The UWEC Student Research Day is supported by funds from the UWEC Foundation. Grants supporting Faculty/Student Research Collaborations are made possible through funds provided by the Undergraduate Initiative of the University of Wisconsin System, the UWEC Foundation, and the University of Wisconsin-Eau Claire.
Abstracts are published unedited as submitted by student presenters.
## Schedule of Events

### Monday, May 1, 1995

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 am - 10:00 am</td>
<td>Students Set Up Posters</td>
<td>Council Fire Room</td>
</tr>
<tr>
<td>9:30 am - 10:00 am</td>
<td>Judges Orientation</td>
<td>Alumni Room</td>
</tr>
<tr>
<td>10:00 am - Noon</td>
<td>Judging</td>
<td>Council Fire Room</td>
</tr>
<tr>
<td>Noon - 1:00 pm</td>
<td>Judges Luncheon</td>
<td>Alumni Room</td>
</tr>
<tr>
<td>Noon - 4:00 pm</td>
<td>Poster Session Open to University Community</td>
<td>Council Fire Room</td>
</tr>
<tr>
<td>3:30 pm - 5:00 pm</td>
<td>Annual Faculty/Academic Staff Grants Reception</td>
<td>Dulany Inn</td>
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<td>(Student Research Day Presenters are invited to</td>
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<td></td>
</tr>
<tr>
<td>4:15 pm</td>
<td>Announcement of UWEC Student Research Day Awards</td>
<td>Dulany Inn</td>
</tr>
</tbody>
</table>

### Tuesday, May 2, 1995

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am - Noon</td>
<td>Poster Session Open to University Community</td>
<td>Council Fire Room</td>
</tr>
</tbody>
</table>
THIRD ANNUAL UWEC
STUDENT RESEARCH DAY

Accounting and Finance

Amy Drifka (70)
Faculty Adviser/Collaborator: Richard Helleloid
Title of Research Project: Tax and Nontax Issues Facing U.S. Companies Doing Business in Mexico

NAFTA has increased the economic interdependence of the U.S. and Mexico. Increasingly, small and large companies throughout the U.S. have been looking to Mexico as a location for production activities and as a market for their goods and services. Tax factors are often exceedingly important in business planning for companies that operate multinationally. The primary objective of the research has been to identify and illustrate important tax and nontax issues that face U.S. companies doing business in Mexico. U.S. companies doing business in Mexico must consider the application of U.S. tax law to Mexican operations; and they must consider the application of Mexican tax law to their Mexican operations. The application of U.S. and Mexican tax rules depends on the nature and scope of the operations in Mexico. Different business entity forms and financial structures are possible. Also, of particular interest in the present climate are the tax and nontax implications of currency instability.

Adult Health Nursing

See H. Deininger et. al. (41)
Nursing Systems

Allied Health

Amy Beckon (56)
Faculty Adviser/Collaborator: Lee Anna Rasar
Title of Research Project: Music Therapy with Chaplaincy in Forensic Settings

My research was part of a music therapy clinical at the Northwest Regional Juvenile Detention Center. I will be presenting an example of a session with the juveniles that dealt with the topic of "Roads". The juveniles listened to songs that dealt with roads. These songs were followed by a discussion and a drawing activity. The drawings were to reflect the various roads in the juveniles life, for example, a detour and a fork. The drawings were then discussed by the juveniles, and the juveniles were asked which road he/she is on now, and which road he/she would like to be on.

Rachel Mattes (54)
Faculty Adviser/Collaborator: Lee Anna Rasar
Title of Research Project: Integrating Music Therapy with Chaplaincy in Forensic Settings

My research was part of a music therapy clinical assignment at the Eau Claire County Jail in the State Maximum Security overflow. My display will explain two major issues that I dealt with during my clinical assignment: racism and transference. An inmate's poem will be included to illustrate the issue of racism.

Kathy Nelson and Joni Wood (52)
Faculty Adviser/Collaborator: Lee Anna Rasar
Title of Research Project: Applicability of Music Therapy Curriculum to Clinical Practice

A survey of the applicability of college course content in music therapy to actual clinical practice in the field was given to members of the Mid-Atlantic Region of the National Association for Music Therapy and the American Association for Music Therapy. Results of the survey will provide a knowledge
base describing the adequacy of music therapy college courses in preparing students for work in their field. The survey results will isolate any population/setting-specific content as well as reveal frequency with which content is used in clinical practice.

Bernadette Stepp (55)
Faculty Adviser/Collaborator: Lee Anna Rasar
Title of Research Project: Faculty/Student Collaboration: Integrating Music Therapy with Chaplaincy in Forensic Settings

An integration of Music Therapy and chaplaincy took place the spring semester of 1994 at the overflow unit of the maximum security Wisconsin State Prison located at the Eau Claire County Jail. Inmates voluntarily participated in weekly group sessions to discuss such topics as guilt, forgiveness, emotional expression and control, and life after prison. Due to confidentiality, results cannot be reported, but assessment tools and activities will be displayed.

Art

Julie J. Calkins (80)
Faculty Adviser/Collaborator: Karen Horan
Title of Research Project: Southwest Indian Arts: Pueblo Pottery

This project, Southwest Indian Art: Pueblo Pottery, was a collaborative research project between faculty mentor, Karen Horan, and senior art education student Julie Calkins. This research was conducted in connection with the course Art 350/550, Field Studies in the Southwest: Pueblos, Museums, & Ruins, taught by Professors Karen Horan and Elizabeth Newsome. That summer '94 course (June 5-19) involved traveling to New Mexico and Arizona to visit reservations, major museums and archaeological sites of Southwest Indian cultures. The research entailed three phases: 1) preliminary research conducted in Eau Claire during the spring semester of 1994, 2) field study conducted in the Southwest, and 3) a dissemination of the gathered research findings in the form of a slide presentation given in the Foster Gallery of the Fine Arts building. This presentation was attended by art majors and faculty members from UWEC. The slides presented by Julie J. Calkins were those taken by her on the trip to the Southwest; besides being a wonderful documentation of that research trip, these slides are also a valuable source of teaching material for a K-12 art program.

Denise DeGidio (79)
Faculty Adviser/Collaborator: Elizabeth Newsome
Title of Research Project: Navajo Weaving and Natural Dyeing

My research on Navajo Weaving and Natural dyeing began like most projects, in the library. There I gathered together a bibliography of materials covering the Navajo peoples' history, religion, art, textiles and natural dyeing. I brought this information with me on a trip with Dr. Newsome in the summer of '94 to the Navajo tribal lands of the Southwest. On the reservation I received a first-hand look at the actual weaving and dyeing techniques that I had read about. I saw that there are still practices or natural dyeing taking place today, using materials found in the surrounding landscape. Another beneficial activity I engaged in was interviewing museum curators and local natives, as well as personally weaving on a traditional Navajo loom. Once back in Wisconsin I carried out the natural dyeing process on wool using the same materials used by Navajo women. I have since given talks to art education students and teachers concerning my travels, natural dyeing and weaving techniques. I have adapted my knowledge of dyeing to Wisconsin's available natural materials and will be able to bring it everywhere I go.
Biology

Kirsten Cahow (35)
Faculty Adviser/Collaborator: David F. Brakke
Title of Research Project: Landscape patterns of chemical conditions in a cluster of lakes in the Pine Lake area, Chippewa and Rusk Counties, Wisconsin

Pine Lake and surrounding lakes have been sampled for various purposes for many years. The first known sampling of Pine Lake was done in 1907 by the pioneering limnologists Birge and Juday. Since then, various studies have been conducted, including some experimental manipulations of small lakes. This project has compiled information from several sources to examine the spatial distribution of lake types, thermal structure and basic chemistry. The lakes range in size, hydrologic type and depth, and they vary considerably in basic chemistry. The features of the lakes are presented as they influence the distribution and structure of biological populations, focusing on considerations of the vertical extent of photosynthetically available radiation, the distribution of oxygen and areas of anoxia and concentrations of algal nutrients, particularly phosphorus and nitrogen.

Matthew Chorley (69)
Faculty Adviser/Collaborator: David Lonzarich
Title of Research Project: The Relationship Between Patch Size and Disease Agent Prevalence of Hantavirus in Deer Mice (Peromyscus Maniculatus) Populations

The Deer Mouse: Peromyscus maniculatus has been identified as the principal reservoir of a deadly new strain of virus tentatively called "Muerto Canyon Virus," however yet to be taxonomically classified. This virus caused an epidemic of deaths in the Southwestern United States, and appears to be prevalent wherever there are populations of Deer Mice. I intend to determine whether or not the virus is present locally here in Wisconsin and if so, determine the effects fragmented landscapes have on viral ecology. I also would like to compare urban and rural patches to see how the intrinsic mechanisms of these areas differ, to see if there may be some link which ties this disease to urban areas more strongly.

Anita Christensen (33)
Faculty Adviser/Collaborator: Paula Kleintjes and William Barnes
Title of Research Project: Comparing two islands on the Chippewa River on the relationship between plant and insect diversity

The species-area relationship is one of the basic tenets for the theory of island biogeography. During the summer of 1994, we examined the association between plant and insect diversity on two different sized islands in the Chippewa River, Eau Claire Co., WI. We tested the hypothesis that a larger (Ski Jump Island) would have a greater species diversity than an island smaller in size (Canary Grass Island). We used pitfall sampling to collect invertebrates and line transects to quantify plant species composition. Simpson Diversity Indices were used to determine plant and insect diversity. We also used interspecific species association analysis by setting quadrats around each insect trap to examine for plant-insect associations. Ski Jump Island had a greater diversity of plant species and the plant communities ranged from riparian forest to reed canary grass meadows. Canary Grass Island was virtually a reed canary grass monoculture with very low plant species diversity. Ski Jump Island also had a higher diversity of insects compared to Canary Grass Island. The majority of insects collected were beetles, grasshoppers and crickets. Non-insect arthropods such as daddy-long-legs and millipedes were also abundant. The data supported our hypothesis that larger, older islands will have a greater diversity of both plant and animal species than smaller, younger islands.
Rodney Cook (77)
Faculty Adviser/Collaborator: David Brakke, Terry Balding, and Lloyd Turtinen
Title of Research Project: Use of DNA Polymorphisms to Evaluate Morphological Differences in the Freshwater Mollusk Pyganodon grandis (Bivalvia: Unionidae)

There is considerable morphological variation found in the floater clam, Pyganodon grandis. Some scientists consider the variation to be in a single species, others recognize distinct morphs and still others designate subspecies. For instance, Baker (1928), considered Pyganodon grandis and Pyganodon corpulenta to be distinct species. Burch (1975), on the other hand, designated subspecies, identifying them as Pyganodon grandis grandis and Pyganodon grandis corpulenta. Most recently, Romano (1992), determined that Pyganodon grandis does exist as two morphological forms, P. g. grandis and P. g. corpulenta, however, he also noted that these two forms seem to be genetically identical. To date, little has been done when considering the DNA of these organisms. With the advent of Restriction Fragment Length Polymorphism (RFLP) analysis of DNA, it has become possible to detect many polymorphisms present at the DNA level. With the help of RFLP analysis, it is possible to construct molecular fingerprints of these polymorphism. I propose to use these fingerprints to aid in the determination of the relatedness of various possible groups of taxa or morphs of Pyganodon grandis.

Megan Coulombe (40)
Faculty Adviser/Collaborator: Terry Balding and Michael Weil
Title of Research Project: Population Structure, Movements, and Activities of the Wood Turtle (Clemmys insculpta) on a Portion of the Eau Claire River, Wisconsin

The Wood turtle (Clemmys insculpta) is a secretive, semi-terrestrial turtle that ranges from the midwest to the northeastern United States and into Canada. Because Wood turtle populations are thought to be declining, it is protected throughout most of its range. Confirmation of their decline has been difficult to quantify because there are few baseline studies. A field study was conducted on the Eau Claire River, in the L.L. Phillips Co. Park region, Eau Claire Co., Wisconsin from April 1994 to November 1994. The purpose of this research was to collect baseline data on population structure, movements and activities of Wood turtles. Of the 18 turtles captured, 31% were juveniles, 25% adult males and 44% adult females. Population density as determined by this study was 0.8 turtles/ha. Home range areas among radio tracked turtles, varied from over 20,000 m² to less than 200 m². Although Wood turtles are thought to be primarily terrestrial during summer, a chi square analysis indicates no preference for land over water in this population (p > 0.05). The turtles were inactive during 46% of all sightings. However, some bias may have been introduced because the turtles detected the presence of the investigators.

Kevin Croker (39)
Faculty Adviser/Collaborator: Wilson A. Taylor
Title of Research Project: Spore wall ultrastructure of the liverwort Monoclea gottschei

The taxonomic placement of the enigmatic liverwort genus Monoclea has been debated since its inception. Various workers have considered its overall morphology, ontogeny, and phytochemistry and arrived at different placements. No one has applied electron microscopy to the study of spore ultrastructure in this genus, until now. The spores of Monoclea gottschei range from 17-20um in proximal diameter and bear reticulate ornamentation. The centers of many lumina (especially on the distal surface) bear a single circular or irregularly shaped ornamental element. The muri (upright ornamental elements) of the reticulum are 230-290nm thick, and are usually perforated. At the
ultrastructural level, the exospore (between the muri) is thinner (46-76nm) than the endospore (1.3-1.5um). Muri stand up to 1.5um above the spore surface. Mature spores of Monoclea gottschei seem to lack any evidence of tri-partite lamellae in their construction, whereas most liverworts have extensively lamellated exospores. The close similarity in spore wall ultrastructure (including few or no lamellae at maturity) between Monoclea gottschei and Marchantia supports previously suggested affinities between the Monocleales and the Marchantiales.

Tina Henriksen (45)
Faculty Adviser/Collaborator: Terry Balding
Title of Research Project: Assessment of a Species-Specific Survey Method for the American Bittern (Botaurus lentiginosus)

The American bittern (Botaurus lentiginosus) is a solitary, elusive bird that is primarily detected by its characteristic pumping song that can be heard for distances up to 500 meters. Data regarding the breeding populations of this species is scarce, particularly within Wisconsin wetland breeding habitats. Those data that are available have been collected using a variety of survey/census methods, methods that are often destructive to American bittern habitat or may cause American bittern behavioral changes related to breeding and/or territoriality. A standardized survey method is needed to provide wildlife managers with an efficient, accurate and cost effective tool for detecting abundances of American bittern breeding populations.

The variable distance line transect, strip transect, fixed-radius point count, and the auditory playback survey methods were each conducted sixteen times on two Central Wisconsin wetlands between the dates of April 20 and June 6, 1994. A comparison of these survey methods found the fixed-radius point count survey method to be the most appropriate for detecting breeding populations of American bittern. Observers sitting stationary for six minutes within a 100 meter radius (study station) allowed observers an opportunity to detect the most birds (pumping males) with a higher degree of accuracy while at the same time causing minimal, if any, behavioral disturbances to the birds present. Cost effectiveness of this method is maximized as no specialized equipment is needed and number of detection's per man-hour is proportionately higher than for the other three methods investigated. The data collected suggested that five repetitions of the fixed-radius point count survey can be conducted at any time within the American bittern breeding season, at the hours of dawn or dusk, and during all weather conditions that do not include winds of greater than 10 mph or precipitation.

Dan Kelner (61)
Faculty Adviser/Collaborator: Terry Balding, David Brakke, William Barnes, and Sean Hartnett
Title of Research Project: A Qualitative and Quantitative Survey of Freshwater Mussels of the Red Cedar and Flambeau Rivers

This study was conducted in part to locate and map several mussel beds within a portion of the Flambeau River. The Flambeau River supports a diverse community of freshwater mussels and has two state endangered species present. The significance of this study was that very little is known of the mussel fauna of the Flambeau River. This baseline data can then be used as a means of detecting change in the water quality by a comparison to future studies. The mussel beds were located and sampled using SCUBA and placement and shape of the beds were determined by Global Positioning System (GPS). A total of four mussel beds were located with substrate type, total area, mean densities of mussels and individual mussel density determined. There were no species associations found (certain species occurring together) and there was a significant preference to a heterogeneous substrate (boulders, sand, gravel).
Plants are sedentary organisms that accomplish their dispersal over a number of generations by producing microscopic reproductive units called spores. These spores possess a desiccation-resistant covering called a sporoderm. When examined using the transmission electron microscope (TEM), sporoderms of different plants have widely varying types of organization. This project focuses on the sporoderm of one type of plant, Selaginella apoda, and traces its development. There are three basic types of sporoderm organization in the genus Selaginella, two of which have been examined at immature stages of development. This project will determine 1) which of the three basic types Selaginella apoda produces, and 2) whether the pattern of development in S. apoda spores conforms to that established in other members of the genus.

James D. Orth (37)
Faculty Adviser/Collaborator: Lloyd Turtinen
Title of Research Project: Optimization of Peptide Mediated Transfection of Plasmid DNA into Cos-7 Cells

Transfection is used to transport DNA into eukaryotic cells. Cells are usually transfected via small molecules of lipid that can bind DNA and carry it into the nucleus of the cell. We have prepared a novel twenty-three amino acid peptide (K5) to test its ability to transfect Cos-7 and foreskin fibroblast cells in comparison to a lipid transfectant (Lipofectin). The success of the transfection was determined by measuring B-galactosidase expression in an X-gal staining assay. In an attempt to optimize the K5 transfection conditions several modifications of the transfection procedure were performed. Preliminary results show that peptide K5 is as efficient as Lipofectin in transfection of Cos-7 cells.

Matthew J. Solensky (53)
Faculty Adviser/Collaborator: Terry Balding
Title of Research Project: Status and Productivity of Taiga Merlins (Falco columbarius columbarius) in Northeastern Wisconsin

Merlins are one of three species of falcons that breed in Wisconsin. The merlin resemble a miniature Peregrine Falcon (Falco peregrinus) without the distinctive mustache. The Wisconsin Department of Natural Resources presently lists the merlin a "species of special concern". This rating however, is based on little if any survey data. Merlins have historically bred in Wisconsin but there has only been a limited amount of systematic research to determine the size of the population. The merlins found in Wisconsin today appear to be members of an apparently recovering population once extirpated by toxins and habitat loss. The goals of this project are to establish guidelines for surveying merlins in Wisconsin, inventory the present population, and give an indication of the potential of the region for the future. Data is being collected pertaining to numbers of nesting pairs, numbers of young fledged, and habitat used.

Scott Toshner and David Nash (36)
Faculty Adviser/Collaborator: David F. Brakke

A comprehensive study of the Island Chain of Lakes was conducted in 1991. Three of the lakes are located along a direct flow path and are drainage lakes having an inlet and outlet. Clear Lake has no surface inlet but drains into McCann Lake, the shallowest of the other lakes. The primary objective of this project was to evaluate whether increasing development, particularly around Clear Lake, was increasing
nutrient concentrations and algal growth. Results from 1994 indicate an increase in total phosphorus and a decrease in lakewater transparency, as well as evidence of increased rates of oxygen depletion in deeper waters. These results suggest a response of the lakes to increasing development in the watershed and demonstrate the sensitivity of the lakes to additional inputs of algal nutrients. Clear Lake continued to have lower nutrient concentrations and algal biomass than McCann Lake related to different hydrologic inputs. However, given the longer residence times of water in Clear Lake, the increases in nutrients may lead to long-term changes in trophic status of the lake. The higher nutrient concentrations in McCann Lake resulted in higher algal biomass and the development of bloom conditions dominated by Cyanobacteria.

Rebecca Van Nelson (38)  
Faculty Adviser/Collaborator: Paula K. Kleintjes  
Title of Research Project: Effects of an Insecticide Treatment on the Balsam Twig Aphid (Homoptera: Aphididae) and its Arthropod Predators in a Wisconsin Christmas Tree Plantation

This study evaluated the effect of an insecticide application upon populations of the balsam twig aphid Mindarus abietinus Koch (Homoptera: Aphididae) and its arthropod predators in a balsam fir Christmas tree plantation in Eau Claire Co., WI. Aphids and predators were sampled at ten day intervals during May-June 1994, using visual count and foliage beating techniques before and after insecticide application. Percentages of aphid infested shoots significantly decreased from 86% prespray to 3% postspray and percentages of infested untreated shoots increased from 75% to 88%. Two weeks postspray, percentages of infested shoots on both plots were below 5%. Numbers of aphidophagous predators (coccinellidae larvae, coccinellidae adults, syrphidae larvae and hemerobiidae larvae) significantly decreased on the spray plot and significantly increased on the untreated plots after treatment. Spiders increased on both plots after treatment. Assessment of needle damage on both plots during January 1995 revealed no significant differences in the number of shoots damaged (51% vs. 58%) between plots. This indicated that the date of treatment was too late to reduce aphid damage but not to significantly reduce beneficial predators. This suggests that aphid populations should be monitored so that timing of treatments, if necessary, can be chosen to maximize aphid mortality and minimize loss of predators.

Chemistry

Jennifer Brandt and Troy Seehafer (25)  
Faculty Adviser/Collaborator: Jack Pladziewicz  
Title of Research Project: Single Electron Transfer Reactions of Organic Molecules with Varying Inner-Shell Reorganization Energies

Marcus electron transfer (et) theory predicts that the rate of et will depend on the energy required to reorganize a molecule's structure from that of the ground-state reactant to that of the transition state for et. For many organic et systems it is difficult to accurately measure reaction rates for molecules with large reorganization energies because the resulting anion or cation radicals produced following one-electron transfer to or from an organic neutral are unstable and decompose rapidly. Consequently, the most extensively studied organic single electron transfer reactions involve aromatic radical/neutral reactions. For most of these the delocalization of electron density in the aromatic system minimizes structural changes accompanying et and the related reorganization energy is likewise small and relatively little is learned about the dependence of the et rate on structural reorganization energy. This paper reports results of kinetic measurements on the et reactions of a set of alkyl hydrazines,
phenylenediamines and ferrocenes that have stable radical cations and for which a relatively large range of reorganizational energies is accessible. The results are discussed in terms of classical Marcus theory for outer-sphere et.

Sonia Chadha and Shane L. Resch(34)
Faculty Adviser/Collaborator: Thao Yang
Title of Research Project: The Synthesis of Atrial Natriuretic Factor by Solid Phase Peptide Synthesis

Since the 1950's the regulatory functions of the cardiac atrium on the natriuretic-diuretic actions of the kidney have been known; however, recently more insight has been gained in this area following the discovery that rat atrial extracts cause a rapid natriuretic-diuretic response. Subsequent research has discovered that Atrial Natriuretic Factor (ANF), a 28 amino acid hormone, is produced and secreted by the atrium of the heart into the blood stream and is directly responsible for natriuretic and diuretic actions of the kidney (Inagami, T., (1989), J. Biol. Chem., 264, 3043). It has been well established that ANF has two types of receptors, guanylate cyclase receptor and non-guanylate cyclase receptor. The binding of ANF to guanylate cyclase receptor leads to the conversion of guanosine 5'-triphosphate (GTP) to cyclic guanosine-3',5'-monophosphate (cGMP), which ultimately resulted in reduction of blood pressure and blood volume in mammals. The binding of ANF to the non-guanylate cyclase receptor is however less well known. Recently, ANF was found to inhibit adenylate cyclase (inhibition of cAMP production) via the non-guanylate cyclase receptor, implying other biological roles and mechanisms (Delporte, C., et al., (1992), Biochem. Biophys. Acta, 1135, 323; Anand-Srivastava, M. B., (1992), Mol. Cell. Biochem., 113, 83). The goal of this research is to investigate the role and mechanism of action of ANF in the inhibition of adenylate cyclase. Since the activation of adenylate cyclase requires GTP, it is not unreasonable to investigate the possible interaction between nucletides and ANF. To enable such study we are synthesizing ANF, and we present here the synthesis of ANF by the solid phase peptide synthesis.

Andrew J. Grall (32)
Faculty Adviser/Collaborator: Leo A. Ochrymowycz and Timothy Lodge
Title of Research Project: The Study of Polymer Dynamics by Light Scattering of Copolymer Solutions

The dynamics of two copolymers, polystyrene-polyisoprene-polystyrene triblock and polystyrene-polyisoprene diblock, were studied in solution using Dynamic Light Scattering (DLS) technique. Solutions of approximately 1%, 3% and 5% of each polymer in THF were examined by DLS. Results thus far have been consistent with theory. This project was undertaken through support of a Lando fellowship appointment of Andrew J. Grall for the summer of 1994 at the University of Minnesota Department of Chemistry. The project consisted of a ten week appointment under the direction of Dr. Timothy Lodge.

David Hoelzel and Mark Dordel (31)
Faculty Adviser/Collaborator: Leo Ochrymowycz
Title of Research Project: Creation of a Structural Database of Rare Organic Chemical Structures

An addition to a database of chemical structures was done by David J. Hoelzel, Mark S. Dordel, and Frank Nannicola using the WIMP v.6.0 for DOS at the Aldrich Chemical Corporation of Milwaukee, Wisconsin for the corporation's new Rare Chemicals catalog. The files created with WIMP were converted to structure and mole files through the Kekule program, which in turn did convert these files to conductivity tables. The conductivity files assist in the researchers' search for needed substances in the corporation's Rare Chemicals catalog.
A collaboration between the presenter's mentors led to a year long undergraduate research internship at Sandoz Pharma LTD, Basel, Switzerland. The internship appointment provided full travel and subsistence support. While Sandoz Pharma has long extended undergraduate research internship appointments on a competitive base to European Community applicants, the presenter was the first U.S. applicant selected. The internship provided a fantastic opportunity to learn how an international pharmaceutical firm carries out product R&D. The presenter was assigned to two team projects of six months duration each. With the approval of Sandoz, the second of these projects is described. This project involved the redesign and partial execution of a twelve step retrosynthesis of a complex CNS agent. The structure of the agent was previously conceived through receptor molecular modeling and inefficiently synthesized by other Sandoz researchers. Preliminary clinical studies confirmed its CNS drug potential. The specific task of the presenter was to optimize an alternative twelve step synthesis scheme so as to achieve at least 20% overall yield; and thus provide a process suitable for transfer to pilot plant development. The first nine steps of the process were successfully executed prior to the term of appointment.

Communication Disorders

Vicki T. Blavat (103)
Faculty Adviser/Collaborator: Thomas W. King
Title of Research Project: Keyboard Emulation via Morse Code Entry: A Comparison of Configuration Parameters Across Four Systems

Morse code, the ancestor of ASCII and other data-interchange codes, is a system of asynchronous data bits composed of binary-encoded circuit opposites used for transmission and reception of alphanumerical information. This elegant, simple, yet powerful encoding system, developed over 160 years ago by Samuel F. B. Morse, is now being increasingly harnessed for rehabilitation applications. Morse code emulation of keyboard functions has become a significant access alternative for many persons with severe disabilities, allowing them to speak, write, and otherwise communicate through adapted access to computers. This study explores and compares configuration parameters across four popular Morse-code-entry systems. A methodology for comparison is proposed, and clinical considerations are summarized.

Laura Helmer (104)
Faculty Adviser/Collaborator: Lisa R. La Salle
Title of Research Project: Effects of Maternal Speech Modifications on Children's Fluency

The purpose of this study was to determine the effects of a reduced maternal speaking rate and MLU on the fluency of children who stutter. Three children who stutter (ages 3-7) and their mothers participated in a 90 minute interaction in which each mother modified her speaking rate alone, MLU alone, and rate and MLU together. Results were discussed in context of the demands-capacity model of childhood stuttering.

Stephanie Hoffman (102)
Faculty Adviser/Collaborator: Alan Gallaher
Title of Research Project: Normal Speech Mechanism Abilities

Measurements of individuals' maximum performance abilities on speech tasks have been a long standing tradition as part of comprehensive oral speech mechanism
examinations performed by Speech-Language Pathologists. Such measurements are frequently used to screen for possible speech mechanism disorders or to establish the extent or severity of damage to the neuromuscular system that supports speech. Unfortunately, minimal norms are available for older adults on such tasks, and no useful criteria for distinguishing normal from abnormal performances have been published to date. This study attempted to establish valid cutoff statistics for each of the following maximum performance tasks: diadochokinetic rates for /p^/; /t^/; /k^/; /l^/; /p^-t^-k^/ and /^-^-^-^-/; length of /s/ and /z/ productions; maximum phonation duration for /a/; pitch range; length of holding breath; number of syllables per breath; and number of breaths used in a standard reading passage. In addition, the study focused on older adults ranging from 45 years to 75 years, the range of increased incidence of dysarthria.

Roxanne Kearney and Mary Peterson (106)
Faculty Adviser/Collaborator: Thomas W. King
Title of Research Project: Evaluation of Four Access Methods to the RealVoice (tm) AAC Device: A Comparative Analysis of Rate, Accuracy, and Error Types

Four standard access methods to the ACS Technologies RealVoice (tm) speech-output device will be compared in terms of input rate and accuracy, as well as percentage and frequency of error types. Access methods will include row-column scanning, direct selection with optical head pointer, two switch Morse code, and direct manual selection from the built-in QWERTY keyboard. Subjects include twenty literate, developmentally-normal adults (ten male, ten female). Printed output from each subject and access method will be analyzed for rate, plus types and frequency of errors. Comparison data across methods and subjects will be summarized as will considerations for clinical practice.

Laura D. Platzek (105)
Faculty Adviser/Collaborator: Linda Carpenter
Title of Research Project: Language Socialization Practices Used by American Indian Mothers

The purpose of this study was to compare the language socialization practices that American Indian and Anglo-American mothers use with their pre-school children. Five American Indian mother-child dyads were matched with five Anglo-American mother-child dyads on mother's educational level and child age and gender. Each dyad was audio- and video-taped during two instructional tasks. The mothers' amount of speech, nonverbal behaviors, and utterance functions were compared between the two groups.

Tina Radichel and Julie Sauer (51)
Faculty Adviser /Collaborator: Linda J . Carpenter
Title of Research Project: Phoneme Awareness in Preschoolers with Phonological Production Disorders

The objectives of this study were to 1) examine phoneme awareness skills in children with phonological disorders as compared to normally-developing children, and 2) investigate the effects of phonologically-based treatment on phoneme awareness in pre-school-aged children with moderate to profound phonological production disorders. A between-groups pre-test/post-test design was used, and two groups of children were selected. One group was composed of children with moderate, severe, or profound phonological production disabilities (n = 8). The other group was composed of normally developing children with no evidence of phonological production disorder (n = 20). Children were given phoneme awareness, phonological production, intelligibility, cognition, and receptive language measures prior to the beginning of intervention programs in the Fall of 1994. For the remainder
of the 1994-95 academic year, children participated in the programs from which they were selected. In April, 1995, children were retested with phoneme awareness, phonological production, and intelligibility measures. Between- groups differences were analyzed using ANOVA techniques.

Communication and Journalism

Amanda Barnes, Jayne Hughes, Erik Neudecker (90)
Faculty Adviser/Collaborator: Judy R. Sims and Joseph Giordano
Title of Research Project: Children and Violence on Television: A Survey of Eau-Claire Parents

The primary objective of this study was to gather data concerning parental monitoring of children's television viewing, parental evaluations of warnings/advisories, and parental evaluations of six pieces of proposed legislation and "other " potential solutions to violent content on television. This study also was designed to gather data to provide further understanding of the relationship between children's viewing of television programs containing violent content and children's display of verbal and nonverbal aggressive behavior, the relationship between children's viewing of Saturday morning television cartoons and children's desires to purchase toy weapons, and to learn parental perceptions of the level of violent content on local and/or national television news.

Survey questionnaires were administered during the Fall Semester 1994 to a nonrandom sample of 877 parents or legal guardians of children ages 3-12. 351 surveys were returned, approximating a 40% response rate. Results indicated a majority of parents ranked "parental control" as their first choice for the most effective solution to violent content on television. "Safe harbor" legislation, which would have directed the Federal Communications Commission to limit violent programs to time slots when children would be least likely to be viewing, was ranked as the number two choice by a majority of parents for the most effective solution to violent content on television. The "safe harbor" bill also was evaluated the most positively by a majority of the parents when it was compared to five other pieces of legislation. Parents ranked "warnings/advisories" as their third choice for the most effective solution. Finally, a majority of parents indicated the warnings/advisories "greatly influence" their decision to allow their child to watch a particular television program.

Amy Dom and Catherine Hamlin (63)
Faculty Adviser/Collaborator: Jan Larson
Title of Research Project: Assessing Perceptions of Quality in Canadian Journalism Education

This study focuses on perceptions of quality in Canadian journalism education among three constituent groups: the faculty members who teach journalism, the students studying journalism and the media practitioners practicing journalism and hiring journalism students. Members of these groups were asked to complete a mail survey consisting of 22 questions designed to gather data concerning the characteristics that contribute to quality in this field. Survey results will aid in determining current perceptions of quality, identify components valued as needed in a high quality program of journalism education and identify areas of agreement/disagreement regarding perceptions of quality in Canadian journalism education. Survey results also may suggest topics for future discussion between groups as all seek to strengthen Canadian journalism education.

Susan Windschitl (62)
Faculty Adviser/Collaborator: Joseph Giordano
Title of Research Project: Dow Corning's Breast Implant Controversy: A Public Relations Success or Failure?
The purpose of this research project is to review the Dow Corning breast implant scandal from a public relations perspective. Three areas are discussed in the project: 1.) the corporate background of Dow Corning, 2.) an explanation of what happened regarding the breast implant scandal, and 3.) the public relations tactics of Dow Corning used to try to end the controversy surrounding the scandal. The project concludes with an analysis of Dow Corning's public relations campaign with regard to the breast implants.

Computer Science

Faculty Adviser/Collaborator: Michael R. Wick
Title of Research Project: Mathematica Applications

Scientific computing offers a unique challenge to computer programming with its need for a seamless integration of symbolic, numeric, and graphic programming primitives. This project, which combines results from several interdisciplinary subgroups, aims to investigate the presence of generic tasks that underlie a variety of scientific and mathematical programming applications. The identification of such generic tasks should provide insight into how to improve the programming skills of undergraduate science majors.

Curriculum and Instruction

Jerry Freimark, Anne Smith, and Delaine Stendahl (93)
Faculty Adviser/Collaborator: Michael Lindsay

Title of Research Project: A Collaborative Case Study of K-12 Curriculum Reform

Representing a unique arrangement between UW-Eau Claire and the Whitehall School District, this faculty/student research collaboration grant helped support an opportunity to contribute to a scant body of research on the history of curriculum development projects. Our collaborative research project is a case study of an ongoing curriculum reform in K-12 education. We have made presentations of our case study at local, state, and national conferences, and the UW-EC grant helped support our presentation at one of the national conferences, namely that of the Association for Supervision and Curriculum Development, which was held in San Francisco from March 25-28, 1995.

Initiated in 1993, the UW-EC/Whitehall School District arrangement provides consulting services to the District to assist in the development of a thematic, integrated K-12 curriculum; graduate-level coursework in Whitehall for District instructional and administrative staff; and placement and supervision of UW-EC intern teachers whose presence enables cooperating teachers to participate in specified activities that serve the District. In our case study, we have traced the District's reform efforts and analyzed the change processes and prospects for enduring effects. In particular, we examined the origins and timeline of the curricular change initiative, theory and practice which informed and guided but did not prescribe the processes in the initiative factors which might mitigate against the initiative, and incidental challenges, opportunities, and outcomes that have arisen during the process-- which is still continuing. We have offered our understandings as a way to help other school districts with their own efforts, but we have cautioned against importing and exporting models from one district to another because each setting has its own history, culture, set of personalities, community expectations, and local exigencies.
Emily Gryskiewicz and Chad Erickson (65)
Faculty Adviser/Collaborator: Robert Hollon
Title of Research Project: Exploring elementary school students' scientific thinking about astronomy and recycling

Understanding the content of students' scientific thinking is a critical element in planning and teaching to foster meaningful understanding of important scientific themes. In this study, we investigated elementary school students' scientific thinking about astronomy and resource conservation. For each topic, 35 students in grades two through five were interviewed using a clinical interview protocol in which students were shown multiple examples of important concepts followed by open-ended questions and probes to explore their reasoning about the examples. Interviews were audio-taped for transcribing and analysis.

Data analysis identified categories representing patterns in individual's responses as well as patterns that emerged across students and age groups. Our preliminary findings show that students in early grades remember the names and the order of the planets, but believe that all planets are about the same size and distance from one another. Students believe that materials made from recycled materials are as good as the original but don't connect recycling activities in the home with the production of goods made from recycled materials. Further analysis of patterns across age groups are being completed to explore age-related changes in the students' thinking.

Economics

Bryan Nelson and Chad Reuter (91)
Faculty Adviser/Collaborator: Wayne Carroll
Title of Research Project: Economics and Performance of Recycling in Wisconsin

This research uses regression analysis to investigate the determinants of the costs and performance of residential recycling programs in Wisconsin communities. We find that average recycling costs are lower in communities that are more densely populated, but that the community's population is not a significant determinant of average costs. The volumes of recyclable materials collected do not depend in the expected way on economic determinants.

Craig Petska and Jason Market (92)
Faculty Adviser/Collaborator: Keith Leitner
Title of Research Project: Effects of State Pollution Control Programs on Industrial Location

An analysis of the general problem of the relationship between state programs for pollution control, and state economic growth and development is presented. A regression model is used because it provides a method to simultaneously assess the revenue and cost factors associated with industrial location, including state pollution control programs.

English

Hilary Rose (74)
Faculty Adviser/Collaborator: Martin Wood and Jennifer Shaddock
Title of Research Project: Textual Studies Textbook Collaboration

The project "Textual Studies Textbook Collaboration" involves the exploration and analysis of various texts based on their relation to society. Dr. Martin Wood and Dr. Jennifer Shaddock of the English department designed the project to aid with the completion of a new textbook specifically aimed to introduce students to the ideas involved in analyzing texts. The word "text" takes on meaning unfamiliar to some in which it can represent film, the internet, a court trial, as well as a book.
Brian Swatek (76)
Faculty Adviser/Collaborator: Bernard Duyfhuizen
Title of Research Project: Charting the Waters: V. and Pynchon’s Sea of Words

Why create an index for a novel? Apart from the fact that “An Index to V.” will become (upon forthcoming publication in the journal Pynchon Notes) a tool to aid other readers and researchers in their meaning-making, Thomas Pynchon’s unique place among his peers in the post-World War II American Novel also merits such detailed scrutiny of his texts. As Steven Weisenburger states in A Gravity’s Rainbow Companion: Sources and Concepts for Pynchon’s Novel (University of Georgia Press, 1988), “we know little at all about the author himself; in an age when all manner of novelists are routinely interviewed about their work and composing process, Pynchon is mum”. Indeed, since 1963 publication of V., Thomas Pynchon has gone into a reclusion that rivals even J. D. Salinger’s famous lack of public presence. Weisenburger goes on to conclude that therefore “With Gravity’s Rainbow, [and, I would add with all of Pynchon’s texts] to alter a sentence Pynchon once got from Wittgenstein, ‘the text’ is all that the case is”.

What then do we know about the author whose texts have been a vital tile in the still to be completed mosaic of what we are currently calling post-Modernism? From research such as the short list of facts collected at the opening of Judith Chambers’ Thomas Pynchon, we know that he was born in 1937 (xiii). Furthermore, we know that he studied engineering, but eventually graduated in English from Cornell, taking time off from his studies at one junction to enlist in the Navy (xiii). Other, shorter publications by Pynchon suggest that V. was written during and after his time at Cornell. Rumors of his travels range far and wide, but most accounts suggest stints in New York, Seattle (working for Boeing), Mexico, and California (xiv). We know that he has published the novels Vineland (1990), Gravity’s Rainbow (1973), The Crying of Lot 49 (1965), and V., as well as Slow Learner (1984), a collection of early short stories. Indexes for all of the aforementioned texts will appear together in a future issue of Pynchon Notes.

Ultimately, Pynchon’s lack of public critical direction in the reading of his texts can be beneficial, as it leads one deep into each page, ready to make bold global statements at one turn, only to be thwarted at the next. Indeed, Pynchon’s very pointed desire to leave a void in the area of biographical criticism has lead his readers and researchers to painstakingly study the detailed structures and language of his texts in an attempt to make meaning of his sea of words.

Stephanie R. Wepler (75)
Faculty Adviser/Collaborator: Christian Knoeller
Title of Research Project: Coming to Grips with Multicultural Literature: Choosing Works that Truly Deliver on the Promise of Diversity

This project first addresses the purposes of multicultural movement in English by questioning role of diversity of authorship. From the integral question “is diversity of authorship in itself enough,” we begin to look toward a rationale for multicultural literature by examining different groups of students who benefit from such diverse works. Research has shown that both minority and non-minority students are empowered in different ways, which indicates varying implications for classroom teaching depending on the students themselves. From a rationale, this project seeks to define multicultural literature by examining similarities and differences among definitions and determining whether or not text selection criteria actually address the aim of teaching tolerance among peoples. The final aspect of this project is to provide sound, curricular methods by which educators can choose from a world of books.
Family Health Nursing

Matthew Berry, Jill Rahrman, Joy Danielson, and Melaine Webb (46)
Faculty Adviser/Collaborator: Kathryn Anderson
Title of Research Project: Further Implementation of a Fitness Program Focusing on Exercise for Psychological Responses of Morbidly Obese Women

Obesity is a complex health problem and a difficult disease to treat (Allan, 1989). Obesity in women causes physiologic, psychologic, and social problems. The dynamics underlying the reason for low adherence to exercise and diet programs remain unclear. The nurse is a logical person to educate and counsel obese women on how to lower their health risks. Using a group approach at the Nursing Center for Health, the first group of this intervention study was conducted last spring and the second group this spring. The program combined fitness education and group processes with the morbidly obese women to assist women to understand their health risks, to foster success in an appropriate exercise program, and to determine individual psychological mechanisms about obesity. A major finding was that group interactions aided the group members to participate in the program. The group process fostered communication, encouragement, and support among members. During the group experience, participants began to seek relationships that extended beyond the group meetings. Results described in the poster highlight how these relationships assisted group members to gain success in adherence to program objectives.

Diana Castelluccio and Linda Hetzel (96)
Faculty Adviser/Collaborator: Susan Diemert Moch
Title of Research Project: Linking Research and Practice: Collaboration Through Discussion

Research discussions between a researcher and nurses in practice were proposed as a means of linking research with practice and for substantiating the researcher's work. Substantiate refers to support with truth or evidence as to give form. The nurses discussed the research and gave feedback to the nurse researcher. A case example is described in which six nurses working in various oncology/hospice settings and a nurse researcher discussed articles and manuscripts that focused on the experience of long-term cancer survivorship. The nurses agreed, through use of a written contract, to meet four times and to prepare for each session by reading an article distributed by the researcher. All sessions were audio taped and transcribed. Preliminary analysis has identified the following themes: 1.) Learning about research, 2.) Inquiry about the specific research being discussed, 3.) Substantiation of the research, 4.) Developing implications, and 5.) Connecting between different clinical settings. Future goals for further studies will be furnished.

Kristen A. Kranig (47)
Faculty Adviser/Collaborator: Barbara MacBriar
Title of Research Project: The Impact of a Multicultural Initiative on Attitudes of Faculty and Students

The purpose of this study is to describe the impact of the LCO Grant activities on the attitudes of faculty and students. A non-experimental descriptive design is being used. Students and faculty are being surveyed using the Multicultural Counseling Inventory without identifying factors being included. Data will continue to be collected at the entrance and exit for all students and for new faculty and current faculty. Data already collected has compared the multicultural competence to see if there are differences related to academic standing, gender, and experience with clients, colleagues, or classmates of different ethnic backgrounds. Preliminary findings indicate that gender,
academic standing, and experience with anyone of differing cultural background does affect multicultural competence levels.

Cyndy Matzek and Amy Gottheardt (48)
Faculty Adviser/Collaborator: Barbara R. MacBriar
Title of Research Project: Evaluation of the Teaching Module "The Body Detective"

This project involved testing the effectiveness of the videotaped teaching module, "The Body Detective", with children in third grade. Ten third grade classrooms in five schools were screened by school nurses for health problems using the "Schoolage Health Concerns Inventory" previously developed by the research team headed by Dr. Barbara MacBriar. One group of third graders in each school viewed the videotaped teaching module and the other group did not. Comparisons of responses on the inventory by the two groups were analyzed and it was determined there was no significant difference in the number of items confirmed as health problems. Comments from school nurses in the study included: children were found to have health problems which were not known about before, and the videotaped teaching module helped children understand definitions of the items on the inventory. This resulted in fewer explanations needed from the school nurse.

Kiley Schaffer and Paula Jack (50)
Faculty Adviser/Collaborator: Susan Diemert Moch
Title of Research Project: Costs of Alternative Health-Related Service for Breast Cancer

The purpose of the research study is to identify health-related service costs of mid-life women diagnosed with breast cancer. The study will be based on 10 mid-life women, ages 35-60, who were diagnosed with breast cancer five years ago. The ten women participated in a research study on the experience of breast cancer five years ago. The women will be invited to participate in the study via letter. If interested in participating they will be contacted by telephone to complete a survey about use of alternative health-related service(s) used in the first five years post initial diagnosis. The costs of the health-related services will be estimated from information received through the telephone survey. The survey is part of a larger study on medical care and alternative health-related services for women following initial treatment for breast cancer.

Paula Reiter (49)
Faculty Adviser/Collaborator: Karen Maddox and Nalina Suresh
Title of Research Project: A Nursing Center Project: Kids, Health, Sports, and Scholarship

Since 1988, a University Nursing Center Project has resulted in the health assessments of more than 2500 children ages 10-16 attending a summer sports program. The purpose of this ongoing Project is to identify health problems and referral needs prior to the beginning of the sports program as well as identify illnesses and injuries sustained by children while the program is in session. Data are collected through health histories, screenings, physical examination, and illness/injury reports. Analysis of 1989-1993 data shows the average number of participants is 524, the average number of health problems is 848, and the average number of referrals is 177. The top ten health problems and the top five referral reasons have been consistent across the years. The referral rate is 25 percent annually. The younger children experience more illnesses and injuries Twenty percent of the illnesses or injuries treated by the camp nurse are sustained at home.

Foreign Language

Krista Rigert (73)
Faculty Adviser/Collaborator: Angelo Armendariz
Title of Research Project: Hispanics/Latinos in Higher Education: College in the Midwest

This research project began as an effort to examine some of the current trends of U.S. Hispanics/Latinos in higher education. A questionnaire was created and sent to the Multicultural Affairs/Minority Student Coordinators at all of the four year colleges in Illinois, Indiana, Minnesota and Wisconsin. The questions pertain to the Hispanic/Latina enrollment and to the functions of the Multicultural Affairs Office (UWEC's American Ethnic Coordinating Office) at that college. The objective is to examine the relationship between the number of Latino/Hispanic students enrolled in college and the functions of the various Multicultural Affairs Programs.

Foundations and Library Science

Diane Kay Resvick (82)
Faculty Adviser/Collaborator: John Ridge
Title of Research Project: Effectiveness Evaluation of a Computer-Based Mathematics Learning Program

The primary objective of this project is to evaluate the effectiveness of a computer-based mathematics learning program which reflects the teaching concepts developed at the University of Wisconsin - Madison under the name of Cognitively Guided Instruction. The computer program was developed as a requirement of the University of Wisconsin - Eau Claire course EDMT 474/674, Computers in Education: Instructional Design and Development. The program is a tutorial which provides guided instruction on how to use the "check and guess" strategy to solve story problems of the type "join start unknown" and "separate start unknown". Also included is a drill segment to provide practice of the strategy and the story problem types. The evaluation will be based on a controlled trial of the program in the author's classroom. Collateral outcomes will be critically but informally observed including the relative use of teacher time.

Geography

Jay Bohac and Dan Schafer (9)
Faculty Adviser/Collaborator: Sean Hartnett
Title of Research Project: Using GPS Technologies To Map The Foster Tornado

This project produced detailed maps of the Foster Tornado which cut a 15 mile path of destruction through southern Eau Claire County on August 27, 1994. Crucial to the success of this project was the use of Global Positioning System (GPS) technology to accurately locate the exact path of the tornado and its damage. GPS utilizes satellite signals to precisely triangulate latitude-longitude coordinates. The system employs a roving field receiver, and a base station receiver to obtain positional accuracies of 2- 5 meters. Working with the Eau Claire County Department of Emergency Government, we located the path of the tornado and specific damage sites last fall. Sites such as houses and farm structures were located as individual points, while the path of destruction was located as a string of points that define the outline of the tornado's swath. Once the GPS coordinates were collected, they were corrected with the base station readings, and then input into a GIS program to assess the total length and area of the tornado's path. Lastly, display maps were constructed in a high-end graphics program to illustrate the tornado's destruction. The significance of this project is that with the use of GPS technology, the resulting map is the most accurate depiction of a tornado ever produced in Wisconsin, and perhaps the country. Of specific note, while called the Foster Tornado, the path of destruction measured 10.31 miles on the ground, extending over three townships.
Jodi Ihde, Chris Olson, and Beth Seitzberg (11)
Faculty Adviser/Collaborator: Roger Thiede

The purpose of this project is to examine the changing visibility of facilities providing services oriented primarily or exclusively to the gay/lesbian community in the US from 1982 to the present. The data for this study consists of entries from the Places of Interest for Men and Places of Interest for Women directories published by Ferrari for the years 1982, 1987, and 1994. This study meets three objectives: 1) to demonstrate an overall increase in the number of services and facilities for gay/lesbian people; 2) to reveal a shift in focus of these services and facilities to an increasing emphasis on health, service and community activities; 3) to show the geographic diffusion of gay/lesbian visibility during the period of study.

Brian Ristola and Marco Shappeck (88)
Faculty Adviser/Collaborator: Sean Hartnett
Title of Research Project: Creating a GIS Database for the 1905 Wisconsin Census

The primary goal of this project was to create a geographic database for the 1905 Wisconsin Census. With the advent of modern Geographic Information System (GIS) technologies, large historical data sets like this census take on new significance as the mapping and analysis of this data is now feasible. To a geographer, these vast data sets are viewed as maps waiting to happen. However, a pre-requisite for these maps involves the transformation of this data from the printed pages of the Census Report to the electronic format of a GIS database. The 1905 census provides a detailed statistical portrait of the state -- detailed in both the variety and scale of the data. The census includes a wide range of social and economic data including statistics on ethnicity, agriculture and industry. This state census offers the most detailed assessment of the state since data is aggregated at county, township, city and village levels (while the federal census aggregates only county data). A GIS database is a hybrid of two types of data; geographic data that specifies the location of geographic features (townships, cities and villages), and attribute data such as census statistics for specific locations. The creation of a GIS database takes this detailed enumeration from the dusty shelves of historical archives to the state-of-the-art platform of computer based map exploration and analysis. The significance of this project is that while the census data has existed for 90 years, the maps of ethnic populations and agricultural activities included in this presentation have never been seen previously. With these maps we can develop a much clearer perception and understanding of Wisconsin in the early twentieth century.

Lisa Theo (10)
Faculty Adviser/Collaborator: Ingolf Vogeler
Title of Research Project: Eau Claire Neighborhoods: Assessment Records

Assessment records for the City of Eau Claire will be used to correlate housing value with building characteristics. The value of the property and its improvements determine the total housing value. Building characteristics such as number of rooms, number of bathrooms, type of heating system, total square feet, and garage size influence the value of improvements. GIS and SPSS statistical software will be used to generate a series of maps for Eau Claire to identify neighborhood characteristics.

See Dan Kelner (61)
Biology

Geology

Peter J. Bement (17)
Faculty Adviser/Collaborator: Kent Syverson
Title of Research Project: Evidence for a Pre-Late Wisconsin Ice-Margin Position in the Northern "Driftless Area", Eau Claire County, Wisconsin

Most published maps indicate that the northern boundary of the Driftless Area passes through Eau Claire County (Hadley and Pelham, 1976; Goebel and others, 1983). Clayton and others (1992) recently suggested that glaciers may have extended south into La Crosse and Monroe Counties, ~ 80 km south of other Driftless Area boundaries cited. This study was initiated to search for evidence of glaciation in the northern part of the "Driftless Area."

Evidence for a former ice-margin position has been found 3-5 km into an area formerly considered part of the Driftless Area. Glacial erratics are abundant along a line extending northwest from the city of Osseo. Erratics up to 1.8 m long are found high in the landscape (up to 372 m a.s.l.). Erratic lithologies include Precambrian quartzite, gabbro, basalt, granite, rhyolite, gneiss and banded iron formation derived from a northerly (Superior) provenance. Clast-supported, poorly sorted cobble gravel is found along Cty. Hwy. HH in a 5-m-deep channel cut into the top of a bedrock hill 335 m a.s.l. (NW 1/4, SE 1/4, Sec.17, T25N, R8W). This gravel contains abundant Precambrian erratics and is interpreted as proximal outwash. Unsorted yellowish-brown to yellowish-red (0YR 5/8 to SYR 4/6), gravelly, sandy loam diamicton interpreted to be till has been found southwest of Foster (average sand:silt:clay ratio 69:14:17, n=4). Evidence for glaciation high in the landscape in northern Jackson and Trempeleau Counties was not found. Glaciers may not have flowed this far south, or erosion may have removed glacial sediment during times of permafrost in western Wisconsin.

The orientation of this pre-Late Wisconsin ice-margin position is similar to the western part of the Chippewa moraine deposited during the Late Wisconsin Glaciation. The older ice-margin position may correlate with the northeast-southwest trending Marshfield moraine in northwestern Wood County. If so, till near Foster may have been deposited during the Nasonville Phase and correlate with the reddish-brown till of the Bakerville Mbr. of the Lincoln Fm.

Tracey Carpenter (23)
Faculty Adviser/Collaborator: Robert Hooper
Title of Research Project: The Rock Elm Shale: An Anomalous Shale of Hydrothermal Origin in the Mid-Continent

The Rock Elm Structure has previously been described as a 6 km-wide cryptovolcanic structure and occurs along the east flank of the mid-continent rift in west-central Wisconsin. The 50 meter thick basin fill in the roughly circular structure consists of a kaolinitic shale beneath a ferruginous sandstone. This study examined the mineralogy of the Rock Elm shale in comparison to the mineralogy of surrounding Paleozoic shales of the mid-continent. While the normal Paleozoic shales of west-central Wisconsin are composed almost exclusively of illite (I/S, 1=90%), the shale within the Rock Elm Structure is composed almost entirely of kaolinite. The minor amount of kaolinite found within the Cambro-Ordovician section is associated with the base of the Mt. Simon where the kaolinite is clearly a product of diagenetic alteration of authigenic potassium feldspars. The Rock Elm shale consists of large (5-10uM) detrital flakes of kaolinite, small detrital quartz grains and minor mica flakes up to 20uM in diameter. The detrital grains have subsequently been altered by the same diagenetic episodes that effect all of the Paleozoic shales in the region including oxidation, and neoformation of illite and potassium feldspar. Partially oxidized framoidal pyrite, molds of pyrite removed by oxidation, and abundant jarosite indicate the Rock Elm shale was deposited in a reducing environment but subjected to subsequent oxidation during diagenesis. The kaolinite is
indicative of a local hydrothermal system that is probably associated with synsedimentary faults associated with the Rock Elm Structure. Illitic clay found in the upper ferruginous sand indicates the breakdown of the hydrothermal system and a return to detrital sedimentation with provenance outside of the structure.

Given the structure's location in relationship to the mid-continent rift it is likely that the hydrothermal system originates in deep seated Precambrian faults reactivated during Paleozoic sedimentation. Sedimentary relationships are consistent with a hydrothermal source near the southern edge of the structure and rapid deposition of the shale along the southern margin of the structure. Placer gold mined from a creek within the structure during the last century may have been a product of the same hydrothermal system.

Kristie Franz (22)
Faculty Adviser/Collaborator: Robert Hooper and Martin Miller
Title of Research Project: Examination of the mineralogy of faulted rocks near Wissota Dam, Chippewa County, WI

Examination of the mineralogy and geochemistry of a brittle fault zone at Wissota Dam, Chippewa County, WI is currently being conducted to determine fabric development and mineral growth within the fault zone. This project is in collaboration with another student (Underwood and Miller, 1995) who is studying the geologic structures of the same fault. The objective of this project is to advance our knowledge of mineral growth and alterations of rocks within a brittle fault zone as a result of both shearing and later alterations. By differentiating between alterations that occurred because of fault movement, later hydrothermal alteration and/or diagenesis we hope to achieve a better understanding of the geologic conditions that existed both during and after faulting. Mineral alignment and fabric development, open-space growth, geothermal indicators and hydrothermal mineralization are some of the geologic characteristics under study. Techniques utilized in this project are Scanning Electron Microscopy (SEM), X-Ray Diffractometry (XRD) and petrography. Occurrence of foliated chloritic mineralization within all the rock samples was confirmed through both XRD and SEM, and is correlated with shearing. Open-space mineral growth of pyrite and several chemically distinct carbonate minerals was also confirmed through SEM and XRD indicating later stages of mineral growth in open fractures. Current work in progress includes further study of chlorite and carbonate crystal growth and determination of other geochemical characteristics of the fault zone.

David Hodek (20)
Faculty Adviser/Collaborator: J. Brian Mahoney and Karen G. Havholm
Title of Research Project: Trace Fossil Assemblages within the Upper Cambrian Eau Claire Formation: Distribution and Significance

The purpose of this project is to determine the distribution and paleoenvironmental significance of trace fossils in the Upper Cambrian Eau Claire Formation. Trace fossils in the Eau Claire Formation are particularly abundant at the contact between thin-bedded shale and sandstone beds, and are typically well exposed on bedding planes. The ichnofauna found is from both the Skolithos and Cruziana ichnofacies, indicating an alternating high and low energy depositional environment. Ichnofauna currently recognized include: Rusophycus, Rusophycus cruziformis, Phycodes Pedum, Repichnia, Planolites, Thassinoides, Diplichnites, Monomorphicus, Dimorphicus, and caprice imprints. The majority of these trace fossils were formed by grazing, resting, burrowing, and other activities of the trilobites and annelid worms that dominated the sea floor in Late Cambrian time. A preliminary paleoenvironmental interpretation based on ichnofacies indicates that the Eau Claire Formation was deposited in
a shallow marine environment that was below normal wave base, but not below storm base. The trace fossil assemblage is characteristic of a moderate energy environment intermittently affected by both strong unidirectional currents and oscillatory wave activity.

Terri S. Hogue (18)
Faculty Adviser/Collaborator: John Tinker
Title of Research Project: Groundwater Modeling at Selected Waste Sites in St. Croix County, Wisconsin

Groundwater contamination from volatile organic compounds (VOC) exists beneath several subdivisions in St. Croix County in west central Wisconsin. The source(s) of the VOC is unknown, but two known waste disposal sites exist nearby. A two-dimensional groundwater flow model, FLOWPATH, is used to determine groundwater flow direction beneath the subdivisions and waste disposal sites to help determine the source of the VOC contamination.

The hydrogeology of the study site consists of glacial drift underlain by fractured dolomite and sandstone. Data collected by the Department of Natural Resources and consulting firms is used to define input parameters for the computer model. The groundwater model is calibrated to on-site groundwater observation wells and to the St. Croix County watertable map. The model has a water balance error of less than one percent and achieves a 0.01 percent error convergence. A sensitivity analysis is performed to quantify the uncertainty in the finished model.

Groundwater flow directions and particle release tracking suggest one of the waste disposal sites is the probable source of the VOC contamination in the subdivisions. Further study is needed to verify this source as the cause of the VOC contamination.

Mark Kiessling (19)
Faculty Adviser/Collaborator: Karen Havholm and J. Brian Mahoney
Title of Research Project: Sedimentology and Stratigraphy of the Eau Claire Formation Tilden Area, Chippewa County, Wisconsin

The depositional environment of the Eau Claire Formation in west-central Wisconsin has previously been interpreted either as a near-shore tidal flat or, alternatively, an off-shore, shelf setting along the eastern margin of the Late Cambrian Hollandale embayment.

At newly exposed outcrops in the Tilden area, the Eau Claire Formation consists of a basal 2.5 m. thick fining-upward package of interbedded medium to fine grained thin (<15cm.) shale and sandstone beds with brachiopods. This is overlain by a 16 m. coarsening-upward succession that consists of 6 repetitions of 3 lithofacies. The lower facies consists of interbedded thin (<10cm.) beds (flaser and lenticular rhythmites) of fine, locally rippled sandstone with brachiopods and mudcracked shale. The middle facies is similar, containing thicker (<25cm.) fine to medium grained sandstone beds and bioturbated horizons. The upper facies is a fine to medium grained sandstone with amalgamated thin (<15cm.) beds displaying basal current-oriented trilobite/hyolithid coquinas and, more rarely, shale rip-up clasts. The proportion of the upper sandy facies to the lower and middle shaley facies increases upward. Each pack of the 3 lithofacies represents a change from a lower energy mud-dominated environment to a higher energy sand-dominated environment. Repetitions of the 3 facies may be the result of either multiple minor relative sea-level fluctuations or seasonal storm cyclicities. Evidence for both shelf and tidal sedimentation continues to make determination of the depositional environment difficult. A tidal influence may be indicated by the rhythmic repetition of sand and shale interbeds. Mud cracks suggest shallow water with periodic subaerial
exposure but could also be attributed to unequal loading in subaqueous settings. However Hummocky cross stratification, parallel lamination and hyolithid and trilobite orientation are typical of deposition in periodic storm events usually attributed to marine shelf deposition.

Kristine Mercer (16)
Faculty Adviser/Collaborator: John Tinker, Jr.
Title of Research Project: Hydraulic Conductivity Determinations for Fluvial Sediment at the University of Wisconsin-Eau Claire, Wisconsin

Previous studies in Wisconsin determine that field and laboratory measurements of the hydraulic conductivity of the same geologic material can differ by one to two orders of magnitude. They conclude the reason for this difference is the scale of measurement between field and laboratory tests. To verify this conclusion, the hydraulic conductivity of seventy soil samples from four soil borings on the lower campus of the University of Wisconsin-Eau Claire are determined by laboratory methods for particle-size analyses. These results are compared to the field values of hydraulic conductivity obtained by slug tests completed at the four soil borings which are now piezometers.

The hydraulic conductivity of the seventy soil samples from the four soil borings are determined from cumulative curves using three different methods, specifically the method of Hazen, Bedinger, and Masch and Denny. The hydraulic conductivity from the slug tests on the piezometers are determined by the Hvorslev method. Results show varying hydraulic conductivity values, for example, the hydraulic conductivity is $1.27 \times 10^{-2}$ cm/sec for Well 4A from the slug test data and $3.97 \times 10^{-3}$ cm/sec from the particle-size data.

The results indicate the scale of measurement between field and laboratory tests cause a difference of one to two orders of magnitude in hydraulic conductivity of the same geologic material. Hydraulic conductivity increases as the scale of measurement increases.

**Greg Michael (21)**
Faculty Adviser/Collaborator: Robert Hooper and J. Brian Mahoney
Title of Research Project: Evaluation of Clay Mineral Distribution in Pliopleistocene Sediments of the Shikoku Basin

This investigation is designed to characterize the lateral and vertical variation in clay mineralogy from fine-grained sediments in the Shikoku Basin of the Philippine Sea. Plio-Pleistocene sedimentation was characterized by episodic volcanism on the basin margins, fluvial input from the islands of Japan and the Izu-Bonin volcanic arc, and eolian influx from Southern Asia. Analysis of the clay mineralogy will allow quantification of the relative importance of each source region throughout Plio-Pleistocene time and also permit an estimation of any diagenetic alteration of the clay component. Fine grained sediment is size separated and clays are examined by a five-step X-Ray diffraction analysis performed on two separate size clay fractions. Initial results have shown distinct mineralogical changes within the stratigraphic column. The majority of the samples contain a strong component of homogeneous illite (mica?), suggesting derivation from an igneous or metamorphic source terrane, most likely of continental affinity. The illite component is periodically overwhelmed by a strong smectite signature, indicative of sediments containing a high proportion of airfall volcanic ash derived from episodic volcanism on the basin margins. Minor amounts of vermiculite and chlorite may reflect fluvial influx from a weathered mafic volcanic source on Japan or the Izu-Bonin arc. The presence of kaolinite is suspected, but positive identification awaits further analyses. Vertical variations in sediment composition within the Shikoku Basin suggest that clay mineralogy may be a
useful tool for basin analysis and provenance studies in fine-grained clastic sediments.

Jeff Schels (24)
Faculty Adviser/Collaborator: Kent M. Syverson
Title of Research Project: Pleistocene Geology of Eastern Chippewa County

Attig (1993) recently completed a detailed Pleistocene geology map of Taylor County. Our study was initiated to extend Attig's work into eastern Chippewa County where little research has been done on the glacial geology. Geomorphology, topographic map and aerial photograph interpretation, soil surveys, field work, and field sediment characteristics were used to map units on parts of the Huron, Stanley, Boyd, and Colburn 7.5' USGS Quadrangles. Till of the Merrill Member of the Lincoln Formation was deposited prior to 25,000 years ago. Erosion has removed much of the primary glacial topography from the surface of this unit. Thus, the landscape is characterized by rolling hills and an integrated drainage network. Till of the Merrill Member is brown to reddish brown and contains 55% sand, 30% silt and 15% clay on average. The Chippewa Moraine contains till and associated sediment of the Copper Falls Formation. This moraine was deposited by the Chippewa Lobe during the last part of the Wisconsin Glaciation (approximately 15,000 to 25,000 years ago). At this time, thick debris accumulated on top of the glacier ice. An irregular landscape marked by ice-walled-lake plains, kettles, and hummocks formed as the underlying ice melted and topographic reversal occurred. The Chippewa Moraine is reddish brown and contains 57% sand, 28% silt, and 15% clay on average. Geomorphic interpretation has been the most important tool used to differentiate between surfaces underlain by till of the Merrill Member and till of the Copper Falls Formation due to similarities in till grain size and color.

Jennifer Tobias, Todd Myse and Nick Loomis (87)
Faculty Adviser/Collaborator: J. Brian Mahoney and Robert Hooper
Title of Research Project: Sulfide Mineral Transport in the Couer d'Alene River and its Influence on Downstream Heavy Metal Contamination

The Couer d'Alene River was contaminated with sulfide mine tailings containing abundant heavy metals during mining operations between 1886-1968. Direct dumping of mine tailing ceased in 1968, but tailings stockpiles continue to wash into the river during flood season. Principal ore minerals in the district include tetrahedrite, galena, sphalerite, pyrite, pyrrhotite and chalcopyrite. These minerals contain high amounts of lead, iron, manganese, zinc, copper, silver, cadmium, arsenic, antimony, and mercury. The United States Geological Survey has documented hazardous amounts of heavy metal contamination in floodplain and lake sediments downstream from the tailings. This investigation is designed to document the downstream modification of sulfide mineralogy and grain size in order to assess the principal contributors to the heavy metal contamination. Our study concentrates on sulfide mineralogy of sediments from the bedload, floodplain, and abandoned oxbow lakes within the Couer d'Alene River drainage. The sulfide mineralogy and grain size of bedload sediments is being examined to determine the degree of sediment modification with distance from the source. The mineralogy and grain size of flood plain sediments is being assessed to determine the lateral and vertical distribution of sulfides during flood events, and to gauge the sulfide storage capacity of the floodplain. Organic and inorganic fractions from abandoned oxbow lakes are being analyzed to determine the role of organic processes in liberation of heavy metals from sulfides. Sediments from the three areas are being size
separated by both wet and dry methods to determine grain distribution. Sulfide minerals are being concentrated with heavy liquids, and analyzed for grain size and composition using a scanning electron microscope. The clay size component will be examined using X-ray diffraction. Comparison of results from the three separate areas will determine the lateral and vertical distribution of sulfide minerals throughout the river system, and will allow an estimation of the downstream modification of sulfide mineralogy, and thus the source of heavy metal contamination, to be assessed.

Chad Underwood (15)
Faculty Adviser/Collaborator: Martin G. Miller
Title of Research Project: Evidence for Post-or Syn-Rifting Compression at Wissota Dam

The fault zone at Wissota Dam contains two main SSW-dipping fault surfaces and numerous subsidiary conjugate faults. The geometries of these conjugate faults combined with movement plane data suggest that deformation accompanied an ENE-trending maximum principal stress ($\sigma^1$). The conjugate faults suggest $\sigma^1$ was oriented approximately N74E while movement planes suggest $\sigma^1$ was approximately oriented N60E. The last documented tectonic event in this area was mid-Continent rifting at approximately 1100 Ma. The fault at Wissota Dam offsets a rift-associated basaltic dike with approximately 5 meters of left-lateral separation. The fault therefore slipped either during late stages of rifting, or after rifting. The ENE-oriented $\sigma^1$ and the SSW dip of the main fault surfaces, together with the left-lateral separation of the basaltic dike suggest that the fault is a left-lateral thrust. If the fault slipped during late stages of rifting, it must be relatively anomalous because thrust faults rarely form during rifting events. It would also require more than 20° of clockwise rotation of $\sigma^1$ from the NNE-trend expected during rifting. If it postdates rifting, the fault must represent a later, undocumented event.

Kristin D. Weaver (14)
Faculty Adviser/Collaborator: Karen Havholm
Title of Research Project: Eolian Dune Type and Relative Age, Nags Head Woods, NC

The barrier islands of North Carolina support a complex sedimentary environment involving both marine and eolian processes. Our research centers on determining the mode and timing of origin of a little-studied group of older, stabilized eolian (wind-blown) dunes on one of the barrier islands. Using aerial photographs, topographic maps, and field study, we distinguished two dune populations with different heights, plan view shapes and orientations. One is a group of larger dunes with arms trending north/south; the other is a group of lower, more east/west trending sand ridges. Strata revealed in trenches dug in the larger dunes are consistent with surface observations that these are parabolic dunes. Dune type and mode of development of the smaller dunes is still unclear. These dunes are sinuous in plan-form and trenches show that the dunes migrated in a southerly direction, a characteristic that rules out two of four possibilities for their origin. However, other dune parameters we examined, such as profile shape and proximity to coast, do not help determine dune type. To determine whether the two dune populations formed simultaneously or consecutively, a trench was dug into an intersection of dunes of each type. These strata showed that the parabolic dunes could not be older than the smaller ridges. Presently grain characteristics of the dune sand are being examined for help in determining whether the smaller dunes are older than the parabolics or whether they formed simultaneously.

Mae E. Willkom (86)
Faculty Adviser/Collaborator: John Tinker
Title of Research Project: Computer Groundwater Modeling of Two Mine Sites in Northern Wisconsin.
This study evaluates the potential hydrologic impacts on the groundwater flow systems at each of two mine sites in Northern Wisconsin. Numerical computer models are constructed to predict possible drawdowns of local water tables resulting from the dewatering of each site. A two-dimensional groundwater flow model, FLOWPATH, is used to represent hydrogeologic conditions at an open-pit copper mine near Ladysmith, Wisconsin. Results from this model are compared to those of a model completed during the mine permitting process by Thomas A. Prickett & Associates, Inc., and Engineering Technologies, Inc. Prickett's model uses a computer program modified to accommodate vertical as well as lateral changes in aquifer properties. Its predicted maximum drawdown is approximately 150 feet, while that of the FLOWPATH model is 104 feet. The difference in outputs between the two models is a consequence of their respective capabilities and limitations in representing hydrogeologic conditions at the site. At the second study site, a proposed underground zinc-copper mine near Crandon, Wisconsin, relatively complex stratigraphy necessitates use of a three-dimensional model to adequately represent vertical variations in site conditions. MODFLOW, a groundwater flow model developed by the U.S. Geological Survey, is chosen for this purpose. The permitting process for the Crandon mine is currently in progress, and a similar modeling effort is being conducted by consultants for the mining company. Upon its completion, a comparison can be made between the results of that study and those generated here. Field data obtained from the Wisconsin Department Natural resources is used as input for FLOWPATH models. Input parameters include boundary condition, aquifer properties and thickness, recharge, and pumprates. Each model is calibrated to achieve a reasonable representation of pre-existing water table maps before being used to predict drawdowns.

History

Sergei Dyakin (100)
Faculty Adviser/Collaborator: Jack Lauber
Title of Research Project: The Effects of the Russian Revolutions of 1917 on an American Business Enterprise in Russia: A Case Study of the International Harvester Company in Russia, 1917-1921

The study examines in detail the effects of the political and economic changes brought by the Russian revolution of 1917 on one of the largest American companies operating in Russia in the beginning of the twentieth century. A few aspects of the Russian market of the revolutionary era, as experienced by International Harvester -- the dislocated economic infrastructure in the provinces, complicated labor and company-customer relations, the impact of war, crime, and political radicalism on company's operations -- are the focal points of the project. The study is an attempt to analyze the motives of International Harvester's management for maintaining the company's presence in the Russian agricultural implement market under the extreme conditions and the methods in achieving this goal. The International Harvester's corporate archives, including correspondence between company's managers and letters from the Russian peasants to the company, served as the primary sources for the research.

Scott Lien (101)
Faculty Adviser/Collaborator: Paulis Lazda
Title of Research Project: Norman Davis and the Memel (Klaipeda) Question, 1923-24: A Case Study in International Diplomacy

In the current historical literature, few, if any, have analyzed the significance of Norman Davis and his role in the settlement of the Memel Question. Thus, the project involved photocopying part of the Norman Davis Collection, located in the Library of Congress in Washington DC, that was relevant to the
Memel Commission. The grant paid for this photocopying and mailing to the University. After analyzing the recently declassified material, it was discovered that Norman Davis had solved, with the aid of the former League of Nations, a difficult and apparently irresolvable dispute between Lithuania, Poland, and the Territory of Memel, according to the conditions set forth by the Conference of ambassadors. What makes this significant is that through Norman Davis' success, the League of Nations showed that it could effectively solve such disputes between sovereign nations. If one compares this success to other disputes handled by the ill-fated League of Nations, then Davis and his work with the Memel Commission appears indeed bright. Unfortunately, such success took place in the mist of growing isolationism on the part of the United States.

Tim Spielman (98)
Faculty Adviser/Collaborator: James Oberly
Title of Research Project: The Evolution of Veterans' Memories of the Civil War

Over the course of the Gilded Age, veterans' memories of the Civil War changed as a result of post-war experiences in a rapidly industrializing age. The ex-soldiers began to view the war not as simply a war to restore the Union, but as a war to restore order. And because the war became the point of reference, the focus of meaning, for late-nineteenth-century Americans, the memories of the war—especially those of the veterans—affected all aspects of society, particularly political issues. This study examines the link between memories and the development of American social welfare policy. Veterans began to view their pensions not simply as reimbursement for disabilities incurred during the war, but as old-age pensions, designed to support them for the rest of their lives.

Mathematics

Matthew Bloss (68)
Faculty Adviser/Collaborator: Andrew Balas
Title of Research Project: The Graphs of the Exponential Functions and Their Centers of Mass.

Within a closed region in the plane, there is a point of balance called the "center of mass," or "centroid." It is well-known that the infinite regions (when bounded on the right) beneath the graphs of the exponential functions possess these centers of mass. This calculation shows that the whereabouts of the center of mass point for an exponential function are given explicitly in the exponent. It is also shown that the centroids beneath the graphs of exponential functions lie on another exponential curve. Moreover, it is determined that the exponential functions are unique in that the abscissas of their centers of mass are always found one unit to the left of the right-bound of the infinite region below the function.

Scott Gaulke (81)
Faculty Adviser/Collaborator: David Ponick
Title of Research Project: Integrating DERIVE into Calculus Instruction

The purpose of this study was to investigate the effects of a computer algebra system (DERIVE) on students' comprehension and computational skills in Brief Calculus, a first year course for non-mathematics majors. Students involved in the study were enrolled in one of eight Brief Calculus sections at the University of Wisconsin-Eau Claire. The seven sections that used the traditional form of instruction were the control group. The eighth section, the experimental group, received instruction that emphasized conceptual understanding through use of the computer algebra system DERIVE. The instructor used DERIVE in class to present graphical, analytical and numerical demonstrations. The instructor also used DERIVE to emphasize the formulation of a step-by-step problem solving
plan. The students were required to do six projects, consisting of calculus problems, using the DERIVE software. A pretest was given to measure group equivalence. A posttest was then administered at the end of the semester to measure conceptual and computational achievement. The experimental group scored significantly higher on conceptual achievement. There was no significant difference between the groups on the computational part of the post test.

**Jodi Timler (67)**
Faculty Adviser/Collaborator: Gwendolyn Applebaugh
Title of Research Project: *A Profile of Math 110 Students*

Dr. Brian Bansenauer and Dr. Marc Goulet developed a survey intended for Math 110 (College Algebra) students. This survey was distributed to a majority of the Math 110 sections - spring '95, a total of 277 students. There is an association between students planning to take another math course and these same students seeing that the topics in College Algebra relate to their other coursework, have relevance, and can see where it's applied.

See Paula Reiter (49)
Family Health Nursing

**Management and Marketing**

**Keri Coffman (72)**
Faculty Adviser/Collaborator: Robert Erffmeyer and Jamal Al-Khatib
Title of Research Project: *Students' Study Abroad Experiences: Gaijin in Japan*

Living in an increasingly globalized world, we can no longer afford to see the world from an ethnocentric viewpoint. The ability to acquire a worldview is becoming more and more important for success in today's business. While participating in the UWEC exchange program at Kansai Gaidai near Osaka, the researchers were involved in several projects dealing with Japanese consumer attitudes and marketing practices. This particular project addresses one of the basic building blocks of understanding another culture - education. While the importance of Japan in the international community has shown an amazing growth, the number of foreign students, particularly Americans studying in Japan, has remained exceptionally small. The study explores relationships between different background training experiences, cultural predispositions and attitudes with students' evaluations of their study abroad experiences. Data was collected from 135 students involved with five different study abroad programs in Japan. Insights are offered on developing successful student experiences.

**Stephanie Ranum and Scott Siebert (71)**
Faculty Adviser/Collaborator: Robert Erffmeyer and Dale Johnson
Title of Research Project: *Assessing Training Practices and Needs of Small Businesses in West-Central Wisconsin*

With the advent of distance education technologies the UWEC Small Business Development Center will shortly have access to a number of different methods to provide training and consulting services to their clients. These technologies will have the ability to provide services at local sites and at a time convenient to owners and managers of small businesses who often find it too difficult to leave their businesses for an extended period. The project sets the groundwork for offering distance training by conducting a thorough needs assessment with past, current and potential clients. Researchers have assisted in identifying training practices and needs involving a variety of marketing research practices: sample selection, development of focus group questions, participant recruitment, and observation, participation and analysis of focus findings. Findings highlight current training practices, providers, training budgets,
training program needs, attitudes toward program pricing and training technologies. Researchers will use the results as a basis for developing distance education program offerings.

Management Information Systems

See S. Ranum and S. Siebert (71)
Management and Marketing

Music and Theatre Arts

R. James Andrews (78)
Faculty Adviser/Collaborator: Ronald Keezer and Scott Hanna
Title of Research Project: Evolution of African Drumming to Modern Jazz Rhythms

To show the evolution of native African rhythms to current western jazz rhythms. Explanations of African culture, language, music, philosophy will be included as elements of the lineage to current western jazz music. Social and physical history of the people and music (instruments) will be portrayed as forebears of the evolution.

Nursing Systems

Heidi Deininger, Chris Jachman, and Debbie Podrez (41)
Faculty Adviser/Collaborator: CeCelia Zorn and Sue Peck
Title of Research Project: Surrounded by Appalachian Culture: A look at Rural Health Care

Seven interested individuals associated with the School of Nursing attended an "Alternative Spring Break" in Rural Kentucky. The purpose of this experience was to enhance the understanding of health care concerns of the Appalachian area by observing and participating in experiences with health professionals. By integrating health into economic, social, political, cultural, and religious contexts, the current health care needs of this population are better understood. This area is served by the Frontier Nursing Service, a highly successful health care service established by a nurse, Mary Breckinridge, in the 1920's to provide care to rural, economically deprived mothers and infants in Appalachia. Through relationships fostered by this initial experience in Eastern Kentucky, similar opportunities for students and faculty will continue.

Christina Jachman (42)
Faculty Adviser/Collaborator: Kathleen Valentine
Title of Research Project: Mapping the Conceptual Domain of Provider and Consumer Expectations of Mental Health Care in Russia

The purpose of this evaluation research study was to explore the differing expectations and perceptions between two American mental health sites and one Russian site. The research project used a participatory, inductive approach aimed at helping the staff and patients articulate their beliefs about mental health services. Data were collected from patients and staff through Concept Mapping (Trochim, 1989). The evaluation questions of interest were: 1. What are the similarities and differences between consumers' and providers' conceptual framework of mental health treatments? 2. How are perceptions similar or different for groups of consumers and providers in the United States and Russia? This poster presentation focuses on the interpretation of results within the Russian setting and across the two American settings. Common themes which emerged are highlighted.

Christina Jachman and Allison Soerens (43)
Faculty Adviser/Collaborator: Kathleen Valentine
Title of research Project: Evaluation of Students' Satisfaction and Critical Thinking: A Longitudinal Analysis and Future Directions

The focus of our research project was to evaluate critical thinking development at UW-EC's School of Nursing. Critical thinking is vital to the role of the professional nurse. Measuring this skill is consistent with the initiatives of the University Assessment Committee. Evaluation of critical thinking was achieved by this research project by analyzing survey data which objectively measured students' ability to distinguish facts from assumptions; gather, analyze, and synthesize data to generate alternatives for action; choose among alternatives; and evaluate the effectiveness of a given course of action. Survey data were collected from students in pre and post tests. Results of the analyses raised the question whether or not the previous method, using the Watson and Glaser Tool, accurately measures development of critical thinking skills in nursing students. Data collected from this research project suggests that an alternative method of evaluation may yield more useful information for program improvement.

Mary Johnson (44)
Faculty Adviser/Collaborator: CeCelia Zorn
Title of Research Project: Religiosity in Non-institutionalized Elderly Women

Spirituality in health care practices with elderly women is often neglected and it has not been addressed in the quality of life studies in this population. The purposes of this study were to examine the level of religious well-being in a sample of 114 non institutionalized, largely rural elderly women (M = 75) and to identify the relationship between selected factors and the level of religious well-being. Descriptive research revealed a high level of religious well-being among the participants and significant positive correlation between religious well-being and social support, hope, and health. A multidimensional approach to religious well-being serves to enlighten an often neglected area of women's health.

Barb Thomas, Linda Hetzel, Pam Alt, and Patty Jensen (95)
Faculty Adviser/Collaborator: Sandra Sweeney
Title of Research Project: Advanced Practice Nurses Networking to Support Quality Health Care in the 21st Century

This faculty/student research grant was undertaken to conduct a descriptive survey regarding the feasibility of initiating an on-line communication network for UW-EC graduate students in nursing, UW-EC graduate nursing alumni, and other Masters prepared nurses in advanced practice. An on-line service is seen as a dynamic interactive method of improving the quality of nursing care being given diverse clients at risk. One hundred nurses in advanced practice will comprise the convenience sample and if successful, the project expects to become a self-supporting network linking nurses in advanced practice from rural, urban, reservations, and public health agencies or clinics with each other and graduate students at the UW-EC School of Nursing for on-line exchange and dissemination of shared knowledge.

Physics and Astronomy

Theresa Sobaski and Steve Maurice (27)
Faculty Adviser/Collaborator: Paul Thomas and Robert Elliott
Title of Research Project: Studying the Rotation Period of the Asteroid Aten

The student will take repeated observations of the asteroid Aten, using the 24-inch Hobbs telescope. Aten is a 1-km diameter asteroid in an orbit that crosses the Earth's orbit. From these observations, the student will determine the rotation period of the asteroid, by measuring its brightness variations as a function of time. The work will require
substantial data reduction of electronic (CCD) images together with techniques such as Fourier analysis. The student will compare this derived rotation period to all known previously derived values.

Christopher Hawes (29)
Faculty Adviser/Collaborator: Kim Pierson
Title of Research Project: Temperature Dependence of the Sputtering Yield of Ag/Cu Alloys

Measurement of the total sputtering yield of multi-phase Ag/Cu alloys as a function of temperature for normally incident 200 eV Ar⁺ at a dose of 10⁹ ions has been performed. The yield is a maximum at low sample temperatures and decreases as the temperature increases. This difference in yield between high and low temperatures can be explained in terms of the development of an altered surface topography during sputtering. SEM micrographs reveal the presence of pronounced cones, ridges, and pebble-like features on the high temperature sample; whereas, at low temperature the sample surface is relatively smooth. A roughened surface will decrease the yield due to redeposition of the sputtered material onto neighboring features. Bombardment enhanced surface mobility accounts for the formation of the altered surface topography at high temperature.

Terrence D. Krueger (28)
Faculty Adviser/Collaborator: Kim W. Pierson and J. Erik Hendrickson
Title of Research Project: Dependence of Sputtering Yield of Ag/Cu Alloys on Incident Ion Energy

Measurement of the total sputtering yield of a Ag/Cu (60/40 % atomic) multi-phase alloy as a function of incident ion energy has been performed. A magnetically confined DC-Triode plasma arc ion source was used. Samples were held at room temperature and were bombarded by normally incident Ar⁺ ions at a dose of 1.7x10⁹ ions. Analysis of the sputtered surface was performed using SEM and EDAX. A sample of the sputtered flux was collected near the end of the sputter run and was analyzed for stoichiometry using EDAX. Results indicate that the dominate mechanism controlling the alloy yield is the formation of altered surface topography. This altered topography forms faster as the energy of the incident ion is increased.

Scott Schwantes and Ron Redetzke (26)
Faculty Adviser/Collaborator: Paul Thomas
Title of Research Project: Orbit Determination of Asteroid Aten

The student will take repeated observations of the asteroid Aten, using the 24-inch Hobbs telescope. Aten is a 1-km diameter asteroid in an orbit that crosses the Earth's orbit. From these observations, the student will determine the orbit of the comet using standard mathematical techniques. The work will also require substantial data reduction of electronic (CCD) images. Finally, the student will compare the orbit derived from this work to the accepted orbit.

Glenn Starkey (85)
Faculty Adviser/Collaborator: Paul Thomas
Title of Research Project: Gravitational Lensing of Light by a Massive Object

Einstein's Theory of General Relativity predicts that light will be bent in the vicinity of a massive object. In general, this effect is too small to be observed except close to very large masses such as stars. Using General Relativistic calculations and computer graphics techniques, we have produced two short computer animation movies. The movies show the distorting effect that a moving black hole has on the appearance of a star field beyond it. The computer software developed can be used to analyze a wide variety of astronomical situations where this "Gravitational Lensing" phenomenon occurs.
**Political Science**

**Kristin Krueger and Christopher Bundy (64)**
Faculty Adviser/Collaborator: Leonard Gambrell
Title of Research Project: **Analysis of Scholarship on the Vietnam War**

Research project involving three students and one faculty member in collaborative analysis of three textbooks on the Vietnam War. Results to be compared to 1993-94 student-faculty analysis of six books written by combat veteran authors on nine selected topics. Methodology: Content Analysis. Hypothesis: There are significant differences on the nine topics sufficient to require the use of both types of works to develop a comprehensive analysis of the war.

**Melissa A. Matczak (3)**
Faculty Adviser/Collaborator: Richard Clucas
Title of Research Project: **American Political Reform**

The research project entails assisting political science professor Richard Clucas in writing a reference book titled *American Political Reform*. Because the desire to modify the structure of the nation's political system has increased in past years, many reform efforts have surfaced in America. However, no single reference book provides information about these issues. The book includes entries detailing terms, events, actors, issues, and concepts dealing with reform movements primarily from the 1960s to the present. The book is designed to offer a single source for finding information to conduct research on American political reform. It is intended for use in high school, college, and public libraries. The student is assisting in researching a number of reform areas, selecting the appropriate topics, and writing entries. Subjects under exploration include a diverse selection of topics ranging from the electoral college to affirmative action policies.

**Bryan S. McQuide (4)**
Faculty Adviser/Collaborator: Sylvia R. Sipress
Title of Research Project: **The Political and Economic Relationship Between the Baltic States and the European Union**

The Baltic states are seeking to participate in an interdependent global economy. Lithuania, Latvia, and Estonia are pursuing membership in the European Union (European Community). Economic reform, international aid, regional trade agreements and inter Baltic cooperation have been undertaken to prepare the path to the EC. Baltic leaders and the Baltic people themselves have voiced support for cementing a strong political and economic relationship with the European Union. This relationship has been developing for three years and may culminate in full membership. This will show that the advantages of strengthening the relationship and future Baltic membership outweigh the disadvantages.

**Psychology**

**Sara Finney (12)**
Faculty Adviser/Collaborator: Dennis “Mac” Greene
Title of Research Project: **Two Paths Diverge: Differential Commitment to Career and Marriage in Undergraduate Women**

Two exploratory studies examined the characteristics of female university students who choose to pursue marriage or a doctoral degree after completing their baccalaureate degree. In the first study, the experimenter interviewed a total of eight subjects to determine the distinct characteristics of the two groups. The results of the interviews allowed the experimenter to design a questionnaire that further investigated the differences between the two groups in the areas of academics, family and personal relationships. The two studies found that the groups differed in high school performance, college study habits,
involvement in school activities, relationships with professors, family orientation, high school and college personal relationships, and motivation. This study must be replicated with a larger sample size to determine if these differences generalize to the population. If the differences do exist, a path analysis could be developed to identify the influential factors of each life path. This would be an aid to incoming freshman and faculty.

Tammy Fisher, Kriston Hines, and Kim Larson (7)
Faculty Adviser/Collaborator: Ananta Dasgupta and Ken Heilman
Title of Research Project: Effects of Hypnosis on Perception of Color and Sound
This study utilized 50 undergraduate students to see if hypnosis had an effect on the perception of sound or color. It was hypothesized that perception of tone and color would differ between hypnotic and non-hypnotic states. Mixed-subject ANOVAS were used to analyze the data and showed there was no significant difference between the perception of sound or color in the absence or presence of hypnosis. Suggesting that the practice effect appears to play a greater role in perception than the hypnotic or non-hypnotic state of mind.

Adam Hafdahl (13)
Faculty Adviser/Collaborator: Blaine F. Peden
Title of Research Project: Olfaction: An Investigation of the Dual-Code Theory and Memory Duration
This study employed a suppression paradigm to investigate factors affecting recognition memory for odors. Subjects were assigned to one of eight experimental conditions in a factorial design that crossed four levels of suppression (none, spatial, verbal, and spatial-verbal) with two levels of test occasion (immediate and delayed). Subjects in all conditions smelled 10 odorants during acquisition. During this phase, subjects in the spatial, verbal, and spatial-verbal suppression conditions performed the condition appropriate suppression task by responding to pre-recorded auditory stimuli presented through stereo headphones. At test—either immediately or one week later—subjects smelled 20 randomized odorants (10 targets and 10 foils). They identified each odorant as old or new and rated their confidence in each decision. Recognition (d') scores were calculated for subjects in each condition. To detect main and interaction effects among conditions of encoding suppression and delay, these scores were submitted to a 4 x 2 (Suppression x Test occasion) between subjects analysis of variance with an alpha level of .05. Neither the encoding suppression main effect, the test occasion main effect, nor the Encoding Suppression x Test Occasion interaction effect reached significance.

Julie Hau (5)
Faculty Adviser/Collaborator: Blaine Peden
Title of Research Project: Undergraduate Females' Preferences for Feminist, Humanist, and Sexist Counselors by Academic, Vocational and Personal Issues
This study investigated the preferences of college females for feminist, humanist and sexist counselors for academic, personal, and vocational concerns. It also analyzed the emotional meaning of each counselor using a semantic differential scale for Evaluation, Potency, Activity, and Sex role. A series of vignettes for each counselor and concern followed by a Likert scale assessed women's preferences for counselor by concern. The results exemplified significant main effects for preference of feminist and humanist counselors over sexist counselors. The results also indicated a main effect of type of concern. The interaction effects between the counselors and concerns also merited significance. For the areas of emotional meaning, the results represented significant main effects for counselor, and Semantic Differential. They also reflected a significant interaction between
counselor and semantic. These finding indicate the importance of counseling research and support a preference for non sexist methods of counseling for women's issues.

Kimberly K. Larson, Kriston A. Hines and Tammy J. Fisher (6)
Faculty Adviser/Collaborator: Ananta M. Dasgupta
Title of Research Project: Effects of Post-Hypnotic Suggestion Academic Incentives and Compliance to Authority on Students' Efforts to Remember

Fifty volunteer participants were exposed to three experimental conditions. One group was given post-hypnotic suggestions urging them to remember certain types of material to be presented later. The second group was offered academic incentives through some extra-credit bonus points. The third group was given no suggestions or incentives, but were simply told to remember the materials for experimental purposes. Three types of materials used were: reading an article, watching a video tape, and listening to an audio tape. Results indicated that compliance to authority, either a hypnotist or a teacher, does not supersede the students' own spontaneous efforts to remember whenever the material is not of any special interest or significance to the students own needs or desire. Nevertheless, audio materials were found to be harder to remember than multi modal materials such as reading or audio-visual materials. Confabulations and distorted information were found to be randomly present in all types of reconstructed memory when recall rather than recognition types of testing techniques were used and coercive methods were not applied.

Veronica Runnheim (97)
Faculty Adviser/Collaborator: William Frankenberger
Title of Research Project: Medication and Children With Emotional/Behavioral Disorders: A Current Affair

This presentation will consider the results of a survey of K-12 teachers of students with emotional disabilities in Wisconsin. The survey a) identifies the number and percentage of children in ED classrooms who are receiving stimulant medication, b) identifies the dosage levels of stimulant medications, c) assesses the attitudes of teachers with respect to the use and efficacy of stimulant medications, and d) discusses the implications.

Callie Stolz (8)
Faculty Adviser/Collaborator: Robert Tomlinson
Title of Research Project: Similarities and Differences Between Male and Female Dream Content: A Social/Developmental Perspective

Twenty males and twenty females from the University of Wisconsin-Eau Claire voluntarily participated in this study which compared dream content between genders. Each participant maintained a dream journal for one week, and filled out a dream content survey. Significant differences between males and females were found in dream content areas of family, eating, and pursuing. Shifts toward similarity of dream content were evidenced in the areas of losing a loved one, being trapped, falling, sexual activity, and studying for tests. The results were interpreted in terms of differential social expectations for males and females as they develop.

Social Work

Leanne I. Esch and Jean Rivard (60)
Faculty Adviser/Collaborator: Rupa Gupta
Title of Research Project: Building Bridges: Capturing the Dream for Hmong Youth

The proposed study seeks to evaluate the Building Bridges Mentoring Program for Hmong Youth. This program is designed to match individual university students to Hmong adolescents in the middle school and their family in a help-providing mentoring
relationship. The study will evaluate whether the intervention on the part of the university students was effective through pre-post instruments administered to the children and their parents.

**Jeff Goldsmith (58)**
Faculty Adviser/Collaborator: Susan Michaud and Mary-Ann Sontag
Title of Research Project: The UWEC Pet Therapy Program

This project developed and implemented a pet therapy program in the Eau Claire area, and is studying the impact of the program. Dog owners were assisted in the process of having their dogs certified as Therapy Dogs and then the UWEC Pet Therapy Program provided the coordination of visits by the dogs to area nursing homes. The research component of the project is focused on exploring factors that influence the decision to volunteer in the program, and examining perceptions of the volunteers about interactions between nursing home residents and the dogs.

**Peggy A. Peelman and Jessica Werth (59)**
Faculty Adviser/Collaborator: Mary-Ann Sontag
Title of Research Project: Hospice Care in England and Scotland: An Exploration

This poster will describe the methods and findings of the UW-EC Hospice Research Project in the United Kingdom. Data about hospice services were collected through telephone interviews with hospice directors. These data were then compared to data collected from a similar study of hospices in the United States. Although the hospice movement in the three countries share common roots, this research project was able to identify how hospices in the United States, Scotland, and England are both different and similar.

**Sociology and Anthropology**

**Rochelle Frounfelker (2)**
Faculty Adviser/Collaborator: Melissa Pflug
Title of Research Project: Native American Prophetic Movements as Ritual Rites-of-Passage: The Case of Handsome Lake

This paper examines the Seneca's socio-religious movement in the early 1800s. The movement spawned by the prophet, Handsome Lake, enhanced tribal unity to counter pressures associated with increasing numbers of Europeans. Understood as a ritual rite-of-passage, we can conceptualize Handsome Lake's movement as achieving "communitas," or breaking down traditional societal structure and subsequently creating greater tribal solidarity. Similar to the stages found in the classical analysis of ritual process, Handsome Lake's movement becomes cyclical in structure: it begins with tribal disunity in the face of negative extrinsic forces; culminates in internal tribal unity achieved through communitas; and, results in the successful reentrance into interaction with external forces with a renewed sense of personal and tribal self. Examining Handsome Lake's movement as a ritual rite-of-passage increases our understanding of both this particular process of social transformation, and socio-religious movements generally.

**Kim DePrenger (94)**
Faculty Adviser/Collaborator: Helaine Minkus
Title of Research Project: Multicultural Holiday Teaching Kits

I am creating two teaching kits to be titled New Year Celebrations and Celebrations of light. Each kit will have items and curriculum pertaining to the holidays included in it. Inside the kits will be the following materials: Background information about the culture and holiday; authentic materials such as art objects or items used in the celebration (such as a menorah for Chanukah); age appropriate,
authentic books; information about biases or stereotypes that may surround the culture or religion; evaluation forms for teachers and children. The purpose of the kits is to provide teachers with authentic materials so they can teach about (not celebrate) holidays of several cultures or religions.

Heidie Magritz (1)
Faculty Adviser/Collaborator: Melissa Pflug
Title of Research Project: Navajo Mnemonics: the Role of Memory in Oral Mythic Traditions

This paper examines the unique interplay between memory processes and oral culture, particularly as mythic traditions are retained by such mnemonics as songs and chants. One area of memory for which little is known is the effects oral culture has on memory and the retention and transmission of knowledge. Virtually nothing is known of the ways in which mythic traditions are retained and transmitted within an oral culture. The Navajo are highlighted as an example of the unique role symbolism, allegory, and metaphor play in preserving and maintaining cultural tradition. Light can be shed on memory within an oral culture through the study of specific memory processes and mnemonic devices that shape and inform Navajo mythic tradition.

Womens Studies

Christine R. Lepak (83)
Faculty Adviser/Collaborator: Sarah Harder
Title of Research Project: Chippewa Valley Post-Secondary Resource Handbook for Student-Parents

The product of the research collaboration between Sarah Harder (Chair of the Women's Studies Department) and Christine Lepak (a senior Sociology major, Women's Studies minor) is the "Chippewa Valley Post-Secondary Resource Manual for Student-Parents". It was the main purpose in creating this manual to help eliminate the barriers to post-secondary education for individuals with family responsibilities. The content of the manual consists of community resources that will assist the individual in this transition, and will be applicable to the Chippewa Valley Technical College, the University of Wisconsin-Eau Claire, and the University of Wisconsin-Stout. This manual will be a valuable resource for UWEC's newly funded Educational Opportunity Centers, student-parent support groups and various other institutions and community agencies. This research collaboration is also connected to a statewide initiative "Women and Poverty," in which UWEC plays a pivotal role in supporting post-secondary access for low-income women.

middle school students with learning disabilities. An analysis of audio tapes of 6th, 7th, 8th, and 9th grade students with and without learning disabilities suggested that students with learning disabilities continue to experience a delay in phonemic awareness skills compared to their average peers.
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<tr>
<th>Student Name</th>
<th>Page</th>
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<tbody>
<tr>
<td>Alt, Pam</td>
<td>29</td>
<td>Hafdahl, Adam</td>
<td>32</td>
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<td>15, 29</td>
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<td>32, 33</td>
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<td>Kelner, Dan</td>
<td>5, 18</td>
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<td>21</td>
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<td>1, 28</td>
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<td>DePrenger, Kim</td>
<td>34</td>
<td>Larson, Kimberly</td>
<td>32, 33</td>
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<td>27, 28</td>
<td>Windschitl, Susan</td>
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<td>20, 24</td>
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<td>34</td>
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<td>16</td>
<td>Moch, Susan Diemert</td>
<td>15, 16</td>
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<td>26</td>
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<td>Ochrymowycz, Leo</td>
<td>8, 9</td>
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<td>3, 4, 5, 6</td>
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<td>34, 35</td>
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