

PROGRAM

- 2:00 Poster Session (list of posters on the following page)
- 2:45 Dr. F. Daniel Larkin, Provost
- 3:00 *Assembling and Calibrating a Vibrating Sample Magnetometer (VSM)*
Student: Joshua Vanderpool, Chung Wong | Faculty: Sunil Labroo
- 3:10 *The Challenges of the Funeral System In A Pluralistic American Society*
Student: Robert E. Jenkins | Faculty: Ho Hon Leung
- 3:20 *Establishment and Use of a High-Velocity Flume System for Hydrodynamic and Ecological Research*
Student: Mark J. Glantz, Colleen Wells | Faculty: Thomas Horvath, Kathryn C. Kilroy
- 3:30 *Surface Measurements of Retained Water Equivalence on the Taku Glacier, Juneau Icefield, AK.*
Student: Evan Mankoff | Faculty: Dr. P. Jay Fleisher
- 3:40 Break\Poster Session (list of posters on the following page)
- 4:20 *The Relationship of Unexpected Stumbles to Endogenous and Exogenous Factors*
Student: David Lytz, Rebecca Starr, Tina Wheeler, Tremaine Harris, Denora Williams, Madeline Belfi | Faculty: Lawrence Guzy
- 4:30 *Identification, Correlation and Origin of Event and Taphonomic Marker Beds in the Helderberg Group: Part I – the Dayville Member*
Student: Timothy Brisley, Nicole Salengo | Faculty: James R. Ebert
- 4:40 *Comparison of the Clearance Rates of Extracellular Bacteria from the Bloodstream of Mice*
Student: Heather Salvaggio | Faculty: Vicky Lentz
- 4:50 *Determination of Drugs of Abuse in Human Urine by Solid Phase Microextraction-Gas Chromatography (SPME-GC)*
Student: Lucille Johnson, Stacey Mooney | Faculty: John C. Schaumlöffel
- 5:00 Dr. Alan B. Donovan, President
- 5:10 Guest Presentation: Terri (Roach) Hay
- 5:40 Poster Session (list of posters on the following page)

POSTER SESSIONS

Spring 2001 Grant Recipients

Identification, Correlation and Origin of Event and Taphonomic Marker Beds in the Helderberg Group: Part II – the Kalkberg Formation

Student: Timothy Stewart, Beth Ann Fitch | Faculty: James R. Ebert

The Carlisle Center Formation: A New Look

Student: Michael Senglaub | Faculty: James R. Ebert

Holocene Stratigraphy and outburst Deposits, Eastern Sector, Bering Glacier Foreland, Alaska

Student: Jeremy Wyckoff, Fred Krone | Faculty: P. Jay Fleisher

Evaluation of Present and Past Flow Conditions in Limestone Caves of East-central New York State

Student: Monica Roth, Daniel Logue | Faculty: Arthur Palmer

Fall 2001 Grant Recipients

From Public Houses to Neighborhood Saloons: The Transformation of New York City's Taverns, 1790-1830

Student: Kurt M. Wunderlich | Faculty: Thomas D. Beal

Environments of Deposition as Interpreted from Quartz Grain Microtextures from Rhythmically Bedded Sand Units Bering Glacier, Alaska

Student: Brendan Kober | Faculty: P. Jay Fleisher

The Magnus Force

Student: Ji Yin Yang, Cheng Yang | Faculty: Paul French

Interpretation of Ground-Based Magnetic Signatures During Auroral Substorms

Student: Nathaniel Charles Berliner | Faculty: Hugh A. Gallagher Jr

Relationship Between Sediment Phase Lead and Arsenic Speciation and Accumulation in Chironomids

Student: Colleen McPike, Theresa Smigelski | Faculty: John C. Schaumlöffel

Contributed Papers

Autonomous Creatures

Student: Jonathan Weinell | Faculty: Donald Allison

Metastasis of Breast Cancer Neoplasms to Secondary Brain Tumors

Student: Elizabeth K. Moore | Faculty: Nancy Bachman

Acid Rain: A Comparison of Nutrient Deficiency and the Presence of Aluminum in Plants. Is What They Say True?

Student: Phillip Schaver and Colleen Wells | Faculty: Paul Bischoff

CHILI

Student: Hera Gnanadorai | Faculty: Annacleta Chiweshe

Comparison of Video and Standard Optokinetic Drum: Anxiety Sensitivity and Motion Sickness Susceptibility

Student: Jaime M. Prianti, Christine M. Lennon | Faculty: Peter Dinardo

Holocene Stratigraphy and Evidence of Transgression in The Ten Thousand Islands, Southwest Florida

Student: Monica Roth | Faculty: James Ebert

Practical Demonstrations of Light and Color

Students: Karen Norton and Colleen Wells | Faculty: Paul French

Java Rampart

Student: Ben Andersen | Faculty: Dennis Higgins

First Memories of Life: Faces, Objects and Events

Students: Buran Doyon and Jared Williams | Faculty: Mary B. Howe

Where the Water is Fast, the Competitors Won't Last: A Field Study on Blephariceridae

Student: Corey Shafer | Faculty: Thomas Horvath

Operating Systems and Networking Sampler Internet

Student: Tim R. Brown | Faculty: Jim Ryder

A Deer Survey of New Island, Oneonta NY

Student: Thomas Gillen | Faculty: Donna Vogler

Abstracts

(Abstracts appear in alphabetical order by faculty advisor.)

Autonomous Creatures

Student: **Jonathan Weinell**

Faculty: **Donald Allison**

I chose artificial intelligence, behavior controls, and 3 Dimensional computer graphics as the problem I wished to research. I have a personal interest in this topic, and I am also aware that it is an area of intense research today. After reading

through an article from a Siggraph conference and basing my problem on that, I decided to program a solution to the behavior of 3 dimensional fish swimming in a tank with stationary, as well moving, obstacles; the graphical representation of the environment; and also being able to allow the user unrestricted camera motion in this virtual world. To this end, I relied heavily on the “Red Book”, or the main instruction resource for programming in OpenGL in Visual C++ Professional Edition for Windows.

Starting with simple spheres marking the origin of the 3-D “Universe”, I needed to allow the user to be able to move the camera. The user, using predefined key commands, can move the camera straight up and down the global y-axis, as well as along the local x- and z-axes (left/right and backward/forward respectively.) Also, I have allowed the user to rotate the camera around the x- and y-axes (left/right, up/down respectively.) This gives the user complete control over the direction in which the camera is facing, as well as freedom to move about the 3-D world.

For the environment, I used simple OpenGL commands to create the many obstacles in the world, starting with the stationary spheres that the fish would need to avoid. These were placed at random locations throughout the tank, primarily near the center of the tank. Following these spheres, nine revolving spheres were added. Initially, these spheres were simply a test to see how well I could program motion. This “test” became advantageous later as the revolving spheres become more obstacles for the fish to avoid.

For the artificial intelligence of the fish (object avoidance and schooling) I used a “mass spring” system. With this system, whenever a fish either came too close to an object (obstacle or fish) or moved too far away from the center of the tank or from a fish with which it had previously schooled, a “spring” would act upon the fish. Using the basic equation for spring forces ($F = Kx$), I was able to calculate the force exerted on each fish by other fishes and objects. In this way, the fish were able to be “attracted” to one another, as well as the center of the tank, or “repelled” from the various obstacles or any other fish that came too close. As a result, I was able to achieve a fairly intelligent school of up to 12 fish that would avoid obstacles, remain inside the fish tank, and school with the other fish in the tank.

Metastasis of Breast Cancer Neoplasms to Secondary Brain Tumors

Student: **Elizabeth K. Moore**

Faculty: **Nancy Bachman**

Cancers develop initially at a primary site and often spread to other areas of the body through the process of metastasis. Metastasis is the escape of cancer cells from a primary site of growth, and the migration of these cells to a secondary location. The spread of the cancer is often

through the circulatory system or the lymphatic system. Breast cancer is the one of the most common cancers that affects women and it is the second most common type of primary tumor that leads to brain metastasis. Central nervous system metastasis occurs in thirty percent of patients with breast cancer. The secondary brain tumors from metastatic breast cancer are inevitably fatal. Although patients with brain metastasis from other primary site tumors usually die from systemic disease, about half of the patients with brain metastasis from breast cancer die of their neurological disease. Breast cancer patients who die with brain metastases have a cancer history that is an average of six months shorter than patients who die without brain metastases. This project analyzes the basis for breast cancer metastasis to the brain. Diagnostic and treatment strategies for secondary brain tumors are also discussed.

From Public Houses to Neighborhood Saloons: The Transformation of New York City's Taverns, 1790-1830

Student: **Kurt M. Wunderlich**

Faculty: **Thomas D. Beal**

The project “From Public Houses to Neighborhood Saloons: The Transformation of New York City’s Taverns, 1790-1830,” explores the history of the tavern. In the colonial period the tavern was an important public institution. For example, courts and elections were

often held in taverns. However, by 1830 residents equated taverns with crime and vice. My research took me to two of New York City’s most important research libraries: Municipal Archives of the City of New York and New-York Historical Society. At the Municipal Archives, I reviewed the papers of the New York City Common Council 1790-1830. I discovered many complaints about and arguments against taverns presented by residents of New York City. These documents helped me understand why taverns came under attack in this period. Instead of being public institutions, by 1830 they had emerged as centers of vice and debauchery. Also, I spent several days in the library of the New-York Historical Society. Here I reviewed complaints against taverns, found dozens of tavern licenses, and compiled a list of tavern-keepers in 1808. I used this list to map the location of each tavern and determine who was a tavern-keeper. For example, I now know that there were a number of women tavern keepers and have a general idea of the ethnicity of each tavern-keeper. This primary research along with my reading of a number of secondary works led me to a better understanding of how, in the mind of many New Yorkers, the tavern went from a culturally significant public institution to a neighborhood hangout.

Acid Rain: A Comparison of Nutrient Deficiency and the Presence of Aluminum in Plants. Is What They Say True?

Student: **Phillip Schaver and Colleen Wells**
Faculty: **Paul Bischoff**

This laboratory study modeling acid rain conditions explores the effects of aluminum ion uptake in corn plants. There have been many studies based on the importance of nutrients in plant growth and health and some specifically addressing aluminum uptake. Acid rain is

the factor which we decided to test in our own lab to see for ourselves if our observations would be consistent. We examined root length, plant height, plant appearance, and the pH factor in each treatment. Our study will show that the presence of aluminum ions in plant medium significantly effect both the growth and health of corn plants.

CHILI

Student: **Hera Gnanadorai**
Faculty: **Annacleta Chiweshe**

My designs are based on an ongoing project of developing designs based on one's culture - my culture being Indian. My inspiration is from various sources of the culture, such as the people, the cultural costume, colors, way of life and art. This

year my source of inspiration is the sari and batik like patterns. The pieces of the sari consist of the choli, skirt and the sari drape. The choli is made from dupion silk, decorated with simple embroidery, and mirror work in which I substituted sequin-like material for real mirrors.

The skirt is made of an interesting polyester/spandex mix, where I have used hand painted patterns inspired by batik designs. The sari drape is organza, which will be delicately draped and beaded to soften the whole look. Each piece of the whole design is different and has it's own character but at the same time linked with a similar element such as color and handwork. My piece is called Chili because the colors are similar to that of a chili pepper. The red choli definitely looks spicier than the green sari drape and skirt.

Comparison of Video and Standard Optokinetic Drum: Anxiety Sensitivity and Motion Sickness Susceptibility

Student: **Jaime M. Prianti, Christine M. Lennon**
Faculty: **Peter DiNardo**

The optokinetic drum (OKD) is a standard, fixed location apparatus for inducing motion sickness. To determine if a video method of presenting the drum (VOKD) could be used as an alternative to the standard procedure, we compared the two procedures on: a) proportion of subjects who could tolerate the entire duration of the procedure) level of motion

sickness symptoms induced c) relationship to individual difference measure of motion sickness susceptibility and anxiety sensitivity. The VOKD and the OKD procedures were similar in proportion of subject's being unable to tolerate the entire duration, and levels of motion sickness symptoms induced. The pattern of correlations among our individual difference measures and responses to the two procedures were similar for OKD and VOKD, suggesting that the procedures are related to the same general construct. The VOKD can be used as an easier, and more mobile alternative to the OKD.

Identification, Correlation and Origin of Event and Taphonomic Marker Beds in the Helderberg Group: Part I – the Dayville Member

Student: **Timothy Brisley, Nicole Salengo**
Faculty: **James R. Ebert**

Event and taphonomic marker beds are layers with distinctive sedimentologic features or unique preservation of fossils that enable geologists to use these layers as key horizons for correlation among outcrops. Two intervals within the Helderberg Group (Upper Silurian -

Lower Devonian) were investigated to identify potential marker beds, test correlations with these beds and to examine the origins of the markers. This study was undertaken to understand better the three-dimensional relationships among the rock bodies that comprise the Helderberg limestones.

Several references from the early part of the twentieth century mention remarkable preservation of crinoids and other fossils from the “transition beds” between the Manlius and Coeymans formations. These classic fossil beds were rediscovered in the vicinity of Schoharie, NY. Although diagnostic calices of *Melocrinus pachydactylus* were not found, well preserved lengths of stem (up to nearly 0.5 m) were discovered in the “transition beds.” The excellent preservation of these stems and associated trilobite pygidia resulted from obrution processes. Sedimentologic features in these beds are diagnostic of storm processes which produced rapid burial of the fauna. These features, combined with the stratigraphic position of the “transition beds” confirm correlation of this interval with the Dayville Member of the Coeymans Formation from west-central New York.

Identification, Correlation and Origin of Event and Taphonomic Marker Beds in the Helderberg Group: Part II – the Kalkberg Formation

Student: **Timothy Stewart, Beth Ann Fitch,**
Faculty: **James R. Ebert**

Event and taphonomic marker beds are layers with distinctive sedimentologic features or unique preservation of fossils that enable geologists to use these layers as key horizons for correlation among outcrops. Two intervals within the Helderberg Group (Upper Silurian -

Lower Devonian) were investigated to identify potential marker beds, test correlations with these beds and to examine the origins of the markers. This study was undertaken to understand better the three-dimensional relationships among the rock bodies that comprise the Helderberg limestones.

The Kalkberg Formation is well exposed along Rickard Hill Road in Schoharie, New York. Bed by bed study of this outcrop revealed several markers suitable for detailed correlations.

The most obvious marker is a distinct change which divides the Kalkberg Formation into two subunits. Interbedded decimeter-scale beds of limestone and shale comprise the lower Kalkberg. The upper unit begins at 4.4 m and is similar, but the shale interbeds are considerably thinner.

Additional potential markers include a) a coarse, skeletal-rich bed at 2.19 m, b) a zone of abundant platyceratid gastropods near the 8 m mark, c) a pyritic bed at 8.8 m and d) a pair of shaly beds near the 9.5 m mark.

Preliminary observations of the Kalkberg at Cherry Valley suggest that some of the potential markers identified at Schoharie may be traceable, but detailed correlations were not attempted.

Holocene Stratigraphy and Evidence of Transgression in The Ten Thousand Islands, Southwest Florida

Student: **Monica Roth**
Faculty: **James Ebert**

Sediment cores from the Blackwater River area of the Rookery Bay National Estuarine Research Reserve document the Holocene transgression in a variety of environments. Four cores were retrieved from a 5 km transect, which included the Blackwater River channel, bay environments, the barrier island region and the margin of the Gulf of Mexico. Sedimentologic characteristics in each core provide a record of changing environments linked to the post-Pleistocene rise in sea level.

Cores were split and described in detail. A series of samples from each core were analyzed for carbonate, organic matter and siliciclastic content. In general, carbonate content increased upward within each core. Mud was generally present in small quantities, with the exception of two samples. Organic matter was sparse except in peaty sands. Quartz sand, very fine through medium grained, was the dominant constituent in nearly all samples. However, the two cores furthest offshore show a decrease in sand content in the younger sediments.

Surface sediments in each core naturally reflect present environments. In three cores, modern sediments are fine to very fine quartz sands. The fourth comprises a sandy, oyster boundstone. Older Holocene sediments in the Blackwater area cores include red mangrove peats, quartz arenites and oyster boundstones. Two cores penetrated the Holocene-Pleistocene, which is marked by Holocene sediments underlain by Pleistocene quartz arenite (Parkinson 1987). In all cores, the Holocene transgression is most clearly recorded by an upward increase in carbonate content, which is attributable to increased carbonate production with increased marine circulation in all estuarine environments.

The Carlisle Center Formation: A New Look

Student: **Michael Senglaub**
Faculty: **James R. Ebert**

The Carlisle Center Formation in the Tristates Group is famous for the abundance of *Zoophycos* burrows which pervade the entire unit. It has long been regarded as barren of body fossils. Discovery of fossil fragments prompted a restudy of the paleontology of this formation. The study was conducted at the excellent exposure on U.S. 20 near Cherry Valley, NY.

During the study, several macrofossils were found. The most significant find was a cluster of three conulariids, preserved in three dimensions, in a bed that lacks *Zoophycos*. These enigmatic, pyramid-shaped fossils are poorly understood taxonomically and paleoecologically.

Samples of the Carlisle Center were also processed to search for microfossils. Many conodonts (phosphatic teeth from small, eel-like vertebrates) were found throughout the unit. They are rather poorly preserved, which may be an artifact of the hydrofluoric acid technique used to disaggregate the rock. Despite their poor condition, the conodonts have been preliminarily identified as *Icriodus curvicauda* or *I. celtibericus* by José Valenzuela-Ríos (University of Valencia, Spain). Both species are index fossils for the Pragian to early Emsian stages of the lower Devonian Period. In addition to the conodonts, one possible scolecodont (worm jaw element) was found.

These preliminary findings indicate that a somewhat diverse macro- and microfauna is preserved in the Carlisle Center Formation. Further study is recommended to document additional fauna that may be present.

Environments of Deposition as Interpreted From Quartz Grain Microtextures From Rhythmically Bedded Sand Units Bering Glacier, Alaska

Student: **Brendan Kober**

Faculty: **P. Jay Fleisher**

The purpose of this study is to compare surface textures of quartz sand grains from three sand units in the foreland of Bering glacier, south central Alaska. The Tsivat sand plain is composed of subglacial sands lying in contact with the eastern terminus of the Bering piedmont lobe. The Footrack member unit crops out as 30

m of rhythmically bedded sand just south of the Tsivat sand plain. These sands have been radiocarbon dated to 1,000-1,600 years BP. About 15 km southeast of the Footrack site is a modern coastal bluff also of rhythmite sand. Scanning electron Microscope images of these sands were studied to determine transport agent and depositional history. More than 150 images of approximately 90 quartz grains from representative stratigraphic intervals were studied. Each grain was magnified and imaged between 150 and 2000 times, viewed and analyzed for surface microfeatures, roundness and sphericity.

The results show that, in addition to comparable mineral composition, the Footrack, Tidal and Tsivat sands show strikingly similar microfeatures and grain shape. The majority of grains in all samples have highly etched (chemically weathered) surfaces that have been almost completely effaced by concoidal fracture and other features indicative of glacial transport. A few grains from all samples show evidence of fluvial transport superimposed on glacially produced features. Some Footrack and Tidal grains also exhibit features eolian transport features. Although these features are not abundant, they appear frequently enough and in the proper assemblages, to indicate very brief fluvial and or eolian transport. Many concoidal fractures are chemically etched (secondary etching). The greater abundance of secondary etching of Footrack sand is evidence of post-depositional weathering. Furthermore, there is additional evidence of chemical weathering in the form of solution lines, a feature not previously reported in the literature. They have been interpreted as preferential chemical weathering along secondary concoidal fracture.

Our analysis suggests that sand within the Footrack member and Tidal bluff originated from glacially transported sediment that was reworked by glacio-fluvial processes, similar to sand of the Tsivat plain. Final transportation and deposition by eolian processes, probably within a coastal environment, are consistent with microfeatures and rhythmic bedding.

Holocene Stratigraphy and Outburst Deposits, Eastern Sector, Bering Glacier Foreland, Alaska

Student: **Jeremy Wyckoff, Fred Krone**

Faculty: **P. Jay Fleisher, J. R. Albanese**

Collaborator: P. K. Bailey

Bering Glacier, Alaska, fronts on a 30 km foreland of lakes and islands. The stratigraphic record exposed in bluffs on Weeping Peat Island (1 km²) is characterized by units depicting Late Holocene events. A surface till (1 - 5 m) mantles most of the island and covers a

diamicton up to 4 m thick, below which is a 15 m sequence of well stratified outwash sand and

gravel. Spatial distribution and prevailing occurrence of coarse gravel indicate proximal accumulation. Contacts within the outwash are generally distinct, although subtle unconformable relationships may be obscured by normal cut-and-fill structures. Up to four, well sorted, flood sand sheets may be found below the diamicton within the outwash. Each contains basal organic horizons in which small trees are rooted. Buried in the growth position by sand, these trees have been bent and sheared in a manner suggestive of deformation by overriding ice. The till above is thought to have been deposited during the 1965-67 surge, which may have also deformed the substrate, thus generating the diamicton and distorting the trees.

Subglacial outbursts at the close of the 1993-95 surge significantly altered the surface of Weeping Peat Island and portions of adjacent lake basins, initially by erosion followed by sandar formation. Data from small-scale sandar landforms and outburst gravel are used to estimate lower-limit paleo-discharge (~1,300 m³) across Splitlake Sandur on Weeping Peat Island and in the formation of Icewall Sandur in the adjacent Tsivat Lake basin.

*Surface Measurements of Retained Water
Equivalence on the Taku Glacier, Juneau Icefield,
AK.*

Student: **Evan Mankoff**

Faculty: **Dr. P. Jay Fleisher**

Collaborators: Maynard M. Miller, Ann C. Malm

As the largest, maritime, temperate glacier fed by the Juneau Icefield, the Taku Glacier has been the subject of mass balance studies for decades.

Past measurements have typically yielded positive overall volume gains, which is consistent with a general regime of advancement. Since 1890, the termini

of the Taku, and the Hole-in-the-Wall Glacier fed from the Taku trunk, have advanced 7 km and 3.2 km, respectively.

During July/August, 2001, nine test pits, extending from 4.7-8.0 m in depth, were dug above the ELA through a range of elevations from 940-1760 m on the main Taku trunk and several tributaries. Each pit was sampled for density through a vertical column of 2000-2001 snow/ice, and the presence of ice structures was noted.

Field data were grouped according to pit elevation. Through this method five elevation ranges were established, each encompassing 250 m increments from 750-2000 m of surficial elevation range. Ablation occurring after field data were obtained, and prior to the seasons first snowfall is not factored into the following calculations. The lowest elevation range, 750-1000 m, had a retained water equivalent of 99.60m³. Subsequent ranges, 1000-1250 m, 1250-1500 m, 1500-1750 m, and 1750-2000 m had values of 505.18 m³, 1434.66 m³, 569.78 m³, and 212.99 m³ respectively.

Surface measurements show that 2822.22 m³ of water equivalence was retained over an area of 712 km² above the ELA, thus contributing to the long-term positive budget. The termini of the Taku and the Hole-in-the-Wall Glaciers continue to advance, while adjacent glaciers retreat is probably the result of such a large accumulation area above the ELA.

Practical Demonstrations of Light and Color

Students: **Karen Norton and Colleen Wells**
Faculty: **Paul French**

The Society of Physics Students has provided SUCO with their *Rainbow Room* outreach catalyst kit. It includes equipment and lesson ideas for use in an outreach effort toward children that facilitates a hands-on learning about light. After researching the basic properties of light, designing experiments and presentation media, and writing a lesson plan, we brought our program to local elementary school children. Our poster would display several of the experiments used to familiarize the children with reflection and refraction of light, and polarization and dispersion of light to produce colors.

The Magnus Force

Student: **Ji Yin Yang, Cheng Yang**
Faculty: **Paul French**

The Magnus force (due to spin on a ball in projectile motion) was found using digital video analysis. Theoretically, due to different air pressure on either side of a spinning ball, when the ball is in backspin or topspin motion, there will be a lower pressure and high pressure on opposite sides. Building on the previous work of SUNY Oneonta students, a camcorder was used to record a uniform spherical ball in projectile motion. *Videopoint Capture*, *Videopoint*, and *MS Excel* were used to digitize and analyze the motion. As in the previous work, the net force on the ball was comprised of three individual components: gravity (downward), the air resistance force (opposite to velocity), and the Magnus force (perpendicular to velocity and angular velocity). The new lighting system and more comprehensive data were used to verify the basic linear relationship between the Magnus force and the cross product of angular velocity and velocity for three different spherical balls. Also, the air resistance force values were confirmed using a different method. As in the previous work, the air resistance and Magnus forces were found to be comparable in magnitude.

Interpretation of Ground-Based Magnetic Signatures During Auroral Substorms

Student: **Nathaniel Charles Berliner**
Faculty: **Hugh A. Gallagher Jr**

A model consisting of longitudinal line currents flowing in the upper atmosphere is used to interpret observations made by ground-based magnetometer networks. The magnetic field associated with the model currents is compared to the observations to determine the optimal latitude, altitude and intensity of the currents. We have found that line currents at altitudes between 200 and 400 km provide a good representation of the magnetic observations. However, the current flow in the ionosphere occurs between 100 and 120 km altitude. Thus, we calculate the magnetic field produced at 110 km by the model currents and through the application of Ampere's Law determine the distribution of the current at this altitude. These currents are often associated with aurora (Northern Lights) and thus we examine temporal changes in the current systems in the context of salient features of auroral emissions observed by NASA's Polar satellite.

The Relationship of Unexpected Stumbles to Endogenous and Exogenous Factors

Student: **Tremaine Harris, Rebecca Starr, Denora Williams, Tina Wheeler, Madeline Belfi, Dave Lytz**
Faculty: **Lawrence Guzy**

Purpose: While walking on a flat surface with shoes in good repair, people have been observed to stumble for no apparent reason. This occurs as the foot that is sweeping forward makes unexpected contact with the floor prior to the anticipated point of contact. Unexpected stumbles are a serious health hazard. We believe that these unexpected stumbles are

not random events, but internal factors based on the unique way stumblers interpret their environment. Participants were presented with three different tasks. The first dealt with identifying the upright when a frame is rolled clockwise or counterclockwise. The second dealt with setting a rod to the upright when the frame is pitched forward, with the top closer to the participant and backwards, with the top further away. The third task was a combination of the two, i.e., setting a rod to the upright from an off-axis pitch- roll orientation. **Method:** From a previous study, we recruited 20 participants identified as High Stumblers (6 or more stumbles/4 wk) and Low Stumblers (one or less stumbles/ 4 wks). Each participant set an illuminated rod to the upright from either a pitched, rolled, and a combination of a pitched/rolled orientation. Surrounding the rod was an illuminated frame that was pitched, rolled, and a combination of pitched-rolled orientations, respectively. The frame was set to three different orientations. **Results:** Presently, data are being collected. **Implications:** We believe that people don't become fallers as they age, but we may be stumbling throughout their lives until they lose the agility to catch themselves.

Java Rapart

Student: **Ben Andersen**
Faculty: **Dennis Higgins**

This is a two-player game inspired by the classic arcade game, Rampart, from Midway Entertainment. It involves two players, each controlling an expanding nation on one side of the river. The objective of the game is to build cannons

and to keep the enemy nation from expanding by building walls around neighboring fortresses. Practically, the game involves four 'stages' of play, each requiring different strategies to culminate in victory. The winner is determined if a player no longer controls a castle or any forts, or after five rounds. If the former, the player maintaining control over at least one fort or castle is the winner. If the latter, the player with the most points is the winner.

This program involves a socket connection to two different host computers. A connection to the Internet or a LAN is required for play. As a game based on quickly moving pictures, a faster processor helps tremendously for smoother animation and faster frame rate.

Further instructions are available within the JAR file in a rules document. This document explains the controls, objectives, and explicitly defines and describes each stage of the game.

Establishment and Use of a High-Velocity Flume System for Hydrodynamic and Ecological Research

Student: **Mark J. Glantz, Colleen Wells**
Faculty: **Thomas Horvath, Kathryn C. Kilroy**

Insect larvae living in waterways get most of their nutrition from algae that grow on rocks and on other substrates on the streambed. The velocity of the stream is believed to have a significant influence on insect grazing. By creating an artificial stream (flume) indoors, variables such as velocity can be controlled, and studies can

be conducted to better understand the insects' feeding habits. A wood frame was constructed to hold the flume in place and to allow for a pulley system used to adjust the angle of the flume, and in turn, the flow velocity.

A consistent flow was established after much trial & error. Flow in the flume is supercritical and therefore very shallow, approximately 2 mm deep. Accurate measurements of flow depth were difficult to make. Hence, velocity measurement methods dependant on flow depth, such as volumetric discharge and Mannings equation yielded poor results. Velocities measured by flotation (1 mm Styrofoam beads) and pitot tube yielded best results. Maximum flume velocities of 1m/s were measured when the flume was pitched at 12.5 degrees. A rating curve relating velocity and slope is being developed. Algae were collected on clay tiles incubated in local waterways. Mayfly larvae were taken from the same locations. Algae were introduced to the flume and studies are being conducted to examine the ability of the mayflies to graze upon algae under various flow conditions. Algal biomass (chlorophyll *a* concentration) and grazing behavior will be examined.

Where the Water is Fast, the Competitors Won't Last: A field Study on Blephariceridae

Student: **Corey Shafer**
Faculty: **Thomas Horvath**

Blephariceridae is the only eastern North American aquatic insect family to have true ventral suckers. These suckers allow blepharicerids to hold position in very fast flowing waters, such as in waterfalls and high-gradient streams, where competition with other invertebrates is minimal.

However, fast-flowing water may limit the available algae, which is the food source for blepharicerid larvae. We looked at the relationships among blepharicerids, other macroinvertebrates, algae concentration, and water velocity. We collected weekly samples from Wataugo Falls on Falls Creek (Delaware County, NY) from October to November 2001. Macroinvertebrates were counted directly by blindly dropping a small quadrat, algal biomass was estimated by measuring chlorophyll concentration, and velocity was measured relatively among sites via a simple Pitot tube. No statistically significant relationships were detected among any combination of variables (Spearman Rank Correlation; all combinations $p > 0.05$). Based on larval and pupal characteristics, species collected was *Blepharicera similans*. Insects pupated and emerged during the study, but larvae were always present. Blepharicerids occupied only fast flowing sections (although not all fast-flowing sections). Maximum blepharicerid density was 49 pupae/55 cm², 4 larvae/550 cm². Mean (\pm SE) chlorophyll *a* concentration was 2.03 \pm 0.03 mg/cm². Other invertebrates collected included physid snails, baetid mayflies, and limnephilid caddisflies. We conclude that current velocity likely affects blepharicerid distribution in Wautabe Falls, but more sampling is needed to discern relationships with algal biomass and other macroinvertebrates.

First Memories of Life: Faces, Objects and Events

Students: **Buran Doyon and Jared Williams**
Faculty: **Mary B. Howe**

Research involving first memories has traditionally involved memories of events. It may be that when experimental participants are asked to report a memory, they assume this means memory of an event. In the present study, a questionnaire was presented concerning earliest memories, but with instructions that the recalled memory could be of any kind: an object, face, song, scene, event etc. In contrast to earlier studies, memories were reported that included: events (64%), objects, such as a toy, (15%), a face (6%), scenes (5%) songs (3%), and some "other."

The variable most often cited as explaining why some infantile memories are retained for life is rehearsal (Nelson, 1995). In contrast, some researchers believe that emotion associated with the event is the critical factor (White & Pillemer, 1979).

If rehearsal/reactivation is the prime cause, then objects should be recalled more frequently than events. Objects are frequently reactivated across a period of years, implying many hundreds of reactivations. Events may be discussed or thought about, but presumably such rehearsal does not occur across hundreds of occasions (e.g. every day for three years).

Recall of episodes occurred significantly more often than recall of objects, as indicated by a chi square of 146, $p = <.001$. 72% of all memories were reported as having been characterized by emotion. This was also true of object memories (68%). These and additional data support the emotion hypothesis.

Assembling and Calibrating a Vibrating Sample Magnetometer (VSM)

Student: **Joshua Vanderpool, Chung Wong, Eric Holt**
Faculty: **Sunil Labroo**
Collaborator: Dale Zych

We report on the assembly and calibration of a vibrating sample magnetometer (VSM). This VSM uses a 1.0 Tesla electromagnet, a mechanism for sample vibration, and a signal detection system that utilizes a Stanford Research SR530 lock-in amplifier. Currently this VSM is configured for a variable temperature range from room temperature to about 900 K using a Lakeshore model 330 temperature controller. Data is acquired by a PC with an IEEE-488 interface. In this study we will present some preliminary data on standard magnetic samples and an estimate of the sensitivity of the VSM.

Comparison of the Clearance Rates of Extracellular Bacteria from the Bloodstream of Mice

Student: **Heather Salvaggio**

Faculty: **Vicky Lentz**

The goal of our research is to compare the clearance rates of four common opportunistic pathogens from the mammalian blood stream: *Staphylococcus aureus*, *Escherichia coli*, *Serratia marcescens*, and *Pseudomonas aeruginosa*. In past years, significant

attention has been given to the T-cell dependent responses to pathogens, however much less has been done to elucidate the specific effects of extracellular bacteria, particularly opportunistic pathogens, on the human body and the immune systems T-cell independent response. There is a considerably large amount of work to be done in illustrating the mechanisms of both virulence factors and the immune systems response for each bacterial species. Ultimately, clarifying the relationship between extracellular bacteria and the immune system, will help researchers develop vaccines and antimicrobial agents against opportunistic pathogens.

In our investigation we hope to aid in this clarification and to tackle these questions: How effective is the immune system in its removal of different species of bacteria? Which characteristics of these bacteria cause differences in effectiveness?

The first phase of our study involves the growth and dilution of each species of bacteria and the determination of the proper dosages of bacteria to be injected into mice. This involves both the generation of standard dilution curves using counting techniques and spectrophotometry, and an examination of the various dilutions on trial mice.

The second phase of our study involves injecting appropriate dosages of bacteria into the circulatory system of the mice, followed by the euthanasia of the mice at various time intervals so that samples of the spleen, liver, and blood can be collected and evaluated for clearance. Evaluation of these samples involves grinding, resuspending, and plating them on appropriate growth media. Final plate counts will be compared to the injected bacterial dilution to quantitatively determine clearance rates.

The Challenges of the Funeral System In A Pluralistic American Society

Student: **Robert E. Jenkins**
Faculty: **Ho Hon Leung**

The purpose of this study is to show how the funeral industry in America has gone from a personal based tradition to a professionally handled process. The methodologies used in this study are a literature review and semi-structured interviews. The literature review is used

to document the changes in the industry over the past one hundred and forty years, and the interviews are used to explore where the industry is at in the present time. Our findings suggest that the industry has made considerable change over the past one hundred and forty years and had changed the patterns on how people deal with the grieving process. The literature review covers topics such as the new ways of thinking towards the sciences and rationality along with a wide range of other topics to explaining changes in the funeral industry. Arguably all of these events and circumstances have been shown to have either a direct or indirect effect on the funeral industry over time. Some of the preliminary findings in the interview showed that the funeral director made the funeral as comforting and helpful to the family as possible. Our findings indicate that there is a higher amount of personalization in rural areas as opposed to what is suggested in the literature. Our discussion will focus on the possible reasons why a funeral home in a rural setting can be more personalized, even though professionalization of this industry tends to be very impersonal and alienating.

Evaluation of Present and Past Flow Conditions in Limestone Caves of East-central New York State

Student: **Monica Roth, Daniel Logue**
Faculty: **Arthur Palmer**

The goal of this project was to use field data from limestone caves in Schoharie and Albany Counties, New York, to determine the range of present and past groundwater flow conditions within the caves. Chemical measurements show that all cave waters during the study period (May-December, 2001) were

supersaturated with the local limestone bedrock, composed mainly of the mineral calcite. Thus, there is no cave enlargement for the duration of the dry season. All samples represent low-flow conditions. Earlier data show that enlargement takes place in caves during high flow, especially during floods.

Scallops are dish-shaped dissolutional features that develop in the bedrock surfaces of caves because of turbulent flow (Curl, 1974). They allow a determination to be made of past flow velocities when the water is undersaturated, because their lengths are inversely proportional to flow velocity. Scallop lengths were found to decrease with height above the cave floors, and thus during times of greater groundwater flow, the flow velocities are higher. Measurement of non-limestone rock carried into the caves in the past were used to obtain estimates of peak flow velocity that could be compared with the scallop data. These show velocities compatible with the scallop data. Since the scallops require fairly long-term stability of flow conditions, whereas the allogenic blocks could possibly show velocities of rare flood events, such as those during glacial melting, there is no indication that the caves experienced unusual flood conditions in the past that do not recur today.

The data obtained in this study also indicates the range of present-day flow through the caves and helps clarify rates of cave development throughout the region.

Operating Systems and Networking Sampler Internet

Student: **Tim R. Brown**

Faculty: **Jim Ryder**

College exposes computer science students to various computer ideas and concepts but often once has little chance to experiment with these ideas on a variety of operating systems and networking configurations. In many other courses, such as chemistry, students perform many

lab experiments to supplement ideas they are exposed to. In computer science, however, students are often not allowed complete access to computer systems on campus because many people, including non-computer science majors, intend the systems for general use. The systems must be secure and manageable in bulk. Therefore, very little experimentation is allowed. I decided, along with my advisor, to build an “Operating Systems and Networking Sampler Internet”.

This internet consists of a variety of differing operating systems and computer hardware. It includes HTTP, DNS, FTP, and Telnet servers, simple hubs, routers (wireless and standard with and without firewalls), Microsoft Windows [xx] based machines (NT 4.0, 95, Win2K), and Linux based machines (RedHat [xx], Mandrake [xx]). This internet of local area networks (LAN) is scalable and an attempt was made to have variety. The sampler internet enables students and faculty to work on operating systems and networking projects, as well as class assignments, without having to worry about campus-wide restrictions. Practically, exposure to these many different computing environments also prepares students well for entry into the competitive job market.

Determination of Drugs of Abuse in Urine by Solid Phase Microextraction-Gas Chromatography (SPME-GC)

Student: **Lucille Johnson, Stacey Mooney**

Faculty: **John C. Schaumloffel**

A variety of novel extraction techniques, including solid phase microextraction (SPME) have been applied to forensic analyses. For example, headspace-SPME is often used for the quantitative determination of drugs of abuse in urine. Research in our group has focused on a modified-SPME technique that can

simultaneously detect volatile and non-volatile drugs of abuse in human urine. The primary advantage of current methods is that our technique can provide quantitative results in less than 40 minutes, making it ideal for both treatment in clinical environments or application to law enforcement in evaluating the subjects condition shortly after the time of arrest. In our experiment, we continued the development of the modified-SPME technique for the simultaneous determination of amphetamines and cocaine in human urine. Details of the method, including limits of detection, linearity, the use of internal standards and more will be presented.

Relationship Between Sediment Phase Lead and Arsenic Speciation and Accumulation in Chironomids

Student: **Colleen McPike, Theresa Smigelski**
Faculty: **John C. Schaumloffel**

Chironomids are a geographically widespread benthic invertebrate found in fresh waters throughout North America. This research project involves raising chironomids in contaminated sediments to determine if they accumulate and/or redistribute lead and/or arsenic found in the sedimentary phase. Sediments were

prepared from Ottawa sand spiked with arsenic (III) oxide, arsenic (III) sulfide and lead (II) oxide. The chironomids were raised in contaminated sediment through the larvae stage and then removed from the tank for testing. In addition, larvae raised in a control system as well as water samples and sediments from the experimental mesocosms were analyzed for lead and arsenic. Samples were analyzed by atomic absorption spectrophotometry following acid digestion. Although difficulties in obtaining suitable chironomid egg masses limited the range of experiments that could be conducted, preliminary results will be presented.

A Deer Survey of New Island, Oneonta NY

Student: **Thomas Gillen**
Faculty: **Donna Vogler**

Deer populations have been steadily growing in the State of New York. Increased herd size potentially causes damage to natural habitats by over-browsing, which reduces vegetation cover.

The City of Oneonta NY is planning a 6-mile public greenway through an undeveloped natural area along the Susquehanna River, which of course include a resident deer population. The objective of my study was to determine the number of deer using the most natural area, New Island. Three transects were laid out in March 2002 and the number of deer pellet groups (deer fecal piles) were counted. From these data I determined that deer density in this area ranged from 21 to 28 deer per mi^2 with an average deer density of 22 deer per mi^2 . The number of deer estimated on New Island exceeds the level considered by the US Fish and Wildlife Service (of 20 deer per mi^2) associated with harm to native vegetation.