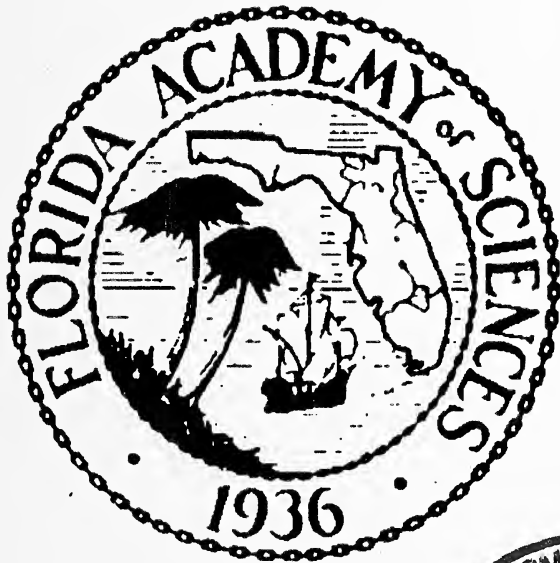


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62nd ANNUAL MEETING

FLORIDA SCIENTIST



Program Issue

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Volume 61

Supplement 1

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1998 PROGRAM ISSUE

THE SIXTY-SECOND ANNUAL MEETING OF THE
FLORIDA ACADEMY OF SCIENCES
in conjunction with the
Florida Junior Academy of Sciences
and the Science Talent Search

Featuring a Symposium
Making Science Learning Attractive and Its Teaching Effective
by the Coalition for Science Literacy and the Suncoast Area Center
for Educational Enhancement, University of South Florida

&

Two Plenary Addresses:

The Medalist Address
Tailor Made Macromolecules
by Dr. George Newcombe

&

The Gale Plenary Lecture
The Nature of Science, Early and Often
by Marsha Winegarner

ROLLINS COLLEGE
WINTER PARK
March 26-28, 1998

FLORIDA SCIENTIST
Volume 61 Supplement 1

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WELCOME

The Florida Academy of Sciences extends a warm welcome to all participants in our 62nd Annual Meeting. This year, we are being hosted, once again, by the historic Rollins College in Orlando, and wish to express our sincere appreciation to the members of the Faculty for all the preparations which they have made, to enable us to have a profitable and enjoyable meeting.

Our theme this year, Science Education, epitomizes the support given by our hosts to this important aspect of our State's - and, by extension, our Nation's - educational program. As an organization that embraces all of the disciplines involved in this field, we have the opportunity to help our State to raise the standard of education in the sciences at all levels of the educational system, and we are encouraged to use these few days spent at Rollins College to the fullest advantage, in this regard.

Building on the organizational foundation which has been strengthened in recent years, let us look forward with keen anticipation to growth in membership, outreach and effectiveness of our Academy, as we become more instrumental in assisting students in our high schools, colleges and universities to develop careers in the sciences; as we seek to strengthen our Sections through the interaction which only an organization like ours can provide, and as we engage in scholarly pursuits which will bear fruit in providing answers to many of the technical issues which are faced by our State.

With best wishes for a great Annual Meeting, Al Hall, President, FAS

MEETING INFORMATION

The 62nd Annual Meeting of the Florida Academy of Sciences will be held at Rollins College in Winter Park, Florida, March 26-28, 1998. A symposium "Making Science Learning Attractive and Its Teaching Effective has been planned.

LOCATION

Founded in 1885 by New England Congregationalists, Rollins College is the oldest recognized college in Florida. Today, Rollins is a private, nondenominational, liberal arts college which claims a Nobel laureate (in Chemistry, 1987, by Donald Cram, Class of 41) among its graduates. Its lakefront setting is two blocks from downtown Winter Park, a residential community, and minutes from Orlando. The distinctive Spanish Mediterranean architectural style of the campus has been noted

for its beauty. The Archibald Granville Bush Science Center and the nearby Cornell Hall for the Social Sciences will be focal points for the meeting.

Rollins is about three miles east of exit 45 off Interstate 4 and 15 miles north of Orlando International Airport. Vicinity and campus maps are provided on the back cover of this booklet.

REGISTRATION

ALL PARTICIPANTS ARE EXPECTED TO REGISTER. Academy members receive the Program Issue by mail in advance, as will non-members who register before February 13, 1998. Additional Meeting material (including programs for individuals registering after 2/13/98) will be available at the registration desk which will be open in the lobby of Bush Science Center at Rollins College Thursday afternoon, March 26, from 3:00-5:30pm, Friday, March 27, from 7:30am until 4:00pm, and Saturday, March 28, at 8:30am.

LODGING

No reservations can be made through the Academy. The following hotels have agreed to reserve a block of rooms at the special conference rates shown if you identify yourself with the Florida Academy of Sciences.

The Langford, (407)644-3400.

30 deluxe rooms have been reserved through March 12, 1998

\$65 single, \$75 double. Contact Becky.

The Langford is on New England Avenue approximately 2 blocks from campus.

Mt. Vernon Lodge, (407)647-1166.

30 deluxe rooms have been reserved through February 26, 1988

\$55 single, \$61 double. Contact Glenda.

Mt. Vernon Lodge is on the corner of Morse Boulevard and Route 17-92, approximately 1.5 miles from campus.

Holiday Inn, Winter Park.

\$59 single or double.

For further information on the Holiday Inn, contact Geralyn Hartz at (407)-514-2079.

MEALS

The Academy Banquet will be held on Friday evening (March 27) at the Orlando Science Center at 6:30pm. The dinner will be a choice of beef, fish or vegetarian.

Only a few tickets will be available on the day of registration, and preregistration for the banquet is suggested.

The Rollins College cafe will be open for lunch with a limited menu during Spring break. There are many restaurants within walking distance of Rollins and information on these restaurants will be available at the registration desk.

MEDALIST LECTURE

Dr. George Newcombe, 1997 Academy Medalist, will present the Annual Medalist Lecture immediately after the Banquet. The title of this lecture is "Tailor Made Macromolecules."

ACADEMY PLENARY SESSION & BUSINESS MEETING

The Gale Plenary Lecture by Ms. Marsha Winegarner entitled "The Nature of Science, Early and Often" will be presented at 2:00 pm in the Auditorium. It will be preceded at 1:30 pm by the Annual Business Meeting chaired by Mr. Al Hall, President of the Academy.

FIELD TRIPS

A number of field trips have been arranged for the Meeting.

Orlando Science Center - Registered participants at the Florida Academy of Sciences meeting will be provided with free admission to the Orlando Science Center on Saturday, March 28, or Sunday, March 29. A flat rate parking fee of \$3.00 will prevail. Details will be available at the registration desk.

Bat House - An expedition to the bat colony on the campus of Rollins College is planned for 5:30pm on Thursday, March 26. The tour will leave from the lobby of the Bush Science Center.

Birds of Prey - Two tours to the Birds of Prey center at Audubon House in Maitland, Florida a short distance from Rollins College are scheduled for Saturday, March 28. The tours will leave at 10:00am and 3:00pm from the lobby of the Bush Science Center. There is a cost of \$2.00 per person.

Leu Gardens - Harry P. Leu Gardens is a local attraction available as an on-your-own tour. Further information will be available at the registration desk.

LOCAL ARRANGEMENTS

The Local Arrangements Chair for this Meeting of the Academy is Dr. Robert Carson, of the Department of Physics at Rollins College (407-646-2637, email rcarson@rollins.edu). He may be consulted for any special meeting needs.

FLORIDA JUNIOR ACADEMY OF SCIENCES ANNUAL MEETING

The Florida Academy of Sciences will meet with the Junior Academy this year. As the student division of the FAS, the Florida Junior Academy of Science provides opportunities which encourage growth of our junior and senior high school students in science by allowing them to compete, share, and network with other students and adults having common interest throughout Florida. The focus of this "common bond" among participants is their research activities. Annual activities encourage student research, sharing of research in a "real life scientist's" format, and interacting with adult role models. The Florida Junior Academy of Sciences is seeking volunteers to assist in judging and act as section moderators at its meeting, to be held on Saturday afternoon (March 28). Persons interested in participating in this rewarding experience should contact the FJAS Coordinator: Mrs. Cathy Gotshall, Melbourne Central Catholic High, 100 E. Florida Ave., Melbourne, FL 32901. Telephone number: (407) 727-0793.

COMMERCIAL AND INSTITUTIONAL EXHIBITS

Space is available on a first come-first served basis for a fee of \$75.00. Exhibits by research institutions or Programs and others of an informational nature may be given free space. Parties interested in fee or free spaces should contact the Local Arrangements Chair for details.

STUDENT AWARDS

Students presenting papers at the Annual Meeting of the Academy and who are registered for the Meeting may be considered for a number of awards. Details are presented below, and further information may be obtained from Dr. David Sheldon, Awards Committee Chairman (813-341-4605).

1. Outstanding Student Paper Award - This award is presented by any of the Academy Sections to graduate and/or undergraduate students.
2. American Association for the Advancement of Science Award - This award is presented to one male and one female undergraduate student annually and is a one-year membership in AAAS including the journal, *Science*.
3. Explorer's Club Award - This prize of \$300 is awarded for the "most original

research paper" furthering the goals of the Club in scientific exploration. The prize is awarded to graduate students and the paper must be presented again at the Explorer's Club banquet in Orlando in May.

4. Sigma Xi Awards - The first award, presented by the University of Florida chapter of Sigma Xi, is for \$50 and a plaque. The award is presented to graduate students. The second award is presented by Florida Institute of Technology for the best paper by an FIT student. The award is for \$50.

5. William W. Behrens, Jr./Florida Institute of Oceanography Award - This \$750 prize is awarded by the Florida Institute of Oceanography to an undergraduate or graduate student for the best paper in any area of ocean or marine sciences.

ANNOUNCEMENTS

PERMANENT OFFICES FOR THE ACADEMY: The FAS office has been relocated to the Orlando Science Center. The Executive Secretary is GERALYN HEARTZ. The address and telephone number are shown below.

Florida Academy of Sciences
Orlando Science Center
777 East Princeton St.
Orlando, FL 32803
407-514-2079.

FLORIDA ACADEMY OF SCIENCES 1998 ANNUAL MEETING PROGRAM SUMMARY

THURSDAY, MARCH 26

TIME	EVENT
3:00 PM	FAS Council Meeting, Bush Science Center Room 114
3:00 PM-5:30 PM	Registration, Bush Science Center lobby
5:30 PM	Bat House Tour, Bush Science Center lobby

continued, next page

FAS MEETING SUMMARY, continued**FRIDAY, MARCH 27**

TIME	EVENT
7:30 AM-4:00 PM	FAS Registration & Information Desk, Bush Science Center lobby
8:00 AM-12:30 PM	FAS Concurrent Paper Sessions & Symposia, Bush Science Center, Various Rooms
12:30 PM-1:30 PM	Lunch on your own, Rollins Cafeteria or local restaurants (information @ registration desk)
1:30 PM-2:00 PM	FAS Business Meeting, Bush Auditorium
2:00 PM-2:45 PM	Gale Plenary Address Bush Auditorium
3:00 PM-5:30 PM	FAS Concurrent Paper Sessions & Symposia, Bush Science Center, Various Rooms
6:30 PM	FAS Banquet & Medalist Lecture, Orlando Science Center

SATURDAY, MARCH 28

TIME	EVENT
8:30 AM	FAS Registration & Information Desk, Bush Science Center lobby
9:00 AM-NOON	FAS Concurrent Paper Sessions, Bush Science Center, Various Rooms
10:00 AM	Center for Birds of Prey, Tour #1, Bush Science Center lobby (\$2.00/person)
NOON	Lunch on your own, Rollins Cafeteria or local restaurants (information @ registration desk)
AFTERNOON	Visit the Orlando Science Center (no charge)
3:00 PM	Center for Birds of Prey, Tour #2, Bush Science Center lobby (\$2.00/person)

AGRICULTURAL AND NATURAL RESOURCE SCIENCES

FRIDAY, 3:00 PM, BUSH 210

BILL BROWN, UNIVERSITY OF FLORIDA, presiding

3:00 PM AGR-1 Effects of Gibberellic Acid-3 on the Competitiveness of Eggplant against Purple and Yellow Nutsedge (*Cyperus rotundus* L. and *C. esculentus* L.). B.M. SANTOS, J.P. MORALES-PAYAN, J.A. DUSKY, AND W.M. STALL. Hort. Sci. Dept., Univ. of Florida, Gainesville 32611. Greenhouse studies were performed to assess the impact of varying rates of the plant growth regulator gibberellic acid-3 (GA3) on the competitiveness of eggplant against the weeds purple and yellow nutsedge. Eggplants in the 4-true-leaf stage were treated with foliar GA3 rates of 0, 25 or 50 parts per million (ppm) prior to transplanting. Sprouted tubers of either nutsedge species were planted along with eggplant in plastic containers (4.5 L) at a total density of 4 plants per pot. A replacement series approach was used with 5 eggplant:nutsedge proportions (4:0, 3:1, 2:2, 1:3 and 0:4). Relative crowding coefficients for eggplant-purple nutsedge and eggplant-yellow nutsedge mixtures were calculated from shoot dry weights per plant after 30 days of mutual interference. When no GA3 was applied, eggplant was more competitive than either nutsedge species. As GA3 was utilized, competitiveness of eggplant increased in all proportions. Each nutsedge species showed differential competitiveness with respect to eggplant as GA3 rates increased. Yellow nutsedge seemed to be the strongest competitor of the weeds, probably due to taller canopies and stems than purple nutsedge. It appears that providing GA3 to young eggplant transplants enhanced the foliage production and shading ability of the crop.

3:15 PM AGR-2 An Economic Analysis of Chicken Consumption in the United States. A. G. MANNERS and Z. I. OLORUNNIPA, Agribusiness Program, Florida A&M University, Tallahassee, FL. 32307. Price, as a resource allocator, tends to exercise a major influence on the consumption of commodities. Using a linear regression model, this paper examines how the prices of pork, beef and chicken, as well as other variables affected the consumption of chicken during the period 1965-1995. The results indicate that price of chicken, price of beef and income were statistically significant as determinants of chicken consumption. Computation of cross price elasticities indicate that consumers perceived chicken and beef as substitutes. Graphical analysis of the data also indicates that chicken consumption per capita has trended upwards over the data period while per capita consumption of beef and pork have declined slightly.

3:30 PM AGR-3 Area of Influence of Smooth Pigweed (*Amaranthus hybridus* L.) on Lettuce as Affected by Phosphorus Fertility. B.M. SANTOS, J.P. MORALES-PAYAN, J.A. DUSKY, AND W.M. STALL. Hort. Sci. Dept., Univ. of Florida, Gainesville 32611. Studies of area of influence were conducted under

field conditions to determine the effect of different smooth pigweed distances on 'South Bay' lettuce yield under two phosphorus (P) fertility regimes. Banded (125 kg/ha) or broadcast (250 kg/ha) P was applied before planting. A twin-row lettuce system was utilized on raised beds separated at 0.9 m from center to center. A 1-week-old pigweed plant was transplanted in the center of twin lettuce rows. A weed-free control was also established. Yield was measured after 10 weeks of interference at 0, 25, 50, 75, 100, 125 and 150 cm from the pigweed plant. Control plots indicated that lettuce increased in about 12% fresh biomass when P was banded. Lettuce yield increased with distance. However, larger yield reductions within one given distance were observed when P was broadcast as opposed to banded. Lettuce heads grown at 100 cm or more from pigweed were not influenced by the weed when P was broadcast, whereas at this distance decreased to 75 cm when P was banded. Banding P showed to provide some advantages against pigweed, reducing the area of influence of pigweed and the amount of P required to produce the crop.

3:45 PM AGR-4 Students SOAR - School Gardens: Nourishing Bodies, Expanding Minds. R. N. RAID AND R. T. NAGATA, University of Florida, IFAS, EREC, PO Box 8003, Belle Glade, 33430-8003. With less than 3% of the nation's population presently involved in agriculture, many Americans (and in particular, our youth) have lost sight of agriculture's importance and relevance in our everyday lives. *Students SOAR* (Sharing Our Agricultural Roots) is a program sponsored by Palm Beach County Agriculture to provide our youth with an appreciation for plants, agriculture, and the environment. Featuring school gardens, *SOAR* serves as an educational medium for a diverse array of topics. Although facilitating obvious science and agricultural lessons, teachers have also utilized the gardens and other *SOAR* projects for teaching math, geography, history, art, music and even sex education. Additionally, *SOAR* emphasizes and fosters teamwork, school pride and community involvement. The program has earned the endorsement of the school district, local communities, governmental agencies, and Palm Beach County agricultural producers.

4:00 PM AGR-5 Competitive Ability of Three Carrot (*Daucus carota* L.) Cultivars against Purple Nutsedge (*Cyperus rotundus* L.). J.P. MORALES-PAYAN, B.M. SANTOS, W.M. STALL, AND J.A. DUSKY. Hort. Sci. Dept., Univ. of Florida, Gainesville 32611. Greenhouse studies were conducted to determine the competitive ability of the weed purple nutsedge against the carrot cultivars Sytan, Chantenay and Nantes. A total of four plants were grown per container (25 cm diameter x 23 cm height). A carrot: nutsedge replacement series (4:0, 3:1, 2:2, 1:3 and 0:4) was established. A split plot design with 5 replications was utilized. Nutrients and water were supplied in non limiting amounts. Plants were allowed to interfere for 35 days after emergence. Plant height and biomass were determined for each plant species, and the resulting data were submitted to analysis of variance. Competitiveness of nutsedge and carrot were determined by

calculating relative crowding coefficients. Nutsedge was more competitive than the three carrot cultivars utilized in this study. This weed was also a stronger intraspecific competitor than either carrot cultivar. The relative interspecific interference of nutsedge was Sytan>Chantenay>Nantes. The differential extent of interspecific interference of purple nutsedge with these carrot cultivars appears to be associated to the development of a shorter and more sparse canopy in Sytan, as compared to the taller and denser canopies of the cultivars Nantes and Chantenay.

4:15 PM AGR-6 Above and Below Ground Interference of Purple Nutsedge (*Cyperus rotundus* L.) with Three Carrot (*Daucus carota* L.) Cultivars. J.P. MORALES-PAYAN, B.M. SANTOS, W.M. STALL, AND J.A. DUSKY. Hort. Sci. Dept., Univ. of Florida, Gainesville 32611. Container studies were performed to determine the influence of shoot and root interference of the weed purple nutsedge with the carrot cultivars Sytan, Chantenay and Nantes. Plants were grown as: a) full (FI), b) below ground (BI), c) above ground (AI), and d) no interference (NI). A split plot design with 4 replications was used. Plants interfered for 50 days after emergence. Plant height and biomass were determined. No height differences were found among nutsedge, Nantes and Chantenay, while nutsedge foliage was taller than Sytan. For the three carrot cultivars, BI had a stronger negative impact on biomass than AI. It seems that the vigorous subterranean system of nutsedge outcompeted the weak carrot root system in the nutrient acquisition process, although allelopathy could be involved. Also, relative AI importance was Sytan>Chantenay> Nantes, which could be due to the shorter canopy of Sytan. Carrot performance was decreased more when FI was allowed than when BI or AI occurred. These results suggest that BI had a stronger influence on the nutsedge-carrot interference relationships. Light competition played a secondary role in tall cultivars and the short-leaf cultivar Sytan, although the relative contribution of AI to the overall interference effect increased in the short-foliage carrot cultivar.

4:30 PM AGR-7 Influence of Nitrogen Fertilization on Purple Nutsedge (*Cyperus rotundus* L.) Interference with Carrot (*Daucus carota* L.) J.P. MORALES-PAYAN, B.M. SANTOS, W.M. STALL, AND J.A. DUSKY. Hort. Sci. Dept., Univ. of Florida, Gainesville 32611. Greenhouse studies were performed to determine the influence of nitrogen (N) fertilization on the competitiveness and yield losses of the weed purple nutsedge on Chantenay carrot. Nitrogen rates of 55, 110 and 165 kg N/ha were supplied. For the competitiveness studies, 4 plants were grown per pot in a replacement series (4:0, 3:1, 2:2, 1:3 and 0:4; carrot:nutsedge) for each N rate. Plants were allowed to interfere for 35 days after emergence. For the additive studies, 2 carrot plants were grown per pot, with nutsedge densities of 0, 1, 2, 4 or 6 plants per pot. Plants were allowed to interfere for 75 days after emergence. A split plot design with 4 replications was used. Plant height and biomass were determined for each species in both studies. Carrot root yield was recorded in the additive studies. Data sets were submitted to analysis of variance

and regression. Relative crowding coefficients were used to quantify the competitiveness of nutsedge against carrot. Replacement series results indicated that nutsedge became more competitive than carrot with N rates. Monocultures of both species produced more biomass as N rates were higher. Additive studies showed that increasing N rates and density provoked higher losses in carrot yields, mainly due to stronger weed pressure at higher densities and to the enhanced nutsedge competitiveness at higher N rates.

4:45 PM AGR-8 Evaluation of Light Interception and Litterfall in Longleaf Pine Stands Under-planted with Wire Grass. M.E. WILLIAMS, O.U ONOKPISE, and K. W. OUTCALT, Division of Agricultural Sciences, Florida A & M University, Tallahassee, Florida 32307-4100. A study was undertaken to assess the competitive ability of wiregrass (*Aristida stricta* Michx.) plugs planted under a longleaf pine (*Pinus palustris* Mill.) overstory as related to light interception and pine litterfall. The experimental design was a split-split-plot design in three replications at three randomly selected sites, as main plots, on the Savannah River Forest in Aiken, South Carolina. Three treatments of cultivation, as sub plots, herbicide and fertilizer, sub sub plots, were applied to each site. Light readings determined by a LICOR light sensor on wiregrass plugs from September 1994 to August 1995, revealed that mean light interception ranged from 933 U mol s⁻¹ m⁻² to 1148 u mol s⁻¹ m⁻², while mean litter fall collected from August 1994, to August 1995, ranged from 244.8 ± 69.5 gm to 267.9 ± 52.5 gm. Mean basal area of wiregrass ranged from 0.85 ± 0.93 m² to 1.84 ± 0.37 m². Data analysis revealed that light and litterfall did not influence growth and survival of underplanted wiregrass. Therefore, wiregrass can be successfully established under existing longleaf pine canopy.

5:00 PM AGR-9 Structural changes in import demand for US Meat: Implications for NAFTA. G. L. QUEELEY AND ZAACH OLORUNNIPA, Division of Agricultural Science, Florida A & M University, Tallahassee, 32307-4100. Using restricted and unrestricted single equation models, this paper investigates the North American Free Trade Agreement (NAFTA) as a possible causal factor of structural change in import demand for beef, pork, and poultry. Results indicate that the meat demand functions in the US, Canada, and Mexico, have undergone significant structural changes since the implementation of NAFTA. The results also indicate much potential for market extension for US meat products into Canada and Mexico.

5:15 PM AGR-10 Effect of Nitrogen Fertilizer and Spatial Arrangement on Fruit Yield of Scotch Bonnett Hot Pepper. C.S. GARDNER AND G. L. QUEELEY, Division of Agricultural Sciences, Florida A & M University. Tallahassee, 32307-4100. A study was conducted at Florida A & M University research farm (Quincy, Florida) during the 1996 growing season, to establish fertilizer rates and row spacing for producing the Scotch Bonnett hot pepper in north Florida.

Experimental design was a RCB factorial with 4 replications. Treatment combinations were N rates (factor 1) of 0, 112, 224 and 336 Kg ha⁻¹ and within row spacing (factor 2) of 60, 120, and 180 cm. Between row spacing was set at 150 cm. Soil type at the location was a sandy clay loam. Seedlings grown in the green house during January through April, were planted in the field plots early May. Harvest period extended from August to Mid November. Results indicate that closer spacing and lower N levels gave greater yield compared to treatments of higher N levels and wider spacing. However, wider spacing and higher N levels produced larger fruits per plant.

FRIDAY 5:30 PM BUSH 210

BUSINESS MEETING: AGRICULTURE AND NATURAL RESOURCES SCIENCES

BILL BROWN, presiding

ANTHROPOLOGICAL SCIENCE

FRIDAY, 8:00 AM BUSH 114

SESSION A: HUMAN ECOLOGY

WM. J. KENNEDY, FLORIDA ATLANTIC UNIVERSITY, presiding

8:00 AM ANS-1 Reconstructing Diet in Hominids: The Role of Stable Isotope Geochemistry. J.J. SNODGRASS, Dept. of Anthropology, Univ. of Florida, Gainesville, FL 32611. Reconstructing diet is an important aspect of understanding the ecology and evolution of early hominids, and has been a goal of paleoanthropology since the inception of the discipline. Numerous methods are available for the study of diet, including: analysis of craniofacial and dental morphology; paleopathology; dental microwear; trace element analysis; and energetics modeling. Recently, a new technique for the study of past diets has emerged. Stable isotope geochemistry involves the analysis of bone composition of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) Stable isotope ratios, and can be analyzed from the organic (collagen) or inorganic (hydroxyapatite) components of bones or teeth. These ratios vary due to changes in diet and are reflected in signatures that code for different trophic levels and aspects of foraging ecology. In this paper I review literature on the use of stable isotope geochemistry, and suggest prospects for its use in the study of diet in hominids. Also discussed are problems related to the methodology (including the effects of diagenesis, bone turnover and fractionation), and suggestions are made for the future directions of investigations into hominid diet using stable isotope geochemistry.

8:15 AM ANS-2 **Reconstructing Florida Paleocology: Faunal Analysis of the Tick Island Archaeological Site.** R. QUINN, Dept. Anthropology, Univ. of Florida. Human paleoecology places humans into past ecological settings and offers a temporal perspective of human influence and impact on the environment. Understanding the dynamics of how human populations shape ecosystems and environments and, alternatively, how these systems influence human existence becomes important when considering conservation issues. Reconstructing paleoecology requires multiple lines of evidence to properly attain an accurate view of the human component within an ecosystem and to assess human induced changes to the environment. Analysis of faunal assemblages associated with archaeological sites is an important method used to reconstruct human use and human-induced pressures on the faunal component within an ecosystem. This study addresses such issues as human exploitation of fauna for dietary purposes and human impacts on faunal populations. Preliminary sorting and species identification of the faunal remains excavated from the Tick Island Archaeological Site in North Central Florida was conducted in the late 1960s. This study reevaluates the previous work and compares the sample to modern faunal assemblages. Taphonomy and excavation methods of the site are discussed and compared to another more recently excavated archaeological site in North Central Florida.

8:30 AM ANS-3 **The Garden of Eden Revisited: Ecology and Human Behavior in an Archaeological Context.** JOSEPH R. ANTHONY, Florida Atlantic Univ., Dept. of Anthropology, Boca Raton, 33431. The development of hypotheses and a resulting paradigm is undertaken in order to explain the influence of the ecological environment upon human behavior, with emphasis placed on change. The function of the process of co-evolution between human behavior and ecological environments is particularly stressed. Ecosystems are classified into broadly-based biome types. The influences of different biome types upon resource procurement, subsistence strategies, settlement patterns, and social stratification are examined in relation to the paradigm. Archaeological and ethnographical data sets from different biome classes are applied to the paradigm to illustrate and demonstrate the validity of its conclusions.

8:45 AM ANS-4 **Island Biogeography and Metapopulation Theory: Jumping on the Conservation Bandwagon.** DEBRA HAIN RODMAN, University of Florida, Department of Anthropology. Island Biogeography and Metapopulation theory have gained popularity among conservationists since the 1970's in the guise of conservation strategies. While the acceptance of these theories as pure science has been under controversy for some time in the scientific community, the application of such theories in the form of conservation strategies have become accepted doctrine among park managers, conservationists and policy makers. I explore the concepts behind these theories that make them so attractive as conservation strategies and the advantages and possible future disadvantages to using these

strategies in nature reserve design. Florida as a leader in the United States in promoting application of these conservation strategies is discussed.

9:00 AM ANS-5 "We the Poor": A Study of Farmer Decision Making in a Honduran Soil Conservation Program Area. MARIA C. MORERA, Dept. of Anthropology, 1350 Turlington Hall, Univ. of Florida, Gainesville, FL 32611. Recent fieldwork in two Honduran hillside communities, made possible with grants awarded by the Tinker Foundation, the Dickinson Award in Tropical Agriculture and the Tropical Conservation and Development Program, examined the association between farmer participation in an agricultural extension program and the rates of adoption of program-recommended soil conservation practices. The results indicate that many participants are now practicing soil conservation less extensively while many past adopters have abandoned the practice altogether. Therefore, adoption here is argued to be cyclical. Analysis, using a political ecology framework, reveals that economic and ecological constraints help determine both the degree of farmers' participation in soil conservation programs and their extent of soil conservation practice. Soil conservation is reconceptualized as a dynamic, human behavioral adaptation to these fluctuating conditions rather than as the result of a straightforward process of technological diffusion.

9:15 AM ANS-6 Immigration and Resettlement of Jews from the Former Soviet Union to Israel and the United States. C. O'CALLAGHAN, 3650 SW 20th Ave, #12, Gainesville, FL 32607, Univ. of FL., 1351 Turlington Hall, Gainesville 32611. With the fall of the Soviet Union, there has been a mass migration of the Soviet/Russian Jewish population to both Israel and the United States. Not only have the lives of these immigrants been dramatically effected, but there has also been a great impact on the communities where they have settled. As with any group of immigrants, these Soviet/Russian Jews will face adjustment problems, that could effect both their mental and physical well being. Based on the experiences of other immigrant groups, Soviet/Russian Jews will likely face discrimination at first in their new communities. Not only will the lives of these immigrants change, but the communities in which they settle will also undergo transformations. Economic and religious life, social relationships and politics will all be greatly effected. These changes and adjustments will all be discussed.

9:30 AM ANS-7 Shifting Resource Strategies and Gender Implications Among Andean Agriculturalists. ELIZABETH M. BYRON, Dept. of Anthropology, P.O. Box 1 17305, University of Florida, Gainesville, 3261 1. Political and economic changes in the Andean nations have directly affected the subsistence strategies of highland agriculturalists. Agrarian reform and the resulting shifts in the modes of production from a subsistence based non-capitalist mode toward an increasingly diverse resource strategy incorporating integration into the capitalist mode of production has been documented. Inadequate land quality and holding size

contribute to the inability to sufficiently produce for household consumption and often contributed to the need to enter into the wage labor market. This paper examines the existing literature on agricultural land use and resource strategies within the context of Andean agrarian reform. Important to note will be gender and ethnic differences that exist in the strategies adopted and the ability to meet household subsistence needs both nutritionally and economically. Access and control over resources within the household will be addressed. Ecological and political factors distinct to the region will be analyzed to direct future research on regional variation and/or patterns of subsistence strategies. Demographic factors, ecological conditions, and wider economic shifts within the region will also be discussed, including issues of exposure and integration into the dominant culture.

9:45 AM ANS-8 Barriers to Weight Reduction Among African-American Women with Type II Diabetes. L.S. LIEBERMAN (1), C. PROBART (2) AND N. SCHOENBERG (3), (1) University of Florida, Gainesville, FL 32611, (2) Pennsylvania State University, State College, PA 16802, (3) University of Kentucky, Lexington, KY 40506. Over 90% of minority women are over-weight or obese at the time of diagnosis of Type II diabetes. Weight loss and sustained weight control are standard therapeutic recommendations yet difficult to achieve. The purpose of this paper is to present data on barriers to weight loss among older African-American women and to suggest appropriate interventions. Ethnographic interviews, participants observation, videotaping of meal preparation, and the Stunkard-Massara anamorphic lens body image assessment test were used in a study of 10 African-American women with varying durations of diabetes. Barriers include a lack of nutritional knowledge, unpleasant somatic symptoms (e.g., fatigue), disruptive changes in patterns of daily living, body images that favor body sizes that are larger than those recommended by bariatric physicians. Based on these data weight loss strategies are suggested.

10:00 AM BREAK

FRIDAY, 10:15 AM BUSH 114

SESSION B: VISUAL ANTHROPOLOGY

WM. J. KENNEDY, FLORIDA ATLANTIC UNIVERSITY, presiding

10:15 AM ANS-9 Ngoma Memories: Exploring Narratives of Visual Ethnography. R. K. GEARHART, University of Florida, Department of Anthropology. This presentation uses documentary footage from the east African coast to explore some of the narrative techniques available to contemporary ethnographic film and video-makers. The ten minute video employs a western-style "voice of God" narration that purposefully fails to mediate the tension between the messages illustrated in the visual narrative and those expressed in the oral narratives of three east African music and dance (ngoma) experts. This approach challenges viewers

to critically analyze traditional documentary film styles while offering an innovative method by which to represent communities comprised of people of diverse ethnic, religious and cultural heritage.

10:30 AM ANS-10 Celebrating Maya Culture In Lake Worth, Florida. DIVIAN MENDOZA and ROBERTO BARRIOS, 321 SE 3rd St., Apt. H-17, Gainesville, Florida, 32601. During the past 15 years Guatemalan Maya immigrants and refugees have settled in various towns and cities of southern Florida. These Guatemalans have settled in the United States as a result of a violent civil war that affected their nation during the late 1970s and 1980s. The forced international displacement of the nearly 20,000 Guatemalans that reside in Southern Florida had a disruptive impact on the social organization and cohesion of these communities. As a result, the Guatemalan Maya of south Florida face a number of socio-cultural challenges as they seek to re-establish their ethnic identity in the multi-cultural context of North American Society. Celebrating Maya Culture in Lake Worth examines the role of traditional festivals in the creation of community leadership and the addressing of socially relevant themes among the Kanjobal Maya community of Lake Worth, Florida.

10:45 AM ANS-11 Culture Shock: Mini-Indias. KEVIN MILLER, MARILYN WINSTON, AND JEANI WOOTEN, Department of Anthropology, University of Florida, 303 W University Ave., Gainesville, 32601. *Culture Shock: Mini-indias* is a nine minute video that explores the personal and social difficulties (or lack there of) that foreign students from India encounter during their first exposure to American culture. An emphasis is placed on the coping mechanisms provided both formally through Institutions and organizations, and informally through networks of individuals on the U of F campus and in the Gainesville community. Topics covered include the retention and assimilation of culture, cross-cultural barriers, and cultural enclavism. The video is constructed out of interviews with both students and faculty, allowing information, ideas, and experiences to unfold without narration. It is the intent of the producers that *Culture Shock: Mini-Indias* find life in the realm of applied Anthropology, perhaps being used as an orientation video for students--foreign or otherwise.

11:00 AM ANS-12 Breast-feeding: Cultural Misconceptions in the United States. C. CABEZAS EURY, E. SIMON, AND R. VENDETTE, Univ. of Fl., Dept. of Anthro., Gainesville 32611. Caucasian-American breast feeding practices are discussed from a cultural-anthropological perspective. In this video, the viewer is encouraged to examine the issues surrounding mothers deciding to breast-feed their babies. The issues explored include misconceptions such as how the breast is viewed as primarily a sexual object and how breast milk is commonly assigned only nutritive value. The fallacies that breast milk is for infants only and should only be done in private are discussed. Findings that partner support is essential to the

success of the Breast-feeding relationship are explored. The video briefly compares Caucasian-American practices in the United States to other global communities.

11:15 AM BUSINESS MEETING: ANTHROPOLOGICAL SCIENCE
WM. J. KENNEDY, presiding

FRIDAY, 3:00 PM BUSH 114

SESSION C: GENERAL ANTHROPOLOGY

WM. J. KENNEDY, FLORIDA ATLANTIC UNIVERSITY, presiding

3:00 PM ANS-13 Elementary Archaeology: A Partnership with Boca Elementary School. REBECCA L. JACOB (1) AND PAIGE MURATORE (2), (1) Florida Atlantic University, Boca Raton, 33431, (2) Florida Atlantic University, Boca Raton, 33431 and Children's Museum of Boca Raton, 498 Crawford Blvd., Boca Raton, 33432. For the past two years the Children's Museum of Boca Raton has had a teaching relationship with the fourth grade classes at Boca Elementary School. This partnership was originally funded through the Statewide Interdisciplinary Arts Grant. This grant was used to design a number of workshops that were used to augment the school's curriculum in the areas of Social Studies, Art and Language Arts. This was accomplished by creating a program that focused on both prehistoric and historic archaeology of Florida in general and Southern Florida in particular. Children were engaged in hands on activities to help them understand the discipline of archaeology and the diversity of people who populated the land that we now call Florida. Examples of teaching units will be presented and ideas suggested for other pilot programs will be given.

3:15 PM ANS-14 The Environmental Experience: A Parent's Perspective. KRISTINA BAINES MYERS, Florida Atlantic University, 777 Glades Road, Boca Raton 33431-0991. Research was conducted on teacher organized school field trips with an environmental focus. The attitudes, expectations and prior environmental knowledge of the parental chaperones is examined. Their role in how the children perceive the activities within the field trip is discussed. Activities examined include canoeing, hiking through coastal hardwood hammock and scrub habitats, beach combing and camping. A comparative study is made through the examination of post-trip impressions of the parent chaperones. Ideas to provide explanation for research findings focus on general socio-cultural topics, with emphasis on those factors unique to southeast Florida.

3:30 PM ANS-15 The Brief History of Spoken and Written Communication. RYSZARD-JACEK, RUSNIAK, Univ. Of South Florida, 4202 E. Fowler Av., Tampa, Fl 33620. The spoken and written language, more obvious than anything else, distinguishes us from the rest of the animal world. Human language as an information and signaling system of sounds and written characters is a most

important factor in our lives. The first ones who spoke were Neanderthals using the combination of sounds as words in simple sequences to express a thought. It is absolutely unacceptable to believe that the creators of Paleolithic cultures lacked the ability of speech. Aspects of the primitive language will be considered.

3:45 PM ANS-16 Botanical Substructures as Symbolic Speech: The Late Classic Carved Stone Monuments of Cotzumalguapa, Guatemala. DEBORA C. KERR, Florida Atlantic University, Dept. of Anthropology, 777 Glades Rd., P.O. Box 3091, Boca Raton, 33431. Cotzumalguapa describes an art style region as well as a geographical region located on the Pacific slope of Guatemala. A portion of the corpus of carved stone monuments within the Cotzumalguapa Nuclear Zone exhibit a unique substructure of botanical symbolism concomitant with central portrait figuration. The particular styles used in the carved stone monuments within and outside the Cotzumalguapa Nuclear Zone include: leaf, fruit, flower, and vine motifs--which are often used as speech scrolls elsewhere in Mesoamerica. These motifs are intertwined with other symbols (circular cartouches, shells, fauna, and anthropomorphs) to create what might be interpreted as a symbolic representation of speech. The botanical substructural elements will be isolated and identified. A detailed analysis of their placement will be presented and their use as a possible form of symbolic speech will be discussed.

4:00 PM ANS-17 Bias and Theoretical Paradigms in Archeology: How Remote Sensing Affects Archeology. CURTIS CAMPIAGNE, Florida Atlantic University, Department of Anthropology, Boca Raton, 33431. This paper explains how remote sensing can serve to remove bias in archeological method and theory. Different forms of remote sensing are covered as well as recent innovations. This paper further illustrates how archeology is a "hard" science and how we can continue to "harden" it, using modern technology. Data from the author's research in Belize, Central America, will show how remote sensing is used to create scientific research design which is correctable, testable and repeatable.

4:15 PM ANS-18 Racism As A Result of Sexual Selection, Classification, Human Plasticity, and Personal Boundaries. D. ZARNOWSKI. Dept. Of Anthropology. Florida Atlantic University, Boca Raton 33431. The purpose of this paper is to discuss the processes of sexual selection, classification, human plasticity, and the establishment of personal boundaries which perhaps set the biosocial stage for what is commonly known as racism. The exact mating strategy and mechanism of pre-modern humans is unknown. It is possible that initially racism was nothing more than a discriminating process that facilitated the antecedents of modern *H. sapiens* in finding a suitable mate. If this is true, then groups of humans devised both intra and inter group boundaries as criteria to what was and was not acceptable mating material. An examination of polytypic methodology and classification systems used to establish personal selection criteria will be discussed.

4:30 PM ANS-19 Intraspecific Applications of Life History Theory: Body size, Maturation and Mating Preferences among Humans and Other Primates. KAMAL FERJALI. University of Florida, Department of Anthropology, 1350 Turlington, Gainesville, FL 3261 1. In their discussion of primate life histories, Charnov and Berrigan (1996) assume that organisms make trade-offs between investment in somatic growth and investment in reproduction. Applied interspecifically, this principle holds well when primate ages at maturation, life spans and fertility rates are studied against the same variables for other mammals. The aim of this paper is to test this principle intraspecifically and intersexually. Life history theory should predict that within the same species, females would reach their adult body size earlier while males would continue to grow to a larger size since female energetic costs of reproduction are higher. Life history theory will be first used to examine patterns of sexual dimorphism within primate species. Primate sexual dimorphism in body size has traditionally been explained using sexual selection theory. I ask whether life history theory can be a more robust strategy of analysis. If so, this theory could also be applied as a unifying approach to maturational timing, mating preferences and body size, in their interrelatedness, for primates generally and for humans specifically. Literature from primate studies, human evolutionary ecology and psychology is invoked to address this issue.

4:45 PM ANS-20 Archeological Evidence for a sub-Roman Reoccupation of Hadrian's Wall. N. LABOS, Florida Atlantic University, Boca Raton, 33431. Beginning around AD 120, the Emperor Hadrian ordered the construction of the Wall which now bears his name. When eventually completed, Hadrian's Wall ran for 117 km, from Wallsend on the River Tyne to Bowness on the Solwat Firth, and was stone throughout its length. The Wall was occupied throughout the Roman period, however, little is known about the centuries following. After the Romans withdrew from Britain in AD 410, it was assumed that the Wall remained continually occupied, either by civilians or military forces, until the early sixth century. However, recent archeological and palynological evidence suggests a discontinuity in occupation. The purpose of this paper is to discuss a research proposal to better understand the nature and character of a possible sub-Roman occupation of Hadrian's Wall. The results of pollen analysis, which seem to indicate a massive woodland regeneration in the early fifth century, will be presented. Other pertinent archeological evidence, such as: burials, weapons, pottery, and inscriptions, will be discussed.

FAS POSTER SESSION (ANS)

FRIDAY, 11:00 AM-NOON & 4:00 PM-5:00 PM

BUSH 107

POS-1 The Graves Collection of Seals from Pre-Hispanic Colombia. M. OYOLA,

M. CRIMI, W. HOWERTON, A. ALCORN, and D. KERR. Department of Anthropology, Florida Atlantic Univ., 777 Glades Rd., Boca Raton, 33431.

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCE

FRIDAY, 3:00 PM BUSH 210

GARY ZARILLO, FLORIDA INSTITUTE OF TECHNOLOGY, presiding

3:00 PM AOS-1 Impact of Mangrove Crab (*Goniopsis pulchra*) Predation on Littorinid Snails. H. MACRELLIS, A. SCOTT, G. GEOGHEGAN, M. CROXFORD, L. SZELISTOWSKI, W. SZELISTOWSKI. Eckerd College, 4200 54th Ave. S., St. Petersburg 33711. This study examined the impact of *Goniopsis pulchra* predation on *Littoraria fasciata* and *L. varia* in the Gulf of Nicoya, Costa Rica. *G. pulchra* occupy lairs in hollowed mangrove trunks and branches. Examination of prey fragments from lairs and laboratory experiments indicated that this crab eats both *L. fasciata* and *L. varia*. Snail densities were no lower in areas of the forest occupied by *G. pulchra* than in areas unoccupied by it. However, the frequency of small *L. fasciata* increased and the predation rate on tethered individuals decreased with increasing distances from lairs. Laboratory trials indicated that small *L. fasciata* are especially vulnerable to crab predation. *Goniopsis pulchra* may affect snail abundance and size distribution on a micro scale level close to lairs.

3:15 PM AOS-2 Ecology and Succession Pattern of Phytoplankton in The North Indian River Lagoon. H. HARADA AND D. NORRIS. Florida Institute of Technology, 150 West University Blvd., Melbourne 32901. Phytoplankton and water samples were taken monthly from the Indian River Lagoon, FL, between the Pineda and Merritt Island Causeways from October 1996 to August 1997. Phytoplankton were collected using a 20 μ m mesh net and identified to the lowest taxa possible and the abundance of cells was determined. Water temperature and salinity were measured in situ. Concentrations of nutrients were measured. During winter unarmored dinoflagellates and chain-forming diatoms were abundant. Overall abundance of phytoplankton was low during spring. Small chain-forming diatoms were dominant in early summer and the larger diatoms were abundant in late summer. Armored dinoflagellates were abundant during the summer. There was no correlation between phytoplankton abundance and nutrient concentration.

3:30 PM AOS-3 Summer Amphipod Assemblages of Tampa Bay. S.A. GRABE. Environmental Protection Commission of Hillsborough County. 1410 21st St. N. Tampa, Florida 33605. The species composition, abundance, and community

structure of amphipods collected from throughout Tampa Bay (Florida), during September-October 1993-1996 is examined. Sampling design and protocols were similar to the USEPA's "EMAP" approach and employed random, probability-based sampling of the soft-bottom benthos and associated physico-chemical variables. Variables such as dissolved oxygen, salinity, and the percentage of fine-grained sediments are known to affect the distribution of benthic organisms. Rather than treat each of these variables as a continuous variable, each was partitioned, after sample collection, into three or five discrete strata. Data were stratified into three levels for near-bottom dissolved oxygen concentration (≤ 2 mg/l, $2 < \leq 4$ mg/l, and > 4 mg/l) and salinity (≤ 0.5 ppt, $0.5-25$ ppt, and > 25 ppt), and into five levels for the percentage of silt plus clay ($< 5\%$, $5- < = 10\%$, $> 10- < = 20\%$, $> 20- < = 40\%$, $> 40\%$). The interaction of these strata yielded 45 possible combinations; in practice, only 28 such combinations existed in the data set. The composition of the benthic community within and between these 28 strata were then examined.

3:45 PM AOS-4 Assessment of Bulk Atmospheric Deposition to the Tampa Bay Watershed. L. KELLIE DIXON, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. Bulk deposition of nutrients, trace metals, and organics was investigated at across the watershed of Tampa Bay for the Tampa Bay National Estuary Program. Copper, lead, zinc, aluminum, nitrogen species and total phosphorus were analyzed weekly for a one year period. Completeness of sample collection was 90%. The bulk deposition to a standardized, two-dimensional surface is likely an underestimation of the total atmospheric deposition. Bulk deposition of total phosphorus ranged from $0.52-1.76$ kg ha⁻¹ yr⁻¹, and $6.02-12.85$ kg ha⁻¹ yr⁻¹ for total nitrogen. Weekly loadings of phosphorus and nitrogen species were significantly different among stations. Watershed variations in nitrate or inorganic nitrogen deposition do not appear to be due to sources north of the watershed, but imply a substantial, region-wide source. Localized anthropogenic activities within the watershed are the dominant factors in metals, pesticides, PCB, and PAH loadings to Tampa Bay.

4:00 PM AOS-5 Florida EXPLORES! PAUL RUSCHER AND KEVIN KLOESEL, Florida State Univ., Dept. of Meteorology, 404 Love Building, Tallahassee, 32306-4520. During 1992-1998, 182 Florida public and private schools implemented the NOAA Direct Readout Weather Satellite Program in an initiative developed by FSU Meteorology and the Florida Technological Research and Development Authority. This program provides K-12 teachers with the technology and training for classroom use of weather satellite imagery to achieve science education goals. Teachers learn the "how-to's" of content acquisition of meteorological data, as well as their application to the earth, environmental, and space science curricula. The primary project goal is to effectively use real time data in pursuit of classroom research initiatives in the earth and physical sciences in

collaboration with University researchers. This program continues to expand and this presentation will outline the program and its application process.

4:15 PM AOS-6 **IMAGE-IN! Imagery for Meteorological Applications and Geophysical Education on the INTERNET.** KEVIN KLOESEL AND PAUL RUSCHER, Florida State Univ., Dept. of Meteorology, 404 Love Building, Tallahassee, 32306-4520. IMAGE-IN is a www-based distance learning course developed to train classroom teachers with internet access to interpret satellite imagery to achieve science objectives in the classroom. This course is designed for teacher enhancement at all levels from K-16. Eight, one week-long modules are presented each semester on topics ranging across a broad spectrum of atmospheric and oceanographic topics. Each module contains daily interactive activities highlighting an Earth System process or phenomenon, and how satellite imagery can be used to define, classify or research the topic of the week. This presentation will highlight the utility of www-based courses such as this as a means to enhance continuing education opportunities for science educators.

4:30 PM AOS-7 **Weather or Knot...It's all Elementary!** SAMARA KAHN, Florida State Univ., Dept. of Meteorology, 404 Love Building, Tallahassee, 32306-4520. Encouraging school children to observe the world around them in a careful, systematic and thoughtful way is crucial to the ultimate advancement of science. The atmosphere provides students and teachers with a dynamic daily field trip; one that is free, and open twenty four hours a day. This presentation will outline both the effective application of the study of weather in the classroom, and the resources available to elementary school teachers concerning the effective teaching of integrated science. Emphasis will be placed on using weather as a "hands-on, minds-on" tool to achieve goals across the elementary school curriculum, including communications and the arts.

4:45 PM AOS-8 **Preliminary Analysis of Sea Surface Height Variability From TOPEX/Poseidon Over the Intra-Americas Sea.** R. W. PRATT AND G. A. MAUL. Division of Marine and Environmental Systems, Florida Institute of Technology, Melbourne FL 32901. The basis of this study was to analyze sea surface height (ssh) variability for the Intra-Americas Sea for the period of October 1992 through December 1995. The TOPEX/Poseidon data set used in this study was ssh residuals after subtracting the marine geoid and mean dynamic height anomaly. This involves the study of the time series for ssh deviation for 526 points located along the satellite tracks. The standard deviation of each ssh time series was determined and the region was contoured. The data was gridded using a bi-linear method for interpolation. Points that were in close proximity to land masses showed aliasing that appears to be tidal, in particular the M_2 . In the vicinity of the Gulf Loop Current, results showed similarity to prior studies, *i.e.* ssh variability of ± 20 -25 cm, and substantial eddy energy in the western Gulf of Mexico. This study also includes

a Hovmöller (space-time) analysis of several cross-basin satellite tracks. Variances in the ssh time series were identified and tracked east of the Lesser Antilles, along the path of the Caribbean Current, and in the Loop Current in an attempt to quantify the frequency and magnitude of eddy events. As expected, the region of highest activity was in the vicinity of the Gulf Loop Current with an eddy frequency of more than one per year.

Friday, 5:00 PM BUSH 210

BUSINESS MEETING: ATMOSPHERIC AND OCEANOGRAPHIC SCIENCE
GARY ZARILLO, FLORIDA INSTITUTE OF TECHNOLOGY, presiding

FAS POSTER SESSION (AOS)

FRIDAY, 11:00 AM-NOON & 4:00 PM-5:00 PM, BUSH 107

POS-2 Successful Vegetative Fragmentation in Three species of *Halimeda* in the Florida Keys. L. J. WALTERS, C. M. SMITH, AND J. S. COYER.

POS-3 A Comparison of Sedimentation Rates Between Open and Closed Creeks in the Timucuan Ecological Preserve. H. R. GRAHAM.

BIOLOGICAL SCIENCES

FRIDAY, 8:30 AM BUSH 325

SESSION A: TERRESTRIAL AND FRESHWATER ECOLOGY

W. E. MESHAKA, MUSEUM/EVERGLADES NATIONAL PARK, presiding

8:30 AM BIO-1 The Breeding System of *Ziziphus celata*, an Endangered Shrub of the Lake Wales Ridge. C. WEEKLEY (1), T. RACE (2), AND S. BURKHARDT (3), (1) Division of Forestry, 550 Burns Ave. #76, Lake Wales 33853, (2) and (3) Bok Tower Gardens, 1151 Tower Rd., Lake Wales 33853. Florida *ziziphus* (*Ziziphus celata* Judd & Hall [Rhamnaceae]) is an xeromorphic shrub endemic to the Lake Wales Ridge and currently known from only five sites in Polk and Highlands Counties. Allozyme electrophoresis suggests that a single multi-locus genotype occurs at each of four sites. We conducted a series of breeding system experiments to test the self-compatibility of one population and its compatibility with several outcross genotypes. We also tested the self-compatibility of off-site genotypes conserved in a captive population at Bok Tower Gardens (BTG). We found that our study population was self-incompatible. Between-genotype crosses within the off-site population at BTG (consisting of seven genotypes) yielded twelve mature fruit. Non-treated open pollinations yielded a

substantial crop. Conservation of this species requires the establishment of several breeding populations. Further investigation of the breeding system of Florida ziziphus is necessary in order achieve this goal. This work was funded by the US Fish and Wildlife Service and Bok Tower Gardens.

8:45 PM BIO-2 Reproductive Effort, Degree of Specialization, and Phenotypic Plasticity in Three *Crotalaria* Species. C. M. STITES AND C. C. BENNINGTON, Stetson University, DeLand 32720. *Crotalaria spectabilis*, *C. mucronata*, and *C. lanceolata* are similar in size, morphology, and life history. However, *C. spectabilis* produces the largest seeds and *C. lanceolata* seeds are the smallest. We predicted on the basis of life history theory that *C. spectabilis*, who produces the largest seeds, would be more of a specialist than the other two species. Thus, fitness would be expected to vary among environments more markedly in *C. spectabilis* than in the other two species. To study the phenotypic plasticity of the species, a greenhouse experiment was performed. Each species was exposed to three levels of water and three levels of nutrients. There is no evidence to suggest that *C. spectabilis* is the most plastic species. Although they differed in plasticity, it was not in the direction expected. Perhaps, there are other environmental factors that are more important in determining the plasticity of each species.

9:00 AM BIO-3 Detection of Genetic Variation among Four Populations of *Blechnum serrulatum* using Random Amplified Polymorphic DNA markers (RAPDs). ELIZABETH GREVENGOED, Biology Department, Eckerd College, 4200 54th Ave. South, St. Petersburg, 33711. Molecular techniques have become a useful tool for determining phylogenetic relationships among species and genera of organisms. In the past five years, the use of random primers in polymerase chain reactions has become an excellent technique to determine genetic relationships at the population level as well. Four populations of *Blechnum serrulatum*, a fern in the Pinellas County area, have shown varying degrees of salt tolerance. RAPDs were used to detect possible genetic variation among these four populations. The genetic variance between salt tolerant *Acrostichum aureum* and non salt-tolerant *A. danaeifolium* was used for a comparison. Some variation among the four populations has been detected.

9:15 AM BIO-4 Investigations on the softshell turtles *Rafetus swinhoei* and *Chitra chitra* in Southeast Asia. LINH T. UONG (1) AND PETER C.H. PRITCHARD (2), (1) Dept. of Biology, Univ. of Central Florida 32816, (2) Florida Audubon Society, 1331 Palmetto Ave., Suite 110, Winter Park 32789. *Rafetus swinhoei* and *Chitra chitra* (Family Trionychidae) are gigantic soft-shell, both exceeding a meter in carapace length. Though *R. swinhoei* is on the brink of extinction, we found several new localities in north Vietnam, and tissue samples were collected for comparison with its only congener *R. euphraticus* in Turkey and Syria. By contrast, *C. chitra* proved to be reasonably abundant in eastern Java even

though its documented distribution was limited to extreme western Thailand. This research was supported by the Central Florida Chapter of the Explorers Club, Dept. of Biology at the University of Central Florida, Dr. William McCord, Mr. William MacArthur, and the Chelonia Institute.

9:30 AM BIO-5 Infection by *Mycoplasma agassizii* in a Box Turtle and its Implications for Conservation Biology. J. SIEFKAS, T. FARRELL, AND P. G. MAY, Stetson University, DeLand 32720. Upper respiratory tract disease syndrome (URTD) has significantly contributed to the decline of tortoise populations. The disease, which causes inflammation of the nasal cavities and eventual death in most cases, is typically found in tortoises, including *Gopherus polyphemus* and *Gopherus agassizii* and is transmitted by direct physical contact. We found one box turtle, *Terrapene carolina*, from the St. John's river flood plain that was infected with *Mycoplasma agassizii* the microbe that causes URTD. We collected data on the movement patterns and behaviors of 11 box turtles using radiotelemetry. These data show that box turtles in the infected population travel widely (home range sizes vary from 992-309,000 m²), interact closely with conspecifics frequently in at least eight months of the year, and occur in dense populations. This information suggests box turtles might transmit URTD widely to both conspecifics and perhaps other species of turtles.

9:45 AM BIO-6 Movements and Reproduction in the Three-Striped Mud Turtle (*Kinosternon baurii*) from the Everglades. W. E. MESHAKA, JR. Everglades Regional Collection Center, Everglades National Park, 40001 SR-9336, Homestead, Florida 33034-6733. Movements and reproductive characteristics were measured in an Everglades population of the three-striped mud turtle (*Kinosternon baurii*). Reproductive season and bimodality of seasonal movements by gravid females were similar to those of populations near the northern edge of its geographic range. However, reproductive characteristics differed markedly between females of the Everglades and those of an eutrophic canal also in extreme southern Florida. This latter finding is shared by the American alligator, the results perhaps caused by the oligotrophic nature of the southern Everglades.

10:00 AM BREAK

10:15 AM BIO-7 The Home Range Area of the Florida Box Turtle, *Terrapene carolina*, in Central Florida. J. A. LABRAM, T. M. FARRELL, AND P.G. MAY, Stetson University, DeLand 32720. We used radiotelemetry to monitor movement of 12 box turtles in a mesic hammock surrounded by freshwater marsh on the flood plain of the St Johns River in Volusia County. We tracked the turtles from October 1996 to November 1997. We estimated home range area for each turtle using the minimum convex polygon method. Home range size differed greatly among individuals, ranging from 992 to 309,000 m². The turtles had considerable overlap

among their home ranges. The mean female home range area was 101,000 m² (n=5) and mean male home range area was 18,000 m² (n=7). The difference in mean home range size among the sexes was not statistically significant because of low sample size and the great within sex variation in home range area. The turtles with the largest home ranges appeared to greatly increase home range areas in the driest time of year, perhaps in an attempt to find water. We will compare home range area of Florida box turtles with conspecifics from more northerly populations.

10:30 AM BIO-8 The Effects of Temperature and Season on the Activity of the Florida Box Turtle. A. M. HENDRIE, T. M. FARRELL, AND P. G. MAY, Stetson University, DeLand 32720. We studied the activity of 11 adult box turtles, Terrapene carolina, in a hammock in Volusia County Florida for one year. We located the turtles using radiotelemetry and measured air temperature and ground temperature at the site of capture. We classified each turtle as either active (if it was out of cover) or inactive (if it was at least partially hidden). If turtles were inactive we estimated the percent of the turtles carapace that was covered by vegetation or debris. Turtles were active throughout the year with the highest levels of activity occurring in the spring. There was a statistically significant relationship between turtle activity and temperature with the highest levels of activity seen between 26-30 degrees C ground temperature. There was no statistically significant relationship between the percent of an inactive individual's carapace that was covered by debris and environmental temperatures. Activity in this southern population of Terrapene will be compared with the results of studies of more northerly populations of this species.

10:45 AM BIO-9 Coccidian Parasites in a Central Florida Population of Pigmy Rattlesnakes, *Sistrurus miliarius barbouri*. J. L. CHEATWOOD, P. G. MAY, AND T. M. FARRELL Stetson University, Deland 32720. We studied which, if any, coccidian parasites could be found in free-ranging pigmy rattlesnakes. Male and female snakes of various ages found with prey (n=21) were captured and held until they defecated. The fecal samples were placed in 2% K₂Cr₂O₇ and allowed to sporulate for seven to ten days. After sporulation, we suspended the samples in modified Sheather's sugar. All sporulated coccidian oocysts found with light microscope were measured and photographed at 1000x magnification for classification purposes. One species of coccidia was found in the population. Its oocysts were spherical, 12.4µm (11.12µm - 13.50µm) in diameter, and had a double layered oocyst wall. A polar granule was present, but micropyle and oocyst residuum were absent. The sporocysts were ovoid, 9.7µm × 7.6µm (8.86µm-10.5µm × 7.11µm-8.07µm) and had steida and substeida bodies. Of the snakes collected, we found that 9.5% were infected. All infected snakes were adults (>3 years old), and an equal number of male and female snakes were found to be infected.

11:00 AM BIO-10 Behavioral Thermoregulation in the Guanaco (*Lama guanicoe*) in Winter. C.D. CARRASCO (1) D. J. SCOTT (1), A. F. SANBORN (1), AND D. A. DE LAMO (2), (1) Barry Univ., 11300 N.E. 2nd Ave., Miami Shores 33161, (2) Universidad Nacional de la Patagonia San Juan Bosco sede Puerto Madryn y Centro Nacional Patagonico. We determined the effects of ambient condition on behavioral thermoregulation in the guanaco (*Lama guanicoe*) during the winter. Observations were made on a male, female and yearling guanaco during daily activities. At high ambient temperatures ($>10^{\circ}\text{C}$) the guanacos exposed their thermal windows (axillary and groin regions) in a standing position but at lower ambient temperatures ($<10^{\circ}\text{C}$) the thermal windows were closed by changing posture. Bedding was a major mechanism of behavioral thermoregulation. Huddling was always initiated by the yearling with the female as a means to conserve energy. At higher wind speeds or colder temperatures the guanacos would bed with their hind quarters oriented into the wind. With a knowledge of the environmental conditions that the guanacos face in the Patagonia region, we were able to assess their behavioral and physiological responses to a harsh environment. This research was supported by NIH-NIGMS MBRS Grant GM45455-07 and NIH-FIC MIRT Grant TW 00033-04.

11:15 AM BIO-11 Causes of Death in Feral Horses. RONALD R. KEIPER and BERNADETTE M. STOCKSLAGER. The causes of death and age at death were determined for seventy feral horses on Assateague Island over a seventeen year period. Three separate outbreaks of EEE (Eastern Equine Encephalitis) produced 24% of the mortality. An additional 22% of the animals drown from flooding accompanying ocean storms. Sixteen percent of the deaths were caused by human cations while 8% were associated with parturition. Other morality factors included infection, verminous arteritis, and malnutrition associated with advanced age. Mortality rates for adult animals varied from 5.7 to greater than 15% of the population. Foal mortality varied widely from year to year but averaged about 12%.

11:30 AM BIO-12 Cadmium Uptake from Water Using *Salvinia Rotundifolia* in an Controlled Environment. M.S. PODGORSKI (1), J. EMS-WILSON (1), R. J. WRIGHT (1), (1) - West Campus, Valencia Community College, 1800 S. Kirkman Rd., Orlando, 32811 *Salvinia rotundifolia*, a common aquatic fern in Florida, was examined to verify it's capacity to effectively remove cadmium ions from water under stable laboratory conditions. The plants were grown for two weeks in the laboratory conditions to allow for adjustment. Cadmium in the form of a nitrate salt was introduced and water and plant samples were tested with an atomic absorption spectrophotometer. Chlorophyll extracts were also taken from the plants before and after to determine the effect of high cadmium levels.

11:45 BUSINESS MEETING (BIO)

W. E. MESHAKA, MUSEUM/EVERGLADES NATIONAL PARK, presiding

FRIDAY, 9:00 AM BUSH 326

SESSION B: MARINE ECOLOGY

TERRENCE FARRELL, STETSON UNIVERSITY, presiding

9:00 AM BIO-13 The Effects of UV-B Radiation of *Enteromorpha intestinalis* Reproduction. JILL PELOQUIN AND BRITT CORDI. (Dr. Sheila Hanes), Plymouth Environmental Research Centre, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, England. (Eckerd College, 4200 54th Avenue South, St.Petersburg, FL). Ozone depletion, caused by anthropogenically introduced chlorofluorocarbons, has been correlated with the increase of UV-B radiation (280-320 nm). Since macroalgae constitute the majority of oxygen production in the world's oceans, it is important to investigate the effects of UV-B on these primary producers. Isolated zoospores from *E. intestinalis* were exposed to increasing levels of radiation and were assayed according to expressed chlorophyll fluorescence. The investigation resulted in a marked decrease in photosynthetic potential in exposed zoospores.

9:15 AM BIO-14 Whole Water Analysis of Chlorophyll-a in Tampa Bay Waters. JOHN J. PACOWTA AND J.O.R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. Chlorophyll-a is an important indicator of water quality and has been selected to manage external loading of nitrogen to Tampa Bay. The spectrophotometric method for chlorophyll-a measurement is more widely used but requires several steps involving sample transfer which may increase chance for error. Whole water analysis uses 0.7 ml of sample mixed with 6.3 ml 100% acetone. No other transfer of sample is needed after this step. After extraction, chlorophyll-a is measured in a filter fluorometer, optically configured to provide sensitive determination of chlorophyll-a with out the need for acidification. About 2000 samples have been analyzed since January 1995 using both the whole water and the spectrophotometric techniques. Results from this comparison will be presented.

9:30 AM BIO-15 General Trends of Phytoplankton Distribution and Composition Throughout Hillsborough and Middle Tampa Bay, Florida. K. HENNENFENT, City of Tampa, Bay Study Group, 2700 Maritime Boulevard, Tampa 33605. Phytoplankton trends were examined utilizing data collected since the late 1970's from two stations located in Hillsborough Bay and one station in middle Tampa Bay. Taxonomy and enumeration were performed and employed to determine variations among the distinct taxa. The phytoplankton were grouped as diatoms, dinoflagellates, phytoflagellates, and blue green algae for assessment of seasonal and regional characteristics. Concentrations of these principal groups will be compared and addressed.

9:45 AM BIO-16 Long-Term Trends of Phytoplankton Production Rates in Tampa Bay, Florida. J.O.R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. The City of Tampa Bay Study Group is maintaining a near 20 year long record of Tampa Bay phytoplankton production rates. Measurements using the *in situ* ^{14}C method have been collected on a monthly schedule since 1978 at two stations in Hillsborough Bay and since 1979 at one station located in Middle Tampa Bay. Current annual production rates, about 370 gC/m^2 for Hillsborough Bay and about 280 gC/m^2 for Middle Tampa Bay are near half of the rates measured prior to the mid 1980s. The decrease in annual production is reflected in a 65 percent reduction in dissolved inorganic nitrogen loading from primarily point-sources discharging to Hillsborough Bay that occurred in the late 1970s and early 1980s. Seasonal phytoplankton production rates reach maximum during the warm summer months and follow seasonal variations in solar radiation and water temperature better than variations in freshwater inflow, external nitrogen loading and phytoplankton biomass. The apparent decoupling between phytoplankton production and external nitrogen loading indicates that the availability of recycled nitrogen is important in controlling Tampa Bay primary production.

10:00 AM BREAK

10:15 AM BIO-17 Lab measure of detritus production in the seagrass *Thalassia testudinum*. J.C. LOPEZ, G.M LEWIS, R.A. KASPEREK, A.D. BOWE, AND J.R. MONTAGUE, SNHS, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161. Above-sediment tissues of attached *T. testudinum* were harvested from a site along the bayside of Virginia Key over a two-week period in Fall, 1997. *T. testudinum* leaf blades were cut and sorted into portions of green (undecayed) tissue and necrotic (fully decayed) tissue. These were placed within mesh-stocking bags and immersed in 20-gallon aquaria for three weeks. Wet weights were measured in each sample roughly once every four days. The decayed tissue released significantly more biomass into detritus (roughly 3% total wet weight per day) than green tissue (roughly 2% per day). The lab rates were comparable to several published field estimates of detritus production. (Supported by NIH MARC grant and Barry University).

10:30 AM BIO-18 Seagrass Monitoring in Hillsborough Bay, Florida. W.M. AVERY, City of Tampa, Bay Study Group, 2700 Maritime Boulevard, Tampa 33605. The City of Tampa (COT) has monitored the reestablishment of seagrass in Hillsborough Bay since 1986. Monitoring techniques have been modified as a result of expanding seagrass coverage and recent technological innovations. Presently, the COT utilizes a combination of high and low altitude photography, on site ground truth surveys, and delineation of seagrass meadows by GPS to follow changes in seagrass coverage. Additionally, the COT is developing a seagrass program under

the auspices of the Tampa Bay National Estuary Program. This program is proposed to be an interagency effort to monitor changes in distribution and coverage of the major seagrass species in Tampa Bay.

10:45 AM BIO-19 How the Growth of one Small Plant can Save the Planet. An Analysis of Mangrove Growth Factors and Soil Chemistry in Mitigation Sites: A three-year Study Showing Evidence of Failure of Current Systems and Suggested Strategies for Improvement. RANDY DOUGHERTY AND BARBARA E. ROTHSTEIN, NMB Biomedical and Environmental Science Magnet, 1247 NE 167th Street, N. Miami Beach, Florida 33162. The entire premise of mitigation (replanting) is inconsistent with the natural process by which mangroves grow. Low growth rates correlated to the low tidal flow of such areas and water chemistry analysis indicated that mitigation as it is currently carried out is not effective. Mangroves must be planted in sequential rows parallel to the shore instead of in large inland areas. By sequentially adding rows of mangroves, the natural process by which mangroves thrive is simulated providing the necessary tidal flows and soil chemistry for optimal growth. Results and model for mitigation are being utilized by the Park Service to design and implement better mitigation systems.

11:00 AM BIO-20 Scleractinian Corals from Patch Reefs off the West Central Florida Coast. CHRISTOPHER W. D. GURSHIN AND STANLEY A. RICE. Department of Biology, University of Tampa, Tampa 33606. With little natural limestone substrate off the west central Florida coast, the scleractinian corals that offer refuge to numerous marine fishes and invertebrates have been restricted to small patch reefs and artificial reefs. Because corals in this region are exposed to harsher environmental conditions than their counterparts in the Caribbean Sea, our research focused on determining whether corals from this region have evolved differently in morphology to adapt to life in the Gulf of Mexico. By study of skeletal morphology, live polyps, live colonies, and their growth patterns, we gathered new information on 11 species. For the first time, *Madracis decactis* was positively identified in this region and found in abundance on some reefs. Other findings of morphological variation in some species suggest uncertainty of species status. The corals collected and examined in this study include: *Scolymia lacera*, *Manicina areolata*, *Isophyllia sinuosa*, *Cladocora arbuscula*, *Solenastrea hyades*, *Stephanocoenia michelini*, *Porites furcata*, *Siderastrea siderea* and *S. radians*.

11:15 AM BIO-21 Records of Mysids from Shallow Water Non-Reef Habitats of Little Cayman Island, BWI. W.W. PRICE (1), R. W. HEARD (2), J. T. HARRIS (3), AND C. M. R. MCCOY (4), (1) Univ. of Tampa, Tampa, 33606, (2) Univ. of Southern Mississippi, Inst. Mar. Sci., Ocean Springs MS 39566, (3) Clean Energy Tech., Sarasota 34234, (4) Dept. Of Envir., Nat. Res. Lab., Georgetown, Grand Cayman Islands. During May 1995, 11 species of mysids were collected from shallow water marine non-reef habitats surrounding Little Cayman Island. An

undescribed species of mysid, Siriella chierchiaie has been previously reported from the Cayman Islands. During May 1995, 11 species of mysids were collected from shallow water marine non-reef habitats surrounding Little Cayman Island. An undescribed species of Heteromysis may be endemic to the Cayman Islands. Three species, Amathimysis serrata, Heteromysis coralina and Siriella chessi are reported for the first time since their description. The other seven species collected have a widespread distribution throughout the Caribbean: Anchialina typica, Antromysis bahamensis, Bowmaniella bacescui, Mysidium columbiae, M. gracile, M integrum and Mysidopsis brattstoemi. We thank the Cayman Islands Marine Conservation Board for granting permission to sample.

11:30 AM BIO-22 The Tagmatized Echinoderm. R.L. TURNER, Department of Biological Sciences, Florida Institute of Technology, 150 West University Boulevard, Melbourne 32901-6975. Tagmosis is a derived condition of metamerism in annelids, arthropods, and chordates in which groups of adjacent segments are modified to perform specific functions. Examples are the clitellum of earthworms, the carapace of lobsters, and the sacrum of tetrapods, to mention a few of many. Examples of tagmosis are not hard to find among echinoderms, a fourth major phylum of metamerized animals; but the degree of tagmosis is weak in most cases. The first few elements of the axial skeleton are often fused as special structures (jaws and other parts of the oral frame, lantern supports) in asteroids, echinoids, and ophiuroids. Crinoid pinnules occur in groups along the arms as genital pinnules and oral pinnules. Porcellanasterid sea stars have cribriform organs along the marginal plates for generation of respiratory currents. Well-developed podial pores and podia are restricted to basal segments of the ophiuroid genus Ophiomusium. Ambulacral plates of most post-Paleozoic echinoids occur in clusters that result in arcs of pore-pairs and in the compound formation of spine tubercles, giving rise to several non-cidaroid tagmatized patterns. The strongest degree of tagmosis occurs in the bilaterally symmetrical echinoids, with petals, phyllodes, plastrons, and frontal ambulacra; and tagmosis differs among the axes. Tagmosis is poorest in holothuroids, bodies of which are almost entirely composed of extra-axial elements.

11:45 AM BUSINESS MEETING (BIO)

W. E. MESHAKA, MUSEUM/EVERGLADES NATIONAL PARK, presiding

FRIDAY, 3:00 PM BUSH 326

SESSION C: MARINE ECOLOGY

W. E. MESHAKA, MUSEUM/EVERGLADES NATIONAL PARK, presiding

3:00 PM BIO-23 The Distribution of the Tunicate B. Digonas (Abbot) and the Seasonal Phytoplankton Biomass Relationship in Tampa Bay. GENE PINSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. Since 1987,

large abundance of the benthic tunicate, Bostrichobranchus digonas, have been observed in areas of Tampa Bay during the winter months. Dense concentrations of this filter feeder, may shift the control of phytoplankton biomass from top-down control, during the warm period, when the phytoplankton is driven by nutrient supply to bottom-up control, during the cold period, when predation impacts the Tampa Bay phytoplankton population. During the winter of 1994-95, the Bay Study Group mapped the spacial distribution of B. digonas throughout Tampa Bay by sampling 115 stations using a benthic trawl with a 60cm opening. Temporal and spacial distribution of B. digonas and the relationship to phytoplankton biomass will be discussed using updated information from the 1997-98 season. Additionally, improved techniques delineating spacial distribution using underwater video equipment and DGPS will be presented.

3:15 PM BIO-24 The Ecology of Matanzas Inlet: Part I. An analysis of the species composition and seasonal distribution of the juvenile fish populations. C. L. DeMORT, J. LITTLEJOHN, S. CIRRENS, and T. SOUDER. Coastal Fisheries Lab. Univ. Of N. Fl. 32224. Matanzas Inlet is located at 29deg., 42',5" N latitude and 81 deg., 13', 42W longitude on the Atlantic Coast of Florida, just north of Marineland. The average winter temperature @ 1M depth is 17.5 C, with an average summer temperature of 30 C. Average salinity in the winter was 17‰ and in the summer is 26 ‰. Dissolved oxygen ranged from 9.0ppm @ 1M depth in the spring to 5.0ppm in late June and July for the period from December, 1996 through November, 1997. A total of 62 species of juvenile fish were collected from the inlet through a combination of bottom trawl, seine, and cast net. The most abundant species in the inlet throughout the year were *Mugil cephalus*, *Fundulus majalis*, and *Trachinotus falcatus*. A large number of juvenile Burrfish and juvenile smooth trunkfish were collected in both seines and plankton nets in June and July. Leatherjackets and lesser electric rays were collected only in November. A total of 17 juvenile king mackerel were collected only in October and early November.

3:30 PM BIO-25 The ecology of Matanzas Inlet. Part II. An analysis of fish population dynamics, Summer, 1997. JIMMY LITTLEJOHN, SHERRY CURRENS, and CAROLE DEMORT. Coastal Fisheries Lab. Univ. of N. Fl. 32246. Matanzas Inlet is the last natural inlet on the east coast of Florida. The study area is a shallow estuary created by an opening in the barrier island chain running parallel to the coast. The inlet lies along the tropical/ temperate transition zone and includes species characteristic of each zone. Biweekly biological sampling was done using seines, cast nets, and plankton nets. Water analyses were conducted at the same times and sites. A total of 29 juvenile fish species were identified from June through August. The most abundant species were *Brevoortia tyrannus*, *Anchoa hepsetus*, and *Leiostomus xanthurus*. Major predators appeared to be the bottle-nosed dolphin, Jack Crevalle, and Red Drum.

3:45 PM BIO-26 Effect of Size and Water Temperature on the Feeding, Growth and Food Conversion of Triploid Grass Carp Utilizing Hydrilla. J. A. OSBORNE. Department of Biology. University of Central Florida, Orlando, Florida 32816. Between February, 1994 and December, 1995, 30 feeding trials were conducted using triploid grass carp fed hydrilla. Size of fish ranged from .2 to 9.1 kg and water temperatures ranged from 17 to 29 C. Feeding trials were carried out in 4 m³ wire mesh cages suspended at weekly intervals in an experimental pond on the campus of UCF. Utilizing pre and post weights of fish and hydrilla; feeding rate, growth rate, and feeding efficiency were determined for fish size and water temperature ranges. While relative feeding rates declined with increase in fish size, absolute feeding rates tended to level out for fish weighing more than 1 kg. Weight gain, relative and absolute feeding rates and feeding efficiency were found increase with water temperature. Relative and absolute feeding rates for .2-.4 kg fish at 17 C were approximately 25% of that for similar sized fish at 27 C. The optimal temperature was 25 C.

4:00 PM BIO-27 The Effects of Beach Nourishment on Sea Turtle Nesting Habitat. T.L. MUELLER, J.J. FOOTE, AND J. SPRINKEL, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. The mid-key portion of Longboat Key, a barrier island bordering Sarasota and Manatee counties, Florida, has been nourished twice in the past ten years. The first nourishment project in this area occurred in 1993, followed by a second project in 1996. Data concerning hatch success and incubation periods of loggerhead (*Caretta caretta*) sea turtle nests in this area both before and after each of these projects are analyzed in order to determine the effect of beach nourishment on hatchling survivability. Factors affecting nests such as sand compactness and position of nests on beach are observed to determine possible causes of change in hatch success and incubation periods.

4:15 PM BIO-28 Fecal Coliform Bacteria Isolated from the Cloacae of the Diamondback Terrapin (*Malaclemys terrapin centrata*). V.J. HARWOOD, S.BROCK, A. DEASIS, S. HWANG, S. MILLIGAN, D PARRISH AND V. WAGNER. Dept. Natural Sciences, Univ. of North Florida, Jacksonville 32224-2645. As part of a continuing study on the sources of fecal coliform contamination to natural waters of northeast Florida, the cloacae of twenty-nine diamondback terrapins collected from a nesting beach on the Nassau River (Duval County) and in nearby tributaries were sampled for total and fecal coliform bacteria. Samples from 69% of turtles tested were positive for total coliforms, and 52% were positive for fecal coliforms Most probable number estimates for fecal coliforms in positive samples ranged from 4 - 177 bacteria per swab. When fecal coliforms were identified at the species level, *Escherichia coli*, *Klebsiella pneumoniae*, and *Citrobacter Freundii* were detected. Fecal coliforms are used by all regulatory agencies as indicator organisms to predict the possibility that human pathogens are

present in water, however the usefulness of the indicator system is predicated on the assumption that the source of the indicator bacteria is human, or at least mammalian. The use of antibiotic resistance patterns of indicator bacteria to determine their source may significantly enhance the accuracy and usefulness of bacteriological indicator systems for predictions of water quality.

4:30 PM BIO-29 Activity Budgets of the Florida Manatee in Sarasota Bay, Florida. S.L. WEBB AND J.K. KOELSCH, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota 34236. Activity budgets are useful for comparing regional or seasonal differences in behavioral patterns, which may influence management strategies. We calculated activity budgets for Florida manatees (*Trichechus manatus latirostris*) in Sarasota Bay, Florida, to gain insight into their behavioral repertoire. During 1995 and 1996, we conducted point-sample focal animal observations of 45 individuals during 68 sampling periods, resulting in usable data from 1,242 intervals. Manatees traveled, milled, rested, and fed more than they socialized or played. Activity budgets of males and females differed ($p < 0.001$); males most often milled whereas females most frequently rested. Significant differences were also found among size classes ($p < 0.001$); adults milled and traveled more, whereas subadults more often rested and socialized. In addition, behaviors varied significantly by time of day ($p = 0.002$); although manatees frequently traveled and milled during all three time periods (morning, afternoon, late afternoon), they played almost exclusively during mornings.

ENGINEERING SCIENCE

FRIDAY 3:00 PM BUSH 127

AL HALL, CITY OF TALLAHASSEE, presiding

3:00 PM ENG-1 The application of Juran's Triprol and Trilogy methodology in Engineering Education. G. GARRIDO, F. B. BUONI, Florida Institute of Technology, 150 West University Blvd., Melbourne, FL 32901. We investigate the application of Juran's Triprol and Trilogy methodology to model and improve the educational process at a technical university. We will discuss progress in defining the quality system matrix within the context of the university, college, course, academic program, and course levels, and how, for each level the quality categories, stakeholders, needs, product design, and process designs are identified.

3:15 PM ENG-2 Optimality of Experimental Designs. S. SODRE DA SILVA, Florida Institute of Technology, 150 West University Boulevard, Melbourne, Florida 32901. In the area of the design of experiments where the objective of the experimenter is to estimate parametric functions of the model parameters, one of the

experimenter's most crucial task is to determine the optimal choice of the controllable factors. Although balanced two-level factorial designs are widely used in education and industry, we will show that the optimal choice of the controllable factor is, in fact, unbalanced except in the case where the experimenter's objective is to estimate single parameters of the regression model.

3:30 PM ENG-3 Optimizing a Temperature Control System to Increase the Temporal Stability of Resistive NMR Magnets. M. E. SABO 91), J. P. VIELE (2), J. R. CROSS (2), AND V. G. SOGHOMONIAN (3), (1) National High Magnetic Field Laboratory, 1800 E. Paul Dirac Dr., Tallahassee, FL 32310, (2) CMS Data Corp., 101 N. Monroe St., Tallahassee, FL 32301, Center for Interdisciplinary Magnetic Resonance, 1800 E. Paul Dirac Dr., Tallahassee, FL 32310. Temporal Stability of the magnetic field is critical for conducting nuclear magnetic resonance (NMR) experiments that require extensive signal averaging. A change of 1°C in the temperature of the inlet water causes a 17 ppm shift in the magnetic field. The sources of instabilities were identified and the control scheme modified to maintain temperature control during both steady state and transient conditions. The resulting temperature control system reduced the temperature excursions by a factor of 2.6 during transient conditions.

FRIDAY 3:45 PM BUSH 127

BUSINESS MEETING: ENGINEERING SCIENCE
AL HALL, CITY OF TALLAHASSEE, presiding

ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCES

FRIDAY, 8:00AM BUSH 234

SESSION A

EILEEN PEREZ,, UNIVERSITY OF SOUTH FLORIDA, presiding

8:30 AM ENV-1 Red Tide Toxin and Airways Disease. MELISSA L. DERBY(1), JOSEPH J. KRZANOWSKI(2), RICHARD F. LOCKEY(3), DEAN F. MARTIN(1). (1) Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620, (2) Department of Pharmacology, College of Medicine, University of South Florida, Tampa, FL 33620, (3) Division of Allergy and Immunology, Department of Internal Medicine, College of Medicine, University of South Florida, Tampa, FL 33620. Over the years red tide has been found to have many different effects on the environment and man. In this study, we will be looking at the effect of the ten different brevetoxins and the allelopathic compounds of *Nannochloris sp.* to determine its effect on airways. We

will also look at what the different R groups role is on the airways. The study will consist of using models to determine the effects of the aerosolized brevetoxin and another study in which brevetoxin is injected into a bath. There will also be a study on the comparisons and differences of the synthetic brevetoxin (the purified brevetoxin bought from companies) and the crude extract of brevetoxin.

8:45 AM ENV-2 Inhibition of Salvinia by Cattail. Part 1: Chlorophyll Production and Growth. MARIA T. GALLARDO, BARBARA B. MARTIN, AND DEAN F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. The allelopathic potential of a cattail species (*Typha domingensis*) towards other aquatic species was studied using the common water fern salvinia (*Salvinia minima*) as a test organism in a short term bioassay. Aqueous extracts of the cattail plants as well as two of its allelopathic phenolic compounds (2-chlorophenol and salicylaldehyde) were found to inhibit the growth and chlorophyll production of salvinia. It is possible that cattail extracts could be used, under controlled conditions, for the biological management of salvinia.

9:00 AM ENV-3 Phytotoxicity and Allelopathy of Bulrush (*Scirpus validus*). MARIA T. GALLARDO AND DEAN F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. The effect of short and long term exposure to aqueous extracts of *Scirpus validus* was evaluated using lettuce seeds (var. Black Seeded Simpson) and the common water fern salvinia (*Salvinia minima*). The extracts were found to inhibit the germination of lettuce and to inhibit growth, chlorophyll production, and oxygen production of salvinia. Upon fractionation of the extracts, the fractions responsible for this effects were characterized.

8:45 AM ENV-4 The Dissolved Oxygen Status of Tampa Bay, Summer 1993 - 1996. STEPHEN A. GRABE AND DAVID KARLEN. Environmental Protection Commission of Hillsborough County, 1410 21st. St. N. Tampa, FL 33605. The dissolved oxygen [DO] status of Tampa Bay is an integral element of the annual bay-wide benthic monitoring program, which has been on-going since 1993. These surveys include daytime monitoring of the water column as well as overnight monitoring at selected stations to determine the diel DO minimum. The sampling design employed is the random, probability-based approach pioneered by the USEPA's "EMAP". Tampa Bay was stratified into seven segments. The number of randomly located sampling points within a bay segment ranged from 15-40 and the total number of sampling points ranged from 90 -> 140 per year.

9:15 AM ENV-5 Is Recycling Worth the Effort? BARBARA B. MARTIN AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 33620. Affected

counties in Florida met the targets set by in the 1988 Florida Solid Waster Act. Now it seems pertinent to review the current status and revisit the question of the usefulness and problems of recycling. For example, how much solid waste might we expect to be produced, and how much land might be consumed for landfills? (Less than you might think.) Is recycling cost-effective? (Depends.) Does recycling contribute to air pollution? (In some places it does.) These and related questions may not be popular, but they should be asked and addressed.

9:30 AM ENV-6 Analysis of Selenium Supplement Tablets. K. M. EASTMAN, R. F. BENSON AND D. F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. Selenium has recently become a topic of interest because of its antioxidant and consequently anticarcinogenic properties. Although we only need very small amounts of selenium in our diets, supplements have become popular in areas like Tampa Bay, Florida, which are selenium deficient. It has been shown that a deficiency in selenium can lead to blood cell abnormalities, impaired circulatory function, and muscle weakness. Commercial selenium supplement tablets are supposed to contain $100\mu\text{g}$ of selenium that is organically bound to yeast. This is 200% of the recommended amount of $50\mu\text{g}/\text{day}$ for an adult. The variation between tablets of the same manufacturer and the variation in tablets between different manufacturers was studied in order to determine if the supplement tablets really contain the amount that they claim.

10:00 AM BREAK

10:15 AM ENV-7 Investigation of Breakdown Products of a Pesticide Mixture. J. McHONE, C. L. GEIGER, E. OFORI, Chemistry Department, University of Central Florida, Orlando, 32816-2366. A review of published information as well as new research results related to the breakdown products of pesticide mixtures will be presented. Five agricultural chemicals were used individually and in combinations to treat specimen plants in a greenhouse setting over a period of eight months. Soil and water samples were collected, extracted, and analyzed using gas chromatography with either a flame ionization or a mass spectrometer detector. These samples were compared to the components of the pure pesticides and differences were noted. A comparison of the components found in the combination samples with breakdown products of individual pesticides will be presented.

10:30 AM ENV-8 Inhibition of Tumor Cell Proliferation by Synthetic Pyrroles. T. R. WRIGHT, H. PRICE, G. CUNNINGHAM, Dept. Of Chemistry, UCF, Orlando, FL 32816-2366. Leukemia (L1210) and Melanoma (A375) cell lines were studied in this investigation. The purpose of this investigation was to test for toxicity and mode of action of a series of halogenated pyrroles against the selected cell lines. The drugs were prepared at concentrations ranging from 0.1 to $100\mu\text{M}$

. 996 well plates were utilized along with a CellTiter96 AQ™ Non-Radioactive Cell Proliferation Assay (Promega), to determine the effectiveness of the pyrroles. The basis of this assay is founded on the reduction of the tetrazolium, MTS, to the formazan in the presence of reducing equivalents (e.g. NADH and NADPH.). The formation of the colored formazan is accelerated by the addition of Phenazine methosulfate (PMS). Cell proliferation can be linked to formation to formazan formation by measuring absorbance at 490 nm. Microtiter plates were analyzed using an automated plate reader (Molecular Devices Corp.) Results of these preliminary studies have identified two active pyrroles. Studies performed at the Parke-Davis Pharmaceutical Research Division, Pathology and Experimental Toxicity, (Ann Arbor, Michigan) discovered that some other actions proposed for pyrroles include inhibition of protein kinases act via inhibition of HMG-CoA reductase. This enzyme is involved in cholesterol biosyntheses and ketone body formation. Future studies of these substituted pyrroles will seek to determine the mode of action by these active halogenated pyrroles.

10:45 AM ENV-9 Use of Sonication-Enhanced Zero-Valent Iron to Degrade Chlorinated Solvents in Groundwater. N. RUIZ (1a), D. REINHART (1a), C. CLAUSEN (1b), AND C. GEIGER (1b), (1) University of Central Florida, P.O. Box 162993, Orlando, 32816-2993, (1a) Dept. of Civil and Environmental Engineering, (1b) Dept. of Chemistry. Permeable iron barriers have gained popularity in the past decade as a near-passive in situ remediation technology for halogenated organic solvents. A continuing problem is the loss of iron reactivity over time, most probably due to a build up of corrosion products or other precipitates on the iron surface. If these materials can be removed, the lifetime of an iron barrier may be significantly extended. Batch studies exposed coarse iron filings in natural groundwater to ultrasonic energy prior to contact with trichloroethylene. Results indicate that a sonication period as brief as one hour can have a significant positive impact on the first order degradation rate constant and the fraction of nonchlorinated species among the daughter products, suggesting that ultrasound may be a candidate technique for enhancing or restoring iron activity.

10:00 AM ENV-10 Drugs and the Human Body: Incorporating Chemistry Into the Liberal Arts Curriculum. J. E. HAKY, Department of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton, FL 33431. The basic science courses offered to liberal arts college students can often be boring to them and reinforce their negative attitudes toward science and its relevance. In response to this, we have developed a course based on the impact of drugs on our society, a subject which even the most chemophobic students find interesting. In the context of how both legal and illegal drugs affect individuals and society, students are introduced to the basic principles of general chemistry, organic chemistry and biochemistry. Additionally, students are presented with interesting societal problems (e.g., the debate over animal testing) which require them to investigate

issues and present opinions based upon sound scientific reasoning. The impact of this course on the attitudes and understanding of liberal arts students towards science and the scientific method will be discussed.

11:15 AM ENV-11 The Development of an Electrokinetic Technique for In-Situ Remediation of Soils Contaminated with Heavy Metals. VANESSA N. PRASAD (1), C.L. GEIGER (1), C.A. CLAUSEN (1), D. REINHART(2), University of Central Florida, Department of Chemistry(1) and Civil and Environmental Engineering(2), Orlando, 32816-2366. Metals such as zinc and lead are common soil contaminants at industrial sites. Disadvantages of current soil remediation techniques and some advantages of an electrokinetic technique will be compared. A schematic of an electrokinetic treatment process, description of the experimental apparatus, and data from this study will be presented. The current experimental data will be used to support the design of a field application process. The potential benefits and applications to NASA, Kennedy Space Center (funding agency) will also be discussed.

11:30 AM ENV-12 Economics of a Method for Separating Copper and Chromium from Electronic Wastes. CHUHUA WANG AND DEAN F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 33620. One of the consequences of the electronic industry is the waste that comes from the etching of computer boards. The waste contains a mixture of copper and chromium in an acidic solution. Previously, we have described a method for separating this material. At this time, we consider estimates of the costs for doing this separation by supra-cloud-point extraction.

11:45 AM BUSINESS MEETING: ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCES

FRIDAY 3:00 PM BUSH 234
SESSION B
EILEEN PEREZ, presiding

3:00 PM ENV-13 Non-Polluting Fertilizers. JAY W. PALMER, Institute for Environmental Studies, Department of Chemistry University of South Florida, 4202 E. Fowler Ave., CHE 306, Tampa FL 33620-5250. In recent years, chemical fertilizers have acquired a reputation as being responsible for most of the pollution found in our lakes and waterways, There are a number of ways for making fertilizers less-polluting. The merits of some of these methods will be discussed.

3:15 PM ENV-14 Hollow Carbon Coated Denuders as a Sampling Device for Tandem Mass Spectral Analysis of Organic Analytes. W.G. SAWYERS AND R.S.

BRAMAN. University of South Florida, Tampa, FL. Technological developments have enabled the detection of extremely low levels of organic compounds. As detection limits decrease, background levels of trace organics become apparent. The use of carbon coated hollow quartz tubes for the sampling of trace organic compounds in air and the interface to the mass spectrometer will be discussed. Detection is accomplished using a triple stage mass spectrometer (MS/MS). The method that will be discussed has analysis times of under one minute. Analytes are not chromatographically resolved; rather are resolved within the quadrupoles of the instrument based on their mass and characteristic product ion.

3:30 PM ENV-15 Comparative techniques in the undergraduate teaching laboratory: The chromatographic separation of plant pigments. DEBORAH W. LOUDA AND J. WILLIAM LOUDA, Department of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton 33431. Often, students are exposed to but one technique for any given procedure. We have recently expanded certain teaching laboratory experiments to include a 'comparative methods' approach. That is, we have the student or teams of students perform the same experiment in 2 or more ways. In the present case, we examine the separation of higher plant pigments (chlorophylls and carotenoids) in spinach. The students perform these separations with thin-layer (TLC), 2-D TLC, column (CC), and high-performance liquid (HPLC) chromatography. They then must compare and contrast the advantages and disadvantages of each method here as well as to paper chromatography (PC) which they utilize in another comparative lab session (PC and titration for amino acids). Sample separations, student results and future directions will be discussed.

3:45 PM ENV-16 Hydrogen Peroxide Enhanced Oxidation and Removal of Nitrogen Oxides from Flue Gases. L.M. TAZI (1), M. COLLINS (2), Q. D. NGUYEN (2), C. D. COOPER(2), AND C. A. CLAUSEN (1). University of Central Florida (1) Department of Chemistry, (2) Department of Civil and Environmental Engineering, Orlando, Florida 32816. Nitrogen oxides (NO_x) and sulfur oxides (SO_x) are criteria air pollutants, emitted in large quantities from fossil-fueled electric power plants. Emissions of SO_x are currently being reduced significantly in many places by wet or dry scrubbing of the exhaust or flue gases, but most of the NO_x in the flue gases is NO , which is so insoluble that it is virtually impossible to scrub. The removal of NO_x in wet or dry scrubbers could be greatly enhanced by gas-phase oxidation of the NO to NO_2 , HNO_2 and HNO_3 which are much more soluble in water than NO . This paper will discuss both laboratory and field studies which show how this oxidation can be accomplished by injection of liquid hydrogen peroxide into the flue gas. The H_2O_2 vaporizes and dissociates into hydroxyl radicals, where the active OH radicals then oxidize the NO and NO_2 to scrubbable species.

4:00 PM BREAK

4:15 PM ENV-17 The Use of Ultrasound to Study the Sorption Properties of Zero-Valent Iron. C. L. GEIGER(1), C. A. CLAUSEN(1), P. TOY(1), N. RUIZ(2), D. REINHART(2), Departments of Chemistry(1) and Civil and Environmental Engineering(2), University of Central Florida, Orlando, 32816. Laboratory tests were conducted to examine the effect of ultrasound on the reaction rate of chlorinated hydrocarbons and zero-valent iron. Application of ultrasound was also used to qualitatively and quantitatively identify species sorbed to the surface of the iron. Experiments were performed under anaerobic conditions in collapsible bags using trichloroethylene (TCE) and two types of iron, 100 mesh and Peerless. Exposure to ultrasound enhanced the reaction rate due to an increase in available surface area. The energy supplied by ultrasound was also sufficient to release TCE and its respective by-products from the surface of the iron.

4:30 PM ENV-18 Comparative Physicochemical Evaluation in Open and Causeway-Impounded Creeks in the Timucuan Estuary, St. Johns River, FL. S. L. FOX (1), C. L. MONTAGUE (1), AND K. J. SULAK (2), (1) Univ. Of Florida, Dept. Of Environmental Engineering Sciences, Gainesville, 32611, (2) USGS/BRD, Gainesville, 32653. Causeways associated with an arterial roadway through the Timucuan Ecological and Historical Preserve have restricted water flow in several creeks. Possible problems associated with restricted flow are decreased access to habitat by fish, change in the pattern of variation in aquatic environmental parameters, and fine sediment accumulation. An investigation of the extent of these effects has been undertaken in advance of a decision to reopen flow-restricted areas to tides in the main river. Research addressing diversity and abundance of fish and bioaccumulation of contaminants in oysters in the flow-restricted areas will be presented elsewhere. Results to date from an analysis of environmental parameters (temperature, pH, salinity, turbidity, dissolved oxygen) and sediment contamination will be presented.

4:45 PM ENV-19 Sandbox Studies of an In-Situ Technique for the Remediation of TCE Contaminated Groundwater. L.R. PETTEY (1), C.L. GEIGER (1), C.A. CLAUSEN (1), D. REINHART (2), University of Central Florida, Dept. of Chemistry(1) and Civil and Environmental Engineering(2), Orlando, 32816-2366. Trichloroethylene (TCE) was used extensively as an industrial cleaner and is a common groundwater contaminant. An experimental aquifer model built to simulate migration and destruction of a contaminant (TCE) in an unconfined saturated porous media will be described. Chemically reactive walls are studied in this model for the purpose of developing design data that can be used to implement a field test program. This data as well as studies of new and low cost methods for building reactive permeable treatment walls will be presented.

5:00 PM ENV-20 The Development of an Analytical Technique for the Analysis of Heavy Metal Contaminants in Soil Samples Through the use of Microwave Digestion. MANUEL J. MORA(1), C.L. GEIGER (1), C.A. CLAUSEN (1), D. REINHART (2), University of Central Florida, Dept. of Chemistry(1) and Civil and Environmental Engineering(2), Orlando, 32816. Heavy metals such as zinc and lead are common soil contaminants. Conventional digestion techniques for the recovery of heavy metals from soils are lengthy and inconvenient. Microwave digestion is presented as a simple, time efficient and cost effective procedure for the recovery of the heavy metals from soil samples. Calibration curves for the extraction of several different metals through conventional means and microwave digestion are compared for precision. The tested method was applied to samples obtained from remediated soil.

5:15 PM ENV-21 The Search For Anti-Tumor Drugs From Plants in the Azores. L. KATAKAM, G. N. CUNNINGHAM, AND D. H. MILES, Dept. Of Chemistry, University of Central Florida, 4000 Central Florida Blvd., Orlando FL 32816-2366. Twenty-seven marine and terrestrial extracts from the Azores were screened for anti-tumor activity using a cell proliferation. The cell proliferation assay is a new procedure developed by Promega and the assay uses a tetrazolium salt, that is bioreduced by cells into a formazan that is soluble in tissue culture medium. The absorbance of formazan at 490 nm (measured directly from 96 well plates) is directly proportional to the number of living cells in the culture. Therefore, the assay measures the percent cell proliferation in the presence of plant extracts which may contain new anti-cancer drugs. This indicates if the extracts possess any significant amount of cytostatic effect on the human malignant melanoma cell line, A375. Three of the extracts exhibited significant amount of activity, as evidenced by the G150 values of less than 12.5 $\mu\text{g/ml}$, which represent the lowest concentration of the extract that inhibits 50% of the cancer cell growth when compared to a control. Further analysis includes isolation of the particular compounds that are responsible for the significant activity exhibited by the three extracts.

SATURDAY, 9:00AM BUSH 234

SESSION C

C. L. GEIGER, UNIVERSITY OF CENTRAL FLORIDA, presiding

9:00 AM ENV-22 Efforts Toward the Characterization of Allelopathic Materials Produced by Nannochloris Eucaryotum. E. PEREZ (1), D. F. MARTIN (1), W. SAWYERS (2), (1) Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620, (2) Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. It has been found that the green alga, Nannochloris eucaryotum, is allelopathic toward Florida's red tide dinoflagellate, Gymnodinium

breve. This research is concerned with the characterization of the N. eucaryotum allelopathic toxins, in addition to the factors affecting the alga's growth and production of the toxins.

9:15 AM ENV-23 Inhibition of Florida's Red Tide Organism by Nannochloris Oculata. E. PEREZ (1), D. F. MARTIN (1), W. SAWYERS (2), (1) Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620, (2) Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. Nannochloris oculata is allelopathic toward Florida's red tide dinoflagellate, Gymnodinium breve. The toxins have been identified, and the effective concentrations on G. breve were determined. In addition, N. oculata's growth constant, doubling time and rate of biosynthesis of the toxins have been determined.

9:30 AM ENV-24 Supramolecular Construction Using Diamide Diacids Containing Aromatic Amino Acids. O. PHANSTIEL IV (1), H. L. PRICE (1), D. TORRES (2), M. RICHARDSON (2) AND D. SECONI (1), (1) Center for Diagnostics and Drug Development, Dept. of Chemistry, (2) Center for Research and Education in Optics and Lasers, Univ. of Central Florida, Orlando, FL 32816. Several 1,1-cyclobutane diamide diacids were synthesized and evaluated for their ability to self-assemble into either microcapsules or microspheres. Each system was generated by the condensation of 1,1 cyclobutane dicarboxylic acid and two equivalents of an appropriately protected aromatic amino acid derivative followed by deprotection to give the desired diamide diacid. The assembly kinetics of a L-Trp derivative were determined. The ability of a L-Phe derivative to agglomerate constructively was evaluated by SEM and X Ray Microscopy measurements. Remarkably, addition of a single methylene unit into the spacer group redirected the assembly process from microcapsule to microsphere macro-architectures.

9:45 AM ENV-25 Studies on species-specific Type I chlorophyll-*a* degradation. LEI LIU, J. WILLIAM LOUDA AND EARL W. BAKER. Organic Geochemistry Group, Florida Atlantic University, Boca Raton 33431. The breakdown of chlorophyll has been categorized into 2 types of reactions. Type II reactions lead to the total destruction of the chromophore (macrocycle). Type I reactions lead only to the alteration of the chlorophyll periphery and/or the loss of magnesium. Here we discuss our studies on the dark oxic and anoxic aging of pure phytoplankton cultures. These incubations are meant to mimic senescence and death phenomena and thereby allow species-specific alteration pathways to be unraveled. Common reactions include the loss of magnesium ("pheophytinization"), phytol hydrolysis, and the loss of the carbomethoxy (aka methyl formate) moiety. Chlorophyllase action is found to be very species-specific. An overall branched pathway for type I chlorophyll degradation is given and implications for chemotaxonomy, community dynamics and organic geochemistry are given.

10:00 AM BREAK

10:30 AM ENV-26 Reductive Dehalogenation of Chlorinated Hydrocarbons Using Zero Valent Iron. N. LAU (1), C. L. GEIGER (1), C. A. CLAUSEN (1), D. REINHART (2), N. RUIZ (2), P. TOY (1), University of Central Florida, Departments of (1) Chemistry and (2) Environmental Engineering, P.O. Box 162366, Orlando, 32816. Funded by NASA, Kennedy Space Center. Groundwater contamination by chlorinated solvents has been found at many sites throughout the United States. One of the major areas of interest pertains to the development of cost-effective methods for remediating contaminated groundwater. Permeable treatment walls are a recently developed technique for use in this kind of remediation effort. In preparation for a field-scale study, laboratory experiments, including column studies, have been conducted at UCF to determine the effectiveness of using zero-valent iron to treat trichloroethylene contaminated groundwater. Data on the by-products of the chlorinated hydrocarbons will be used to propose possible mechanistic pathways.

10:45 AM ENV-27 Nitrate, Nitrite and Nitrosamine Analyses of Environmental, Food and Tobacco Samples. ROBERT S. BRAMAN (1), MARGARET FARAGO (2) and GEORGE KAZANTZIS (2), Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 33620; (2) Imperial College of Science Technology and Medicine, London, England. Analyses for the analytes are being done using a chemiluminescence type detector having a detection limit at the nanogram level. Selective detection is available for nitrites. Nitrates are analyzed in a vanadium-III solution. Nitrosamines are analyzed in potassium iodide acidic ethylene glycol. Nitrites are analyzed in acidic and KI containing water. Applications have been made to analysis of environmental water samples, various foods, smoked foods, drinks, and tobacco products. Very little to no nitrosamines have been found in the analytes. Substantial nitrate levels were found in tobacco. There appears to be a strong correlation between the nitrate level in tobacco products and the excess mortality rates for smokers. Substantial reduction of nitrate levels in tobacco would be greatly beneficial.

11:00 AM ENV-28 Vectored Antineoplastics Predicated Upon Polyamine-DNA Intercalator Conjugates. O. PHANSTIEL IV, S. MAJMUNDAR-SHAH, L. WANG, AND H. L. PRICE, Center for Diagnostics and Drug Development, Dept. of Chemistry, Univ. of Central Florida, Orlando, FL 32816. One of the major shortcomings of current cancer therapies is the non-selective delivery of the antineoplastic drug to both targeted tumor cells and healthy cells. Enhanced targeting of such drugs could diminish their associated toxicity by reducing their uptake by healthy cells. The synthesis of conjugates between DNA intercalators

and the natural polyamines (spermidine and spermine) will be discussed. In addition, the application of these conjugates as chemotherapeutics will be illustrated. This research was supported by awards from Research Corporation, the Florida Hospital Gala Endowed Program for Oncologic Research and the Division of Sponsored Research at the University of Central Florida.

11:15 AM ENV-29 Effects of an Applied Magnetic Field Upon Solubility of Solids. ROBERT F. BENSON, JEFFERSON C. DAVIS JR., and DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 33620. Magnetic fields have been used to remove hard water scale solids from pipes and boilers. An application of a magnetic field has been observed to increase solubility of many diamagnetic materials in both aqueous and non aqueous systems. This paper explores the physical variables that can be used to predict the extent of this effect.

11:30 AM ENV-30 Early chlorophyll-*a* diagenesis and paleoecological evaluation of the lime-muds of Florida Bay. JOSEPH W. LOITZ(1), J. WILLIAM LOUDA(1), EARL W. BAKER(1) and DAVID T. RUDNICK(2). (1) Organic Geochemistry Group, Florida Atlantic University, Boca Raton 3341. (2) South Florida Water Management District, West Palm Beach 33416. This study investigates diagenesis and the chemotaxonomic assessment of paleoproductivity and paleoecology using chlorophyll and carotenoid pigments in the sediments of Florida Bay. Recently, the Bay has experienced cyanobacterial blooms apparently linked to anthropogenic perturbation of the ecosystem. The vast majority of identifiable chlorophyll-*a* residua in these sediments is found to be cyclopyropheophorbide-*a*-enol, a pigment likely formed during the heterotrophic processing (=grazing). Data, including a 1.2 meter core which reached the Pleistocene 'bedrock', reveal several past periods of elevated productivity. Sedimentary pigments are found to derive from cyanobacterial / eubacterial (Purple-S) mats / films rather than the water column *per se*. However, water column and sediment mat productivities are no doubt coupled.

11:45 AM ENV-31 Development of Extraction Techniques for Analysis of Multi-Component Residues of Agricultural Chemicals. EMMANUEL OFORI, C. L. GEIGER, Department of Chemistry, University of Central Florida, 32816-2366. Funded by the National Science Foundation. The interactions of multiple agricultural chemicals and their byproducts are largely unknown. The project involved the construction of a small shade house and application of five agricultural chemicals individually and in various combinations to individual trays of orchids. Samples of soil media and water were obtained and an extraction technique was developed for optimization of recovery of all five chemicals. The methods used to optimize these techniques will be discussed.

FAS POSTER SESSION (ENV)

FRIDAY, 11:00 AM-NOON & 4:00 PM-5:00 PM

BUSH 107

POS-4 Inhibition of *Salvinia* by Cattail. Part 2: Oxygen Production. JENNIFER ASCHER, M. JORDAN COLLIER, MARIA T. GALLARDO AND DEAN F. MARTIN, Dept. of Chemistry, Institute for Environmental Studies, USF, 4202 E. Fowler Ave., Tampa, FL 33620.

POS-5 Studies on the Present and Past Photoautotrophic Populations of Florida Bay Using Chlorophyll- and Carotenoid-Based Chemotaxonomy. J. W. LOUDA, D.T. RUDNICK, AND E. W. BAKER. Florida Atlantic University, 777 Glades Rd., Boca Raton, FL 33431.

POS-6 The Isolation and Characterization of Scytonemin: the Indole-Phenolic Sunscreen Present in the Shaeths of Certain Cyanobacteria. J. W. LOITZ, J. W. LOUDA AND E. W. BAKER. Florida Atlantic University, Boca Raton, 777 Glades Rd., FL 33431.

POS-7 Biosynthesis of an Anti-Inflammatory Drug From a Marine Soft Coral. LAURA MYDLARZ AND RUSSELL G. KERR. Florida Atlantic University, 777 Glades Rd., Boca Raton, FL 33431.

POS-8 Investigation of the Bryostatins, Anticancer Agents From the Marine Bryozoan, *Bugula Neritina*. JOSEPH LAWRY AND RUSSELL G. KERR. Florida Atlantic University, 777 Glades Rd., Boca Raton, FL 33431.

FLORIDA COMMITTEE ON RARE AND ENDANGERED
PLANTS AND ANIMALS

FRIDAY 10:15 AM BUSH 207

DEAN BAGLEY, UNIVERSITY OF CENTRAL FLORIDA, Presiding

10:15 AM REB-1 Distribution and Variations of *Nerodia clarkii* in Northern Brevard and Southern Volusia Counties, Florida. WILLIAM BOYD BLIHOVDE, University of Central Florida. The *Nerodia clarkii* complex is one that ranges from Eastern Texas along the Gulf Coast to Volusia County, Florida. The endangered subspecies, *Nerodia clarkii taeniata*, and *Nerodia clarkii compressicauda*, intergrade at the boundary between northern Brevard and

southern Volusia counties. Upon analysis, snakes captured at the boundary between Brevard and Volusia study sites showed high levels of variation in morphology. Snakes captured further north, showed external characteristics of N.c.taeniata, whereas snakes caught further south, in Brevard county, showed characteristics toward N.c. compressicauda. Snakes caught on the western side of the Indian River and/or Mosquito Lagoon, showed more characteristics of Nerodia fasciata pictiventris, a freshwater species. Thanks are given to Merritt Island National Wildlife Refuge for logistical and financial support. Paul Moler, of Florida Freshwater Fish and Game Commission, has been a great help with technical details.

10:30 AM REB-2 A Model Approach to Urban and Rural Bald Eagle Nest Productivity. P. J. BOWEN, Biology Dept., University of Central Florida, 4000 Central Florida Boulevard Building 20 Room 210, Orlando 32816-2368. The Southern Bald Eagle, *Haliaeetus leucocephalus leucocephalus*, has traditionally nested in pristine areas. With urban development in Florida, some Bald Eagles are now nesting in close proximity to man. Using four years of data from 87 nests monitored under Florida Audubon's EAGLEWATCH program and using Florida Game and Fresh Water Fish Commission Developmental Index Codes, this study statistically analyzes differences in urban and rural nest productivity. Using average annual fledglings, based on nest site types, a Bald Eagle nest productivity model is developed which predicts annual nest production in areas outside the original sample counties of Brevard, Lake, Orange, Osceola and Seminole. A second Bald Eagle nest productivity model is developed to assess the impact of land use changes on annual Bald Eagle nest production. This model incorporates land use changes based on changes in Developmental Index Codes and predicts annual Bald Eagle nest production based on current or potential changes in land use patterns.

10:45 AM REB-3 Voice of the Turtle: Marine Turtle Conservation in Florida. K. SAMEK, New College of the University of South Florida, 5700 North Tamiami Trail, Sarasota 34243. Once abundant in the waters around Florida, the sea turtle species that use the state beaches for nesting have been pushed towards endangerment. The historical cause of the sea turtle's regional decline through the turtle fishery is examined through 19th century and early 20th century documents. The origins of sea turtle conservation are discussed, leading into an presentation of issues pertinent to marine turtle protection in the 1990s, including state and local legal efforts, and the conservation strategies of ecotourism and habitat protection.

FRIDAY 11:00 AM BUSH 207

BUSINESS MEETING: FLORIDA COMMITTEE ON RARE AND
ENDANGERED PLANTS AND ANI MALS

DEAN BAGLEY, presiding

GEOLOGICAL AND HYDROLOGICAL SCIENCES

FRIDAY 4:30 PM BUSH 127

DONALD LOVEJOY, PALM BEACH ATLANTIC UNIVERSITY, presiding

4:30 PM GHY-1 A 7,000-Year History of Sedimentation, Bottom Water Anoxia-Oxidation, Vegetation, and Trace Element Geochemistry in the Ochlockonee River Estuary, NW Florida Z.Q. CHEN (1), J. F. DONOGHUE (1), R.W. HOENSTINE (2), AND J. LADNER (2), (1) Dept. of Geology, Florida State Univ., Tallahassee, FL 32306; (2) Florida Geol. Survey, 903 W. Tennessee St, Tallahassee, FL 32304-7700. Studies of the subbottom seismic profiles, analysis of degree of pyritization (DOP), organic content (TOC), trace element geochemistry, palynology, and C-14 geochronology of six vibracores have revealed a 7,000-year history of the bottom water conditions and sedimentation in a region of the NE Gulf of Mexico. Unlike many estuaries in the U.S., this estuary, and perhaps the adjacent NE Gulf coast, has experienced a steady increase in oxygen level for the past millennium (except for the most recent one or two centuries), implying a strong climate-driven fluvial effect upon environmental evolution.

4:45 PM GHY-2 Acid Rain and the Formation of Sinkholes in Karst Regions. J. BYRON, J. GEIGER, R. REICH, AND B. STONE. Jacksonville University, 2800 University Boulevard North, Jacksonville, Florida, 32211. A review of the literature indicates that acid rain is associated with a decline in forest and freshwater ecosystems and the corrosion of buildings and monuments made of limestone or marble. Sinkholes are the result of sudden subsidence of the ground when limestone subsoil (karst) collapses. Sinkhole formation is common in Florida, and causes significant damage to buildings, roads, and other structures. Sinkhole formation has been linked to local scale activities, including groundwater withdrawals and leaching of reactive mine spoils. We propose that acid rain accelerates the formation of sinkholes on regional and global scales. Acid rain is commonly ten to one-hundred times more acidic than natural rain water. The chemical mechanism for the dissolution of limestone by acid rain is the same as that which corrodes buildings and monuments. A survey of the literature resulted in thousands of references to acid rain and sinkholes as separate topics, but no mention of the influence of acid rain on sinkhole formation. Economic estimates of the cost of acid rain should be revisited in light of this possible connection.

FRIDAY 5:00 PM BUSH 107

BUSINESS MEETING: GEOLOGICAL AND HYDROLOGICAL SCIENCES

DONALD LOVEJOY, presiding

MEDICAL SCIENCES

SATURDAY 9:15 am BUSH 210

SESSION A - MICROBIOLOGY

ALLEN SMITH, BARRY UNIVERSITY, presiding

9:15 am, MED-1 A Study on the Effects of Trimethoprim, Sulfamethoxazole and Dapsone on *Klebsiella pneumoniae*. J. VELLEF AND A. M. DHOPLÉ, Florida Institute of Technology, Melbourne, FL 32901. The effects of trimethoprim, sulfamethoxazole, dapsone and any combination thereof on *Klebsiella pneumoniae* were examined at various concentrations. The minimal inhibitory concentrations (MICs) of each individual drug were determined followed by the minimal bactericidal concentrations (MBCs). Using the MIC and MBC data the best concentrations of each drug will be chosen for its combination with another drug. At this point MIC and MBC tests will be run on combinations of drugs where the concentration of one drug remains constant while the concentration of the other is varied experimentally in order to find the optimal ratios of the different combinations of these drugs.

9:30 am, MED-2 Analysis of Chromosomal DNA of *Candida albicans* by Pulse Field Electrophoresis. A. Z. AL-WATABAN (1), W. W. SAFRANEK (2), AND A. M. DHOPLÉ (1), (1) Florida Institute of Technology, Melbourne, FL 32901, (2) Wuesthoff Memorial Hospital, Rockledge, FL 32056. Studies were performed using a pulsed field gel electrophoresis, and the eight chromosomal DNAs of *Candida albicans* were isolated and identified. A chromosomal hybridization was performed to show the location of chromosome number 9 (short chromosome) and to confirm that this short chromosome is derived from chromosome number 3. These studies may help in identifying the genes responsible for both yeast-hyphal transition and the white-opaque transition.

9:45 am, MED-3 Use of Combined Mycobacterial Antigens for Specific Diagnosis of Crohn's Disease. I. SHAFRAN, W. FENSTER, S. ISHAK, AND S. NASR, University of Central Florida, Orlando, FL 32816. Crohn's disease, similar to Johne's disease which is a *Mycobacterium paratuberculosis*-caused inflammatory bowel disease in ruminants and primates, is an inflammatory bowel disease with suspected mycobacterial etiology. Recent data using improved culture techniques, specific PCR-based assays, and analysis of humoral immune response of Crohn's patients have strengthened the association of *Mycobacterium paratuberculosis* with this disease. Sera from 51 confirmed scoped Crohn's patients and 17 controls were analyzed in SDS-immunoblots of *Mycobacterium paratuberculosis* sonicate and two recombinant clones selected from *Mycobacterium paratuberculosis* expression genomic library. The recombinant p35 (specific to sera from Johne's disease) and p36 (specific to sera from Crohn's disease) express a 35K and 36K protein

respectively. Of the 51 Crohn's sera tested, 71% reacted with both antigens, 92% reacted with at least one antigen, 90% reacted with p36 and 76% reacted with p35. As expected, a small portion of Crohn's samples, 8%, did not react with either antigen. Of the 17 sera from negative controls, none (0%) reacted with both antigens, 18% reacted with p36, and 12% reacted with p35. These data suggest that using combined p35 and p36 antigens is more specific for Crohn's disease diagnosis than either antigen alone.

SATURDAY 10:00 AM**BUSINESS MEETING: MEDICAL SCIENCES****DR. ALLEN SMITH, presiding****10:30 AM BREAK****SATURDAY 10:45 AM****SESSION B - PHYSIOLOGY****DR. ARVIND DHOPLE, FLORIDA INSTITUTE OF TECHNOLOGY, presiding**

10:45 AM MED-4 Energy Metabolism in Atrophic and Normal-Sized Muscle Fibers of Dermatomyositis (DM) and Polymyositis (PM) Patients. S. SESODIA, Barry University, Miami Shores, FL 33161. Single muscle fibers from patients with DM and PM were analyzed for two key enzymes of energy production, adenylkinase (AK) and lactate dehydrogenase (LDH). Microanalytical biochemical assays were used to obtain quantitative information on enzyme activities and to avoid cross contamination from the non-parenchymal components variably present in muscle homogenate assays. A method of fiber procurement was employed that permitted the assessment of the myosin ATPase type and size of the fibers under biochemical investigation. We found that the type I fiber population had normal (or elevated) levels of both AK and LDH in DM and PM. The type 2a and 2b fibers had normal AK but a significant reduction in LDH. This metabolic profile of the fiber types was the same in normal-sized and highly atrophic fibers. The results suggest a severe deficit in the glycolytic energy capacity in the fibers that extensively rely on energy pathways requiring LDH, despite the presence of normal-appearing fibers.

11:00 AM MED-5 Evaluation of the Allergenicity of Bahia, Melaleuca, and Bottlebrush Pollens Using Skin Test and Fluorescent Allergosorbent Test. A. MAJIDI, N. RODRIQUEZ, R. GENNARO, S. KLOTZ, R. WHITE, AND M. SWEENEY, University of Central Florida, Orlando, FL 32816. The allergenicity of the defatted crude pollen extracts of *Paspalum notatum* (Bahia), *Melaleuca leucadendron* (melaleuca), and *Callistemon citrinus* (bottlebrush) were analyzed by skin testing and the fluorescent allergosorbent test (FAST). Seventy-one percent of the 110 randomly selected patients were skin test positive to at least one of the

pollen extracts. Thirty-six percent of the patients were positive to all three extracts, 11% were positive to two out of the three extracts, and 24% were positive to only one extract. The majority of the skin tested patients were more sensitive to Bahia than to melaleuca or bottlebrush. FAST analysis indicated that 74% of Bahia skin test positive patients had circulating anti-Bahia IgE.

11:15 AM MED-6 Purification of the Major Allergens of Bahia, Melaleuca, and Bottlebrush. G. GHOBRIAL, N. RODRIQUEZ, R. GENNARO, S. KLOTZ, M. SWEENEY, AND R. WHITE, University of Central Florida, Orlando, FL 32816. The protein components of the crude pollen extracts of Bahia (BA), melaleuca (ME), and bottlebrush (BO) were purified using isoelectric focusing (IEF) and continuous elution electrophoresis. Most of the protein components in ME and BO are acidic and they separated within a pH range of 3 to 6, while the optimum separation of BA protein components was between 5 and 10. Preparative SDS-PAGE using continuous elution electrophoresis purified three IgE-binding proteins from BA IEF fraction C (27, 32, and 34 kD) and 6 each from ME and BO IEF fraction D (ME: 24, 34, 36, 38, 41, and 45 kD; BO: 24,33, 36, 41, 45, and 48 kD). IEF and continuous elution electrophoresis provide an excellent general approach to purification of a variety of allergens.

11:30 AM MED-7 Kidney Tubules: Resolving a Dilemma in Medical Education. A. A. SMITH, Barry University, Miami Shores, FL 33161. All current histology textbooks assert that the site of action of aldosterone in the kidney is the distal convoluted tubule. All current physiology textbooks assert that the site of action of aldosterone in the kidney is the cortical collecting tubule. The dilemma is best resolved in favor of the physiology textbooks. Such a resolution simplifies the teaching of pharmacology. Students remember the details of a diagram of the kidney tubules better than the details of text about them.

PHYSICS AND SPACE SCIENCES

FRIDAY 8:15 AM BUSH 301

SESSION A

MARK MOLDWIN, FLORIDA INSTITUTE OF TECHNOLOGY, presiding

8:15 AM INTRODUCTION

8:30 AM PSS-1 A Mach-Zehnder Interferometer as a basis for an Enhanced Hyperspectral Imager, PHILLIP C. KALMANSON, JOEL H. BLATT,

CHRIS HART, Florida Institute of Technology Melbourne, FL 32901 Here we present the unique properties of the Mach-Zehnder interferometer and the use of these properties in a Mach-Zehnder based hyperspectral imaging Fourier Transform Spectrometer. The Mach-Zehnder interferometer is unique among interferometers in the way that it splits and later recombines a beam of light. These properties stem from the use of two beam splitters; one splits the beam and another recombines it, as compared to one beam splitter doing both tasks in Michelson and Sagnac interferometers. Because of its construction a Mach-Zehnder interferometer provides advantages unavailable to other types of interferometers used for hyperspectral imagers. These advantages consist of two possible inputs and an increased throughput that can be used for resolution enhancement. The increased throughput of the Mach-Zehnder is accomplished by not having one of the recombined beams reflected back to the source, as is the case with other interferometers. The Mach-Zehnder outputs both beams in directions at 90 degrees to each other and reflects no light back to the source. These two outputs differ in phase and fringe visibility. Using these two beams we present possible ways to enhance the spectral resolution of the images by using methods such as microscanning (subpixel sampling) and image field addition. During either of these processes it is possible to use the second input of the interferometer for reference, alignment and calibration which are needed to maintain high resolution. The feasibility of using the Mach-Zehnder hyperspectral imager to obtain greater spatial and spectral information is shown in the spatial discrimination of simple colored targets with and without resolution enhancement as well as in discriminating between small variations in color.

8:45 AM PSS-2

Hyperspectral Imaging Radiometry Payload for Orbital Atmospheric Remote Sensing, J. RITTER, J. FARANDA, S. BROWN, C. BRUNO, R. BRANLY, Broward Comm. College 3501 SW Davie Road Davie FL33314 Broward Community College and Brevard Community College with support from the Boeing Company-KSC, and the Association of Small Payload Researchers (ASPR) will fly an earth viewing hyperspectral radiometric imaging system through NASA's GAS payload program. The experiment consists of a Sagnac interferometer configured as a holographic Fourier transform spectrometer (MSI) integrated with a multi-channel discrete cell radiometer (RACE). The top of atmosphere upwelling spectral radiance distribution will be measured from 300 to 1000 nanometers. RACE and the MSI will view the same area of the earth's surface simultaneously but will utilize completely separate optical and electronic systems. Although the spectral resolution of the MSI is quite high, absolute radiometric calibration of the MSI on orbit is challenging. The RACE module will provide absolute radiometric data from individual spectral channels. This dataset will be used to effect an absolute radiometric calibration of the spectrometer providing an integrated dataset having both high spectral and spatial resolution as well as good

absolute radiometric accuracy. Final products will include: phytoplankton concentrations, and atmospheric aerosol characterizations.

9:00 AM PSS-3 Microgravity Synthesis and Tracking of Right and Left Handed Molecules that Capture CO₂ From the Air: Synthesis of Enantiomeric (R)- and (S)-Phenylethylamine-CO₂ Crystals. D. FESSLER, A. PAYTON, J. RITTER, Broward Comm. College 3501 SW Davie Road Davie FL33314
micro-Phenylethylamine is a manmade liquid that is a 1:1 mixture of right- and left-handed molecules. Reaction of this amine with CO₂ from the air is an established fact. The development of a space shuttle payload at our college offers the opportunity to grow crystals in a microgravity environment. Pure right- and left-handed forms of micro-Phenylethylamine, obtained by a standard chemical resolution procedure using L-(+)-tartaric acid, will be used to obtain crystals by reaction with CO₂. Synthesis of individual right- and left-handed amine-CO₂, despite its simplicity is believed to be the first documented case. X-ray crystallographic structural determinations as well as Scanning Tunneling Microscopy will be performed post flight. A convenient method of generating CO₂ within a small payload container has been developed. Our progress in meeting these goals will be described.

9:15 AM PSS- 4 Electrochemical Deposition in Microgravity, R. AMIN, P. KALAMANSON, KERRI DONALDSON, GERARD GRAUBALLE and R. P. RAFFAELLE, Dept. of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne 32901. We have developed an electrochemical deposition system for use in a microgravitational environment. This system is scheduled to fly in an upcoming space shuttle mission as part of NASA's Get Away Special Canister (GAS-CAN) program. A prototype will be tested on NASA's KC 135 Microgravity Research Aircraft at the Johnson Space Center this spring in conjunction with the 1998 NASA Reduced Gravity Student Flight Opportunity. As description of the hardware as well as the design of experiment will be presented. This work is being supported by the Florida Space Grant Consortium and the Florida Space Institute

9:30 AM PSS-5 Dawnside Observations of Detached Plasmaspheric Plasma from Geosynchronous Orbit. P. D. PARRISH, H. K. RASSOUL, AND M. B. MOLDWIN. Dept. Of Physics and Space sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne, FL 32901. Plasma data from three Los Alamos National Laboratory geosynchronous satellites (1989-046, 1990-095, 1991-080) were surveyed to explore the occurrence and evolution of the dawnside plasmasphere (MLT 22 => 08) in response to enhanced convection and substorm dynamics. The traditional MHD model, which accounts for the interaction and dynamics of the convection and corotational electrical fields, can explain the appearance of plasmaspheric plasma in both the duskside and premidnight regions.

However, it cannot easily explain plasmaspheric events in the midnight to dawn sectors. This paper will present the results of an 80-month statistical study from the combined data sets of the three satellites. Initial results suggest a strong correlation between plasma trough and plasmasphere observation with about a 40% change of plasmasphere development immediately following plasma trough observation.

9:45 AM PSS-6 Laser Beam Shape Variations Due to The Thermal-acoustic Effect in Absorbing Solutions. S. YANG, D. I. KOVSH, E. W. VAN STRYLAND, AND D. J. HAGAN, CREOL, University of Central Florida, 4000 Central Florida Blvd., Orlando 32816. Applying an excited-state absorption mechanism, liquid-based tandem optical limiters have been offering the best limiting results because of the high damage threshold of liquids. With a large amount of energy absorbed within a small region in a liquid-based limiter, the thermal-acoustic effect becomes significant and degrades the performance. To better understand this phenomenon, a series of laser beam images were taken and analyzed in a Z-scan geometry. A comparison of the experimental results were made with computer simulations. Showing a good predictions of the thermal-acoustic effect, this computer code can be used to design liquid-based tandem limiters more accurately.

10:00 AM BREAK

10:15 AM PSS-7 Core level shifts at the (001) and (100) surfaces of equi-atomic CuAuI. W. MUNOZ, E. RALEY AND, R. G. JORDAN, Alloy Research Center and Department of Physics, Florida Atlantic University, Boca Raton 33431. We report some recent measurements of the binding energy shifts of core levels at the (001) and (100) surfaces of ordered, equi-atomic CuAuI, carried out at the National Synchrotron Light Source (NSLS) and in our own laboratory at FAU. We show that the results are sensitive to the orientation of the surface; furthermore, they are in good agreement with first-principles electronic structure calculations. Work supported by the NSF (DMR-9500654).

10:30 AM PSS-8 Some properties of Cu-Au Alloy Surfaces. R. G. JORDAN, Alloy Research Center and Department of Physics, Florida Atlantic University, Boca Raton 33431. I will review some recent studies I have carried out with colleagues of the electronic structure in the vicinity of the low index surfaces of ordered Cu-Au alloys. Our work involves a combination of first-principles calculations (that include a surface) and angle-resolved photoemission measurements. We have investigated a wide range of surface-related phenomena but I will focus on examples of the occurrence and properties of surface states and surface core level shifts and their dependence on termination. I will show that photoemission measurements provide a very sensitive problem of such subtle behavior. Work supported by NATO and NSF (DMR-9500654).

10:45 AM PSS-9 Electrical Characterization of Schottky Barriers on Electrodeposited CuInSe_2 . T. POTDEVIN, J. G. MANTOVANI, AND R. P. RAFFAELLE, Dept. Of Physics and Space sciences, Florida Institute of Technology, 150 W. University blvd., Melbourne, FL 32901. We have investigated the electrical behavior of Schottky barriers on electrochemically deposited thin films based on the $\text{Cu}_x\text{In}_{2-x}\text{Se}_2$ system. CuInSe_2 Or CIS is a leading candidate for use in photovoltaic solar cells due to its optical absorption and electrical characteristics. The carrier density and semiconductor type of CIS is dominated by native defects which correspond to film stoichiometry. Film stoichiometry is controlled via the electrochemical deposition potential. Carrier density and semiconductor type as a function of stoichiometry will be given for a series of CIS thin films as determined by capacitance versus voltage measurements using Schottky barriers. Schottky barrier heights will also be given as a function. This work was supported by the NASA-ASEE program in cooperation with the Lewis Research Center and Ohio Aerospace Institute.

11:00 AM PSS-10 Applications of a Intracavity Frequency Doubled Continuous Wave $\text{Ti:Al}_2\text{O}_3$ Ring Laser in Resonance Raman Spectroscopy of Heme Proteins. K. ZOLLINGER, A. SCHULTE. Univ. of Central Florida, Orlando. The second harmonic output of a frequency doubled Ti:sapphire laser is employed to excite the resonance Raman spectrum of heme proteins with strong absorption bands in the range of 400 to 450 nm. Non-critical temperature-tuned phase-matching in KNbO_3 provides a second harmonic tunable from 430 - 442nm. To achieve a wavelength of 413 nm which is well suited for Soret band excitation of cytochrome c, we explore intracavity frequency doubling with LiB_3O_5 . Application to studies of ligand binding to heme proteins will be presented. The Raman bands yield information on the spin and oxidation states of the central iron atom and on conformational changes near the functionally important linkage between the heme and the protein.

11:15 AM PSS-11 High Pressure Raman Investigation of Cytochrome c. N. BARTON, M. ROSE, K. ZOLLINGER, A. SCHULTE. Univ. of Central Florida, Orlando. Pressure is a fundamental thermodynamic variable which can alter conformational states in proteins, and it is important to the understanding of physical forces which stabilize native structures. We probe the local environment of the heme active site of horse heart cytochrome c at variable pressure (0.1 - 185 MPa) using resonance Raman spectroscopy. Changes in the spectral bands are observed in the $1475 - 1520 \text{ cm}^{-1}$ region. These modes are sensitive to the axial coordination and the spin state of the heme iron. The results are compared with pressure effects on the heme environment in myoglobin. We discuss experiments using variations in pressure and temperature to study unfolding of cytochrome c.

11:30 AM PSS-12 Transient Absorption Studies of Ligand Binding to Myoglobin at Variable Pressure. M. ROSE, N. BARTON, O. GALKIN, A. SCHULTE. Univ. of Central Florida, Orlando. Ligand binding to myoglobin is a prototype reaction in heme proteins. We study the dynamics by monitoring spectral changes following flash photolysis over wide ranges of external parameter. A setup is described where transient absorption data are acquired from 5×10^{-8} to 10^2 seconds in a single shot. Data acquisition is controlled by a graphical programming environment (LabView). Monitoring the Soret band we measure the pressure dependence (0.1 to 185 MPa) of ligand binding to myoglobin. The multistep kinetics in the temperature range between 200 and 300 K is markedly altered by pressure. We discuss a model which connects the rebinding kinetics with the relaxation of a conformational coordinate involving the heme iron and the linkage to the protein.

FRIDAY 11:45 AM BUSH 301

BUSINESS MEETING: PHYSICS AND SPACE SCIENCES

MARK MOLDWIN, presiding

FRIDAY 3:00 PM BUSH 301

SESSION B

MARK MOLDWIN, presiding

3:00 PM PSS 13 Simulation and Experimentation with Electronic Devices, SEED. TOUFIC M. AKIM, BASHIR A. SAYAR AND N. SUNDARALINGAM, Engineering Programs, Jacksonville University, 2800 University Boulevard North, Jacksonville, FL 3221 1. Extensive use of electronic devices in homes, on the road, and in the workplaces has become common practice. In order to promote an awareness of electronic systems among the science, engineering, and non-science students, an NSF/ILI grant was used to develop a hands-on electronics course. The main goal of the project is to engage students in hands-on activities in order to motivate them to pursue science and engineering and improve retention. An introduction to analog and digital electronics, safety considerations, and testing of individual component characteristics were provided. Design and construction of elementary circuits using different components, employment of such circuits in the creation of simple electronic devices and measurement apparatus were emphasized. Heavy use of electronic devices such as multimeters, oscilloscopes, power supplies, function generators, and computer interfacing was emphasized. This laboratory course was offered to freshman and sophomore students in the dual degree engineering programs and science students from chemistry, physics, biology and environmental science majors. The activities were multidisciplinary, project-driven, and team-based.

3:15 PM PSS-14 Science as a Unifying Theme for a Basic Science Department. J. D. PATTERSON, J. H. BLATT, M. B. MOLDWIN, T. D. OSWALT, H. K. RASSOUL, AND M. A. WOOD, Physics and Space Sciences Department, Florida Institute of Technology, Melbourne, FL 32901. We offer degrees at all levels in both Physics and Space Science. We will discuss our curricula and the strategies we are using to maintain all our programs. For our majors we specialize in integrating interesting applications in the fields of condensed matter, optics, astronomy, astrophysics, and space physics including plasmas, while using fundamental physics as the glue. We also discuss our complementary roles of teaching service courses, and in doing research in the context of graduate school. Our department teaches approximately 650 students per year in our introductory physics courses, has approximately 70 total majors, and graduates about 20 students per year in all areas. The book value of our research continues at over a half million dollars.

3:30 PM PSS-15 Bringing Research Projects Into the Classroom Via the Internet, H. K. RASSOUL, M. B. MOLDWIN, P. DOUGLAS, P. MARTIN, T.J. AHRENS, M. MONTGOMERY, J. BOCCHICCHIO, T. BENTLEY, and A. UD-DOULLA Advances in communication technologies, and particularly those offered through the World Wide Web, are making it easier to access a variety of scientific resources. This talk discusses the impact of the WWW on semester long research projects in a graduate Space Physics course. During Fall 1997, the faculty (HKR and MBM) provided a suggested list of publishable research projects to our students in one of our Space Physics courses. The semester projects were chosen so they can be completed in one semester, with possibility of expanding the projects into full-blown master's theses. The projects complimented the required review article on some issue relevant to the topics. Here we provide a brief account of the science objectives of each topic investigated by the above students, then we report on their scientific findings. Finally, we discuss the potential of the on-line database projects as a tool to enhance student research experiences and improvement of their scientific literacy.

3:45 PM PSS-16 Looking for Patterns in the Digits of Pi. D. FOLK, T. RASH, AND H. HICKMAN, Hillsborough Community College, P.O. Box 30030, Tampa, FL 33630. Poincare Sections are widely used in non-linear dynamics to reveal hidden patterns in time series data. Electrical noise voltage for example, might look completely random when viewed as a plot of $V(t)$ vs. t . But a Poincare plot of $V(t)$ vs. $V(t - \tau)$, where τ is a constant, could reveal the presence of periodic or chaotic signals that had been buried in the noise. If the noise voltage is entirely random then the Poincare Section will be a formless cloud of points. White noise is a classic example. If the noise voltage contains either periodic or deterministic aperiodic (chaotic) elements, then some kind of pattern will emerge in the points. In this study a "pseudo time series" was constructed by taking the digits of Pi two

at a time. Poincare Sections were then prepared for several different values of τ . No pattern was seen to emerge, and the digits of Pi produced Poincare Sections that looked just like the Poincare Sections of completely random white noise.

SCIENCE TEACHING

FRIDAY 8:00 AM BUSH 127

JAN EMS-WILSON, VALENCIA COMMUNITY COLLEGE, presiding

8:00 AM TCH-1 Environmental Projects as Nature's Classroom. MARIBEN ESPIRITU ANDERSEN, Pinellas County Department of Environmental Management, 300 South Garden Ave., Clearwater, FL 33756. Several projects in the Allen's Creek watershed in Pinellas County have incorporated public participation to promote environmental education. Pinellas County Government has formed partnerships and offer voluntary environmental projects at three local schools. Teachers and their students may help monitor plant and wildlife use at two habitat restoration projects close to their school. Two project sites are used as nature's classroom to learn about native and invasive plants, birds, animal tracks, other wildlife and the environment. Vegetation at three other projects was planted with the help of parent, student and teacher volunteers, thus giving them a sense of ownership. These students are continuing to monitor the restoration progress as part of their school curriculum while a few have used the restoration area to conduct science projects. Incorporating community involvement as part of habitat restoration projects provides an avenue to increase environmental awareness, expose students to different Florida habitats and increase public acceptance and participation.

8:15 AM TCH-2 The inclusion of learning disabled students into an Environmental Science curriculum. A. GRANT AND B. E. ROTHSTEIN.. NMB Biomedical and Environmental Science Magnet, 1247 NE 167th Street, N. Miami Beach, FL 33162. The curriculum will include inviting outside speakers to talk with the students about careers in this field, the art and necessity for recycling, the construction and maintenance of a marine tank containing species of salt water fish for student observation/study, and interactive laboratory experiences with teams of cooperating learning disabled and regular students. Statistical evaluative data was obtained through pre- and post-testing of: student knowledge of the environment, student attitudes towards science and ecology, student knowledge of science in general, and attitudes of both learning disabled and regular students towards each other.

8:30 AM TCH-3 The GIS for Environmental Health Education. D.D. WOODBRIDGE. College of Public Health, University of South Florida, 13201 Bruce B. Downs Blvd., Tampa, 33612-3805. There exists a great dearth of information relative to the magnitude of environmental stressors and the occurrence of health impairment. Existence of this condition is both an operational and educational impairment. The real impact of adverse environmental conditions and risk evaluations have not been effectively evaluated. Creation of the computerized Geographic Information System (GIS) provides a mechanism to overcome the problems associated with the lack of space wise correlation of data. Utilization of this technique has the potential to greatly increase the technical capability to create critical evaluations of the thinking methodologies and how to evaluate the affects of changes in environmental conditions. Both existing and potential future environmental health conditions can be evaluated based on the existing situations and changes that could be implemented. The GIS is a vital tool in evaluation and development of planning methods for the reduction of environmental stressors and needs to be an integral part of environmental health education.

8:45 AM TCH-4 Laboratory Experiments Based on a Theme for the Analytical Chemistry Course. RAMEE INDRALINGAM, Stetson University, DeLand 32720. Analytical Chemistry has been traditionally taught in a two-semester format. The first semester's course was called Quantitative Analysis, and the second semester was termed Instrumental Analysis. The laboratory experiments for these courses were based on commercial or instructor-prepared unknowns. This paper will present the use of a collection of experiments using familiar, everyday samples such as foods in order to carry out quantitative determination of various analytes. Sample preparation and relevant instrumental parameters will be discussed. Results of experiments developed at Stetson University will be presented. The advantages and disadvantages of using such theme-based labs will also be evaluated.

9:00 AM TCH-5 Teaching Students About Bats. L.S. FINN. Fly By Night, Inc., 431 Sheryl Dr., Deltona 32738. In the last several years it has become common for primary and secondary school teachers to include a bat unit during the school year. Bats are used as a basis to teach children subjects ranging from biology, ecology, geography, geology, health, math, science, and social tolerance. Several excellent publications are available to guide the instructor. However, many of these publications neglect the importance of teaching children about wildlife diseases (i.e., rabies) and the potential dangers of handling any unfamiliar animal. A live bat demonstration is often the climax of these educational units, and are particularly popular around Halloween. Due to the fear of rabies, live bat demonstrations have been banned in many states. However, when done properly, live bats can be an excellent conduit through which an educator is able to illustrate both the importance of these animals and stress the potential dangers. Only qualified biologists and educators should be allowed to handle bats

and students who are taught to leave wildlife alone will be better equipped to protect themselves and their peers.

9:15 AM TCH-6 Teaching Physical Science to non-science majors. R. G. JORDAN, Department of Physics, Florida Atlantic University, Boca Raton 33431. Over the years, it seems that relatively little thought has been given to the teaching of physical science to non-science majors. One only needs to review the current crop of text books to realize that with few exceptions they are all very similar in approach, structure, content and presentation; worse than that, they have remained essentially unchanged over the past decade or so, apart from the addition of even more information! It is undeniable that the text book sets the pedagogy so, since the students of today have rather different expectations, academic backgrounds, etc., than those of a decade or so ago, I think it appropriate that we use a different, up-to-date approach to teaching science to the non-science major that is both relevant and builds on students' own experiences. In this talk I would like to introduce you to some of my ideas, both tested and un-tested.

9:30 AM TCH-7 Innovations in Physics Education: A Workshop for High School Physics Teachers. S.L. SAVRDA, Lake-Sumter Community College, 9501 US HWY 441, Leesburg, 34788-8501. A series of workshops was developed to expose high school physics teachers to some of the techniques that have been developed as a result of physics education research. Participants in the workshops received hands-on experience in both high tech methods such as graphing calculator applications and computer based laboratories and low tech classroom techniques such as ranking tasks, conceptual exercises and modeling. An overview of the workshops and samples of participant's work will be presented. Funded in part by the Higher Education Consortium.

9:45 AM TCH-8 Utilizing Examples of Socio-political Injustice and Human Rights Violations to Enhance the Teaching of Cellular Organelles. DAVID W. SHELDON, Valencia Community College P.O. Box 3028, Orlando, 32825. Every freshman biology class includes a study of the cell. This often requires students to commit to memory a list of cellular organelles. To increase student interest in the mitochondria, I explore the uses of mitochondrial DNA in grandpaternity testing. This method is being used in Argentina to unite children abducted from their murdered parents by military governments with their grandparents. Topics such as human rights violations that are seemingly unrelated to cellular structures and biology allow students to appreciate unexpected applications of the material.

10:00 AM BREAK

10:15 AM TCH-9 Science Education in Transition: A Procedural Blueprint. A. HALL, Tallahassee Scientific Society, 4335 Sherborne Road, Tallahassee, 32303. It has been recognized for several years that the systems used for high school education in the sciences are in need of improvement, especially when students in the United States are compared with their counterparts in other developed countries. Standards of achievement have been reviewed and enhanced, with the expectation that students will achieve them and thereby obtain a better education in the sciences. However, the approach to science education remains unchanged, thereby making the achievement of the desired standards more elusive. This paper outlines a step-by-step process for transition from the approach in use today, to one which will facilitate the achievement of the required standards.

10:30 AM TCH-10 The Images of Scientists. E.T. HAYS, SNHS/SGMS, Barry University, Miami 33161. Most of us are probably aware that scientists are often stereotypically portrayed in literature and in the media. Future scientists usually adopt these stereotypical images. What can we as scientists and science educators do to change these images? I will describe the results of a survey conducted on freshman biology majors to determine their image of a scientist. I will then discuss some of the methods I have used to help dispel some of the stereotypes. As a result of these activities, students from diverse cultural backgrounds can learn about the diversity of scientists currently doing science. Also, the students can not only learn of the importance of having scientists from diverse backgrounds in science but they can learn how they (and all Americans) can make contributions to the advancement of science in the United States and the world.

10:45 AM TCH-11 Teaching Biological Research Methods at the Community College as a Means of Enhancing Minority Educational Opportunities. T. P. ARNOLD, F. A. FRIERSON, J. D. PATTERSON, AND R. J. KEIPER, Valencia Community College, Science Dept., West Campus, P. O. Box 3028, Orlando, FL 32802. Valencia Community College in partnership with the University of Florida and the University of South Florida has instituted a biological research methods course to increase the representation of minorities in life science programs at these universities. Techniques that are represented include: Spectrophotometric Measurement, Enzyme Assays, Electrophoresis of Proteins and Nucleic Acids, Bacterial Transformation by Prepared Plasmids, Restriction Fragment Length Polymorphism Analysis of DNA, Polymerase Chain Reaction, Tissue Fixation and Staining, Advanced Microscopy, Isolation and Separation of Algal Pigments Utilizing HPLC. This program is supported by a grant from the National Institutes of Health; minority bridges program.

11:00 AM TCH-12 A Rapid Field Method for the Extraction and Preparation of Aquatic Algal Pigments for Later Analysis by HPLC. J. D. PATTERSON (1,2)

AND T. P. ARNOLD (1), (1) Valencia Community College, Science Dept., West Campus, P. O. Box 3028, Orlando, FL 32802, (2) Rollins College, Winter Park, FL. Utilizing minimal specialized equipment, a procedure to isolate algal pigments was adapted for field use for incorporation into a research methods program. This approach was necessitated by the labile nature of the compounds of interest and the logistics involved in the transition from sampling in the field to analysis in the laboratory. Further development of this technique has incorporated an isocratic solvent system for HPLC which also lends itself to portability. These protocols are now being taught as part of a biological research methods course. Funding from the NSF and the NIH supports this independent study of student design at Valencia.

11:15 AM TCH-13 Mathematical Properties of Telescopes. T. E. RUTENKROGER. Valencia Community College, P. O. Box 3028, Orlando, FL. The purpose of this presentation is to provide insight into the basic optical properties of telescopes. The simple applications presented within the following text are directed toward applications in the mathematics or physical science classroom. The principles of both inverse and direct variation will be used extensively. Properties discussed will include magnifying power, resolving power, apparent brightness and area of images, speed of a telescope, and focal ratio, all of which also apply to microscopy and photography. An emphasis is placed on a function-oriented approach correlated to the use of tables. The use of technology in classroom presentation is encouraged, and the TI 83 calculator (*or any computer format supporting tables*) is recommended.

11:30 AM TCH-14 Developing a science magnet school: How does it interact with the community? B. E. ROTHSTEIN, R. L. FONTANT, AND P. BAKER, NMB Biomedical and Environmental Science Magnet, 1247 NE 167th Street, N. Miami Beach, FL 33162. Science magnet schools are formed in order to racially balance a portion of the school system. This study discusses the factors affecting the implementation of this mandate. A study was conducted to determine what were the needs of the community of North Miami Beach, Florida. The results of this survey were utilized to design a community friendly curriculum with the science focus infused into most of the classes in the curriculum, with action-bases activities and career investigations in the classrooms, and on the job site, with partnerships forged in the community. Students were recruited on the basis of academic achievement and potential ability to cooperate with staff and peers. Demographics of the student applicants were compared with those of the involved communities. The attitudinal changes of the community toward the school with the formation of the science magnet were discussed. Also discussed are the relative interests of the community toward various types of science magnets.

FRIDAY 11:45 AM BUSH 127
BUSINESS MEETING: SCIENCE TEACHING
JAN EMS-WILSON, presiding

FAS POSTER SESSION (TCH)
FRIDAY 11:00 AM-NOON & 4:00 PM-5:00 PM BUSH 107

POS-9 The Determination of Riboflavin in Dairy Products by High-Performance Liquid Chromatography. C. M. SARGENT, M. A. PAGE, T. A. BROUSSEAU, AND R. INDRALINGAM, Stetson University, DeLand 32720.

SCIENCE TEACHING SYMPOSIUM

“Making Science Learning Attractive and Its Teaching Effective”

Organized By: Gerry Meisels, Coalition for Science Literacy and Suncoast Area Center for Educational Enhancement, University of South Florida.

FRIDAY 9:00 AM - 12:00 PM CORNELL 226

Session A: “Inquiry-Based Teaching Using Science Kits: a Workshop for Elementary School Teachers.” ROBERT POTH, Pinellas County Schools.

Mr. Poth is a Presidential Award winner who has been a key individual in moving the district toward hands-on, inquiry-based teaching strategies at the elementary school level.

Mr Poth will work with teachers so that teachers can gain direct experience with kits, understand how to use questioning and support strategies to enhance student learning, and show how inquiry based teaching can be used to enhance student learning, and show how inquiry based teaching can be used to enhance reading and writing skills.

FRIDAY 9:00 AM - 12:00 PM CORNELL 230

Session B: “Integrated College Science for non-Science Majors That Meets the Requirements of Florida’s Education Reform.” ROBERT POTTER, GERRY MEISELS, BIBI TEKLEHAIMANOT, MARK MARONE, University of South Florida and KEN THOMAS, Hillsborough Community College.

These individuals have participated in the development of a Modular Approach to teaching introductory, non-major science.

The workshop will help faculty understand the relationship between the K-12 Science Sunshine State Standards and the College curriculum, will help them develop strategies for effective teaching that recognize individual differences among students, and will explore the relationship between meaningful assessment and the development of thinking and other science process skills.

FRIDAY 3:00 PM - 5:30 PM CORNELL 226

Session C: Workshop conducted by JUDY JOHNSON, University of Central Florida. This workshop is geared toward high school and middle school teachers. Details were not available at press time.

FRIDAY 3:00 PM - 5:30 PM CORNELL 230

Session D: "Integrated College Science for non-Science Majors That Meets the Requirements of Florida's Education Reform." ROBERT POTTER, GERRY MEISELS, BIBI TEKLEHAIMANOT, MARK MARONE, University of South Florida and KEN THOMAS, Hillsborough Community College.

This a continuation of Session B.

SOCIAL SCIENCES

FRIDAY 10:15 AM BUSH 125

SESSION A

MARIBETH DURST, SAINT LEO COLLEGE, presiding

10:15 AM SOC-1 Collective Security, Sanctions and Peace-keeping: from the United Nations to the U.S./NATO Mission in Bosnia. MARCO RIMANELLI, Saint Leo College, 1012 South Dakota Avenue, Apt. 7, Tampa, Florida, 33606-3066. An analysis of the effectiveness of international sanctions, military interventions and peace-keeping in international affairs to stop aggressions and preserve peace. A Brief history will survey previous attempts from the League of Nations' failed 1935-36 Sanctions against Fascist Italy in the Italo-Ethiopian War to the U.N. interventions in the 1950-53 Korean War, the 1961-64 Congo Civil War, the 1964-80 Rhodesian Sanctions, the 1990-91 War against Iraq and the 1994 Intervention in Haiti. The main case-study used is the U.N./NATO interventions in Bosnia preceding and after the Dayton Peace Accords.

10:30 AM SOC-2 The Heritage of the U.S. Central Command. JAY HINES, Command Historian U.S. Central Command, U.S. Central Command/CCHO, 7115 South Boundary Boulevard, MacDill Air-Force Base, Tampa, Florida, 33621-5101. An analysis of the role played by the U.S. Central Command of MacDill Air-Force Base in the Middle-East/Persian Gulf/East Africa regions and especially against Iraq from the Gulf War of 1990-91 to the follow-up interventions in the same area, as well as its readiness against other regional forms of threat affecting the free flow of oil and U.S./Western interests in the region.

10:45 AM SOC-3 Apparent Changes, Continuity and Turmoil in Japan's Politics. JACK HORGAN, TAO Associates, 4419 Swann Boulevard, Tampa, Florida. A survey of the domestic politico-cultural make-up of Japanese politics since World War II and the difficulty of making lasting changes in the governmental/party system towards a more multi-party political setting less dominated by local interests and cliques.

11:00 AM SOC-4 Science Education in Honors Programs. HUDSON REYNOLDS, Department of Social Sciences -MC 2067, Saint Leo College, P.O. Box 6665, Saint Leo 33574. There are more than 350 honors programs at Colleges and universities across the country. Many of these programs contain a significant science component. I propose to investigate the variety of means employed to integrate science into honors curriculums. Since the publication this year of Peterson's Guide to Honors Programs, the National Collegiate Honors Council is expecting to witness a doubling of the number of honors programs across the country within four years. By undertaking an investigation of the scope and variety of science components within established honors programs, I hope to provide a useful reference for those confronted with the task of implementing these new programs. As one of the founders and current Director of the Saint Leo College Honors Program, I have helped to create and administer an interdisciplinary honors curriculum that includes a challenging science component, so that I am well aware of the difficulties and rewards of integrating science education and the liberal arts.

11:15 AM SOC-5 Perception of Needs for Nontraditional Students in the College Setting. L. BENTON (1), M. PHELPS (2), (1) 8088 Indian Trail Rd. Brooksville 34613, (2) 408 Morse St. Inverness 34452. Nontraditional students, in the college setting, represent an increasing population with distinct needs. Due to the ever growing enrollment of nontraditional students, colleges are in need of a reevaluation of student services. The following qualitative study will examine the needs of nontraditional students within the college setting. A review of literature will be used to support the research. The purpose of this paper is to bring to light the needs of the nontraditional student, in order to affect a positive change within the college setting.

FRIDAY 3:00 PM BUSH 125

SESSION B

MARIBETH DURST, SAINT LEO COLLEGE, presiding

3:00 PM SOC-6 Learned Helplessness as Mediator Variable for Adult Children of Alcoholics - A Pilot Study. KATJAM M. SPRADLIN and JAMES EPPS, Dept. Of Psychology, University of South Florida, 4202 E. Fowler Ave., BEH 339, Tampa 33620. Past research findings were combined to form a

mediational model of learned helplessness in Adult Children of Alcoholics (ACOAs). The Children of Alcoholics Screening Test - 6 (CAST-6); Hodgins, Maticka-Tyndale, el-Guebaly, & West, 1993) and the Learned Helplessness Scale (LHS; Quinless & McDermott-Nelson, 1988) were used to assess the prevalence of learned helplessness in ACOAs. Parental and personal alcohol abuse were also investigated. While 13% of the 180 surveyed adult college students identified as being ACOAs with learned helplessness, ACOA status and level of learned helplessness were not significantly related. The length of time the ACOA spent with the alcoholic parent(s) did not seem to affect that relationship. The results were incongruent with past research findings and further data collection is necessary to ensure a more powerful analysis.

3:15 PM SOC-7 Canonical Correlation Analysis of Alcohol Expectancies and Self-Reported Alcohol Use. M. S. YOUNG, J. DARKES, J. D. KROMREY, AND M. S. GOLDMAN, University of South Florida, Tampa 33620. The Alcohol Expectancy Inventory - Short Form (AEI-SF), a 24 item measure of alcohol expectancies, has been shown to reflect eight first-order factors (Darkes, Greenbaum, and Goldman, 1997). 185 first time college students provided AEI-SF and drinking data via telephone interview during their initial month on campus. Canonical correlation revealed that a composite of self-reported drinking quantity, frequency, and frequency of intoxication was significantly related to a composite of the eight AEI-SF factors, $r = .532$, $p < .0001$. Results also indicated that heavier drinking was strongly (and positively) associated with arousing and positive expectancies. These findings are consistent with previous alcohol expectancy research (Goldman, Greenbaum, & Darkes, 1997; Rather and Goldman, 1994) and support the utility of the AEI-SF for assessing of alcohol expectancies. Research supported by NIAAA Grant # RO I-AA083 3 3 to Mark S. Goldman

3:30 PM SOC-8 HIV/AIDS in an Adult Correctional Facility: The Rate of Fear as Viewed by the Officers and Inmates. A.S. HARROD, Psychology, Saint Leo College, St. Leo, Florida 33574. This study compared the rate of fear of the HIV/AIDS virus between correctional officers and inmates. Thirty two officers and thirty inmates at three adult detention centers in Florida, completed the Fear of AIDS Scale (FAS; Bouton, Gallagher, Garlinghouse, Leal, Rosentstein, Young, 1987) along with a list of demographic questions. The hypothesis of this study was that officers would report a greater fear of contracting the virus than the inmates, due to the inmates having a learned helplessness attitude and lacking in educational background. However, the results in this study indicated that there was no difference between the two groups regarding their self-report fear of aids. Results are discussed in terms of educational programs for officers and inmates on HIV transmission in correctional facilities.

3:45 PM SOC-9 Attitudes toward and use of condoms among college students to prevent HIV and STDs. LESLEE PELTIER P.O. Box 2402 Saint Leo College, St. Leo, 33574. Two surveys and a demographic questionnaire with several sexual history questions were given to 100 student participants at a small liberal arts college in Florida. The 100 participants consisted of 45 males and 55 females; including 43 underclassmen and 57 upperclassmen. The purpose of the study was to research the attitudes towards and use of condoms among college students to prevent Human immunodeficiency virus (HIV) and Sexually transmitted diseases (STDs). The study found that males have more positive attitudes about the use of condoms than females and the difference was statistically significant. Males, on-campus students, and underclassmen, (freshmen/sophomores), use condoms more frequently than females, off-campus students, and upperclassmen, (juniors/seniors). More females than males did know that the use of a condom is a good method to prevent getting sexually transmitted diseases. A statistically significant negative correlation was discovered that reveal that the more religious a student is, the less likely he/she knows about the use of condoms and the facts about HIV and STDs.

4:00 PM SOC-10 A Multivariate Analysis of the Relationship Between Alcohol Expectancies, Ethnic Background, and Quantity and Frequency of Alcohol Use. W. M. HUNT, M. S. GOLDMAN, AND J. DARKES, Dept. of Psychology, University of South Florida, Tampa 33620. Alcohol expectancies and drinking patterns of 962 college students from a five year study were selected for analysis based on ethnic background and gender. Canonical correlation was used to examine the relationships between quantity and frequency of drinking (DV's) and gender, ethnic background, and alcohol expectancies (IV's) as measured by the six scales of the Alcohol Expectancies Questionnaire (AEQ). The sample was 64.6% female and self-identified into six ethnic groups (White=74%, African American=10.3%, Hispanic=9.1%, Asian=4.1%, Native American=0.7%, and other=1.8%). Both canonical variates were significant ($p < .05$) and approximately 34% of the variance in the DV's was accounted for by the IV's. Consistent with previous research, results suggest both positive and arousal expectancies are reliably predictive of drinking behavior. Additionally, there was some evidence of a high quantity/low frequency or binge-type of drinking pattern in the data. Finally, although cautious interpretation is called for, findings have implications for both gender and ethnicity in relation to drinking patterns, as well. Research supported by NIAAA Grant # R01-AA08333 to Mark S. Goldman.

4:15 PM SOC-11 Incarcerated delinquents' attitudes towards their parents: A correlation of incarcerated juveniles entering a correctional boot camp to those ready to graduate from the boot camp. NICOLE ANN WEEKS, Psychology, MC 2127, PO Box 6665, St. Leo College, St. Leo, Florida 33574. Experts say that family structure and the strength of the relationship between a

parent and child affects the possibility of delinquency in a child. The current study surveyed juvenile delinquents in a correctional boot camp and assessed them on their personal attitudes towards their parents. The scores of those detainees who had recently entered the program were compared to the scores of detainees who were about to graduate the program. The results showed a significant positive shift of attitude scores from those beginning the program to those exiting the program.

FRIDAY 4:30 PM BUSH
BUSINESS MEETING: SOCIAL SCIENCES
MARIBETH DURST, presiding

URBAN AND REGIONAL PLANNING

FRIDAY 3:00 PM BUSH 207
RICHARD MARCH, SOUTH FLORIDA WATER MANAGEMENT DISTRICT,
presiding

3:00 PM URP-1 Evaluation of Alternative Population Forecasting Techniques for Counties Within the South Florida Water Management District, RICHARD A. MARCH, South Florida Water Management District, P. O. Box 24680- Six time-series models for forecasting county population for the sixteen counties partially or entirely within the South Florida Water Management District. Accuracy of forecasts generated in the past will be evaluated and the degree to which forecast accuracy degrades as the projection horizon lengthens will be evaluated. Implications for issuance of longer-duration water use permits will be discussed.

3:15 PM URP-2 Problems of Change Detection in Water Management in South Florida with Emphasis on Geographic Information Systems and Agricultural Water Use Forecasting- JOHN HIGGINS AND RICHARD A. MARCH, South Florida Water Management District, P. O. Box 24680, West Palm Beach, Florida 33416. In order to develop accurate future projections of land use and water use associated with land uses, it is necessary to be able to accurately detect historical patterns of land use change. Geographic information systems have the potential to allow for development of this type of database. Problems of change detection using existing GIS coverages will be discussed and suggestions for improvement of the use of GIS and remotely sensed data will be discussed. Use of such data for improved forecasting and planning will be discussed.

3:30 PM URP-3 Sequential Planting in Mangroves: A Proposal for Change in Mitigation Techniques. BARBARA E. ROTHSTEIN and RANDY DOUGHERTY, NMB Biomedical and Environmental Science Magnet, 1247 N.E.

167th Street, N. Miami Beach, FL 33162. Current mitigation design leads to high mangrove mortality using the row planting method. Analysis of chemical data has shown a strong correlation of mangrove growth to distance from land. This study proposes a sequential planting method, whereby only a few rows of mangrove seedlings are planted parallel to the shore and allowed to partially develop. Chemical and physical markers are being developed to determine when to plant the next outer rows. This type of planting would require a policy change to set up specific guidelines for sequential planting.

FRIDAY 3:45 PM BUSH 207

BUSINESS MEETING: URBAN AND REGIONAL PLANNING

RICHARD MARCH, presiding

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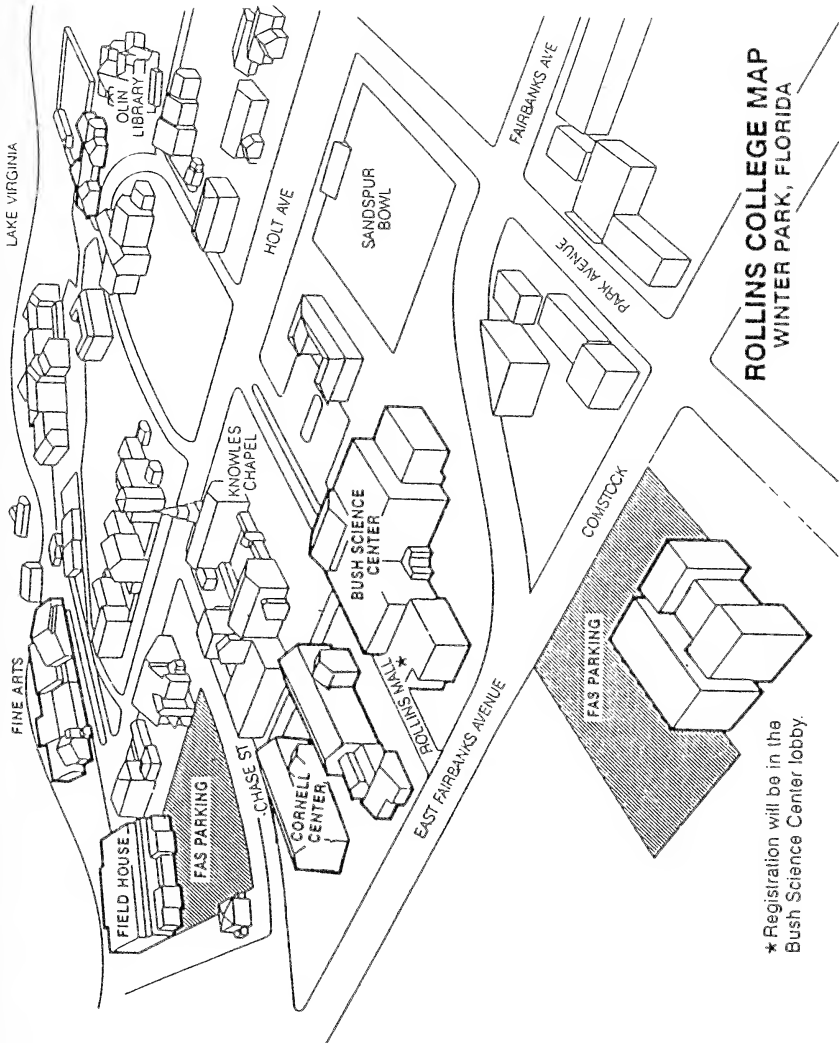
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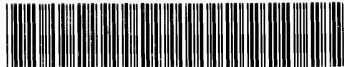
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ROLLINS COLLEGE MAP
 WINTER PARK, FLORIDA

★ Registration will be in the
 Bush Science Center lobby.



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