE (ethyl tertiary butyl ether), and their metabolites in blood, breath and urine from eight controlled human exposures were examined. Declining levels of each chemical were fit with zero-, first-, and second-order equations, as well as with a physiologically-based kinetic model. The most stable and easily measured of these chemicals were identified, in order to provide markers of human exposure to MTBE and ETBE.
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