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Program Issue



64th ANNUAL MEETING

FLORIDA INSTITUTE OF TECHNOLOGY

Melbourne, Florida

MARCH 9-11, 2000

ISSN: 0098-4590

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2000 PROGRAM ISSUE

THE SIXTY-FOURTH ANNUAL MEETING OF THE
FLORIDA ACADEMY OF SCIENCES
in conjunction with the
Florida Junior Academy of Science
The Society of Physics Students
and the Science Talent Search

Featuring A Symposium:
ENVIRONMENTALISM IN THE NEXT MILLENNIUM

Two Plenary Addresses:
The Medalist Address
CTP: Computational Theory of Perception
by Dr. Abraham Kandel
&
The Gale Plenary Lecture
Reflections on the Future of Biological Science in the New Century
by Dr. Betty Smocovitis

Florida Institute of Technology
Melbourne
March 9-11, 2000

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PRESIDENT'S WELCOME

It is indeed a pleasure to welcome all participants to the Sixty-fourth Annual Meeting of the Florida Academy of Sciences. As we pause from our daily activities to gather together here at the Florida Institute of Technology, we note with pride the venerable history of the Academy and enthusiastically look at the challenges and opportunities of its future. We are deeply grateful to include among our number all those who have promoted scientific knowledge, sponsored good scientific teaching and promoted the ethical application of the sciences to the service of humanity. And, as we enter the transitional period to the 21st Century, it behooves all of us to build on those past accomplishments not only during the next few days we spend here together but also into the future. As the only independent scientific and technological university in the southeast, Florida Tech is an ideal location for us to make that commitment and begin that process now.

Maribeth Durst

MEETING INFORMATION

The 64th Annual Meeting of the Florida Academy of Sciences will be held at the Florida Institute of Technology in Melbourne, Florida, March 9-11, 2000. At 1:00 PM, Friday, March 10, Dr. Betty Smocovitis, of the University of Florida, will present the Gale Plenary Lecture, immediately following the Annual Business Meeting. Following the Academy Banquet on Friday night, Dr. Abraham Kandell, the 1999 Academy Medalist, will give the Annual Medalist Address. Two Sections will show a selection of films, and on Saturday (March 11), a symposium on "Environmentalism in the Next Millennium," will take place from 10:30 - 11:30 AM.

LOCATION

Florida Institute of Technology was founded in 1958 as Brevard Engineering Institute to offer continuing education opportunities for personnel working at what is now NASA's John F. Kennedy Space Center. In 1961 Florida Tech moved to its current Melbourne campus, which had been used by the former University of Melbourne. In 1966 the name was changed to Florida Institute of Technology, and today Florida Tech is the only independent scientific and technological university in the southeast. Approximately 4,200 students are enrolled, with nearly 2,700 on the Melbourne campus and 1,450 at off-campus graduate centers. Florida Tech offers more than one hundred and twenty degree programs in science and engineering, aviation, business, humanities, psychology, and communication. Doctoral programs are offered in 18 disciplines, while master's degrees are offered in more than 50 areas of study.

Florida Tech is located on Babcock Street about five miles east of Interstate 95, and about 30 miles south of Cape Canaveral on Florida's East Coast. Further details about Florida Tech and vicinity, including location and campus maps, are provided in this Issue of the *Florida Scientist* (Supplement 1 to Volume 63). This and other relevant information will also be posted on the FAS website (<http://pss.fit.edu.FAS>).

REGISTRATION

ALL PARTICIPANTS ARE EXPECTED TO REGISTER. Academy members receive the Program Issue by mail in advance, as will non-members who register before January 1, 2000. Additional meeting material (including programs for individuals registering after January 1, 2000) will be available at the registration desk which will be open in the lobby of Skurla Hall on Thursday afternoon, March 9, from 3:00-5:30 PM and Friday, March 10, from 7:30 AM until 4:00 PM.

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.

- Best Western Harborview Hotel (quite close to Florida Tech Campus)
964 South Harbor City Blvd. (US-1), Melbourne, FL 32901
Reservations: 1-888-329-8901, Fax 407-951-9974
\$49.00, plus tax, per room, per night, king bed or two double beds
- Hilton Melbourne Airport (quite close to Florida Tech Campus)
200 Rialto Place, Melbourne, FL 32901
Reservations: 1-800-437-8010 (no block), Fax 407-956-7247
\$69.00, plus tax, single or double occupancy
- Melbourne Beach Hilton Oceanfront (on beach, fifteen minutes from campus)
3003 North A1A, Indialantic, FL 32903
Reservations: 1-800-221-2424, Fax 407-777-3717
\$97.00, plus 10% tax, single or double occupancy
- Melbourne Beach Quality Suites (at beach, fifteen minutes from campus)
1665 North Highway A1A, Indialantic, FL 32903
Reservations: 1-800-876-4222
Rates available on request

The Local Arrangements Committee has information on other lodging within easy driving distance from Florida Tech. This information will also be posted on the FAS website (<http://pss.fit.edu.FAS>) and available by phone at 407-674-7390.

MEALS

The Academy Banquet will be held on Friday evening (March 10) at the Denius Student Center on the Florida Tech campus beginning at 6 PM with a reception. The dinner will be a choice of Chicken Marsala, Broiled Fish, or Manicotti Stuffed with Three Cheeses. Preregistration for the banquet is suggested; only a limited number of tickets will be available on the day of registration.

Lunch will be available at 12:00 PM on Friday (March 10). For those who desire it, information on local restaurants within a few minutes drive of Florida Tech can be obtained at the registration desk or on the FAS website (<http://pss.fit.edu.FAS>).

ACADEMY PLENARY SESSION & BUSINESS MEETING

Dr. Betty Smocovitis, Associate Professor, History of Science, in the Department of History at the University of Florida, will present the Gale Plenary Lecture on Friday (March 10) at 1:00 PM, immediately following the Annual Business Meeting. Dr. Smocovitis is a science historian specializing in biology. Her lecture is entitled "Reflections on the Future of Biology in the New Century."

MEDALIST PRESENTATION

Dr. Abraham Kandel, the 1999 Academy Medalist, will present the Annual Medalist Address following the Banquet Friday evening. Professor Kandel is Chairman of the Department of Computer Science and Engineering, and Endowed Eminent Scholar at the University of South Florida. The title of his address is "CTP: Computational Theory of Perception."

FIELD TRIPS

Botanical Garden – tours of Florida Tech's 30-acre botanical garden, which is unique in the continental United States, have been arranged for Saturday, 9:30 to 11:30 AM. The garden consists of more than 300 palm trees and other tropical growth in a shady hammock bordered by a stream. 200 different species of palm trees are marked for identification.

Information on additional field trips, such as tours of Cape Canaveral, will be provided at the registration desk or posted on the FAS website (<http://pss.fit.edu/FAS>).

LOCAL ARRANGEMENTS

The Local Arrangements Chair for this Meeting of the Academy is Dr. Frederick Buoni at Florida Institute of Technology, assisted by Dr. Hamid Rassoul (407-674-8778 email rassoul@pss.fit.edu). Dr Rassoul should be consulted for any special meeting needs.

SYMPOSIUM

The theme of this year's meeting is "Science in Florida: a Millennial Perspective," and a joint Florida Academy of Sciences/Florida Junior Academy of Science symposium dealing with this theme will be held Saturday, March 11 from 10:30 – 11:30 AM in the Auditorium at the F. W. Olin Engineering Complex. The symposium is entitled "Environmentalism for the Next Millennium," and will be moderated by Dr.

Noreen Noonan, who serves as Associate Administrator of Laboratories for the Environmental Protection Agency. Dr. Noonan holds the Ph.D. degree in Biology from Princeton University.

ANTHROPOLOGY FILMS

The Anthropological Sciences Section will show a selection of outstanding Anthropology films Friday (March 10) in Skurla 106 from 9:30–11:15 AM:

9:30 – 10:00 AM *Expedition Florida: From Research to Exhibits*: Follows scientists from riverine fossil beds, limestone caverns, and Indian shell mounds to museum exhibit construction (brand new: November, 1999).

10:15 – 10:45 AM *Shadows and Reflections: Florida's Lost Peoples*: beautiful images of Florida's Native Americans in the sixteenth century (winner of the prestigious Wolfson Award).

10:45 – 11:15 AM *The Domain of the Calusa: Archaeology and Adventure in the Discovery of South Florida's Past*: Scientists track down the lost heritage of the mysterious Calusa people (another Wolfson Award winner).

OCEANOGRAPHY FILMS

The Atmospheric and Oceanographic Sciences Section will show the following Oceanography films beginning at 3:15 PM in Skurla Room 116:

3:15 – 3:30 PM *The World of Harbor Branch Oceanographic Institution*.

3:30 – 3:45 PM *Bridging the Gap: Minorities in Marine Science*

4:00– 4:55 PM *Galapagos: Beyond Darwin*: Superb photography from the HBOI/Discovery Channel expedition to the Galapagos Islands. Unique life forms both on land and in the remote and unexplored habitats under the sea.

FLORIDA JUNIOR ACADEMY OF SCIENCE ANNUAL COMPETITION

The Florida Junior Academy of Science will meet with the Florida Academy of Sciences this year. As the student division of the FAS, the Florida Junior Academy of Science provides opportunities which encourage scientific research by Florida's middle and senior high school students through allowing them to compete, share and network with other students and adults having common interests. The Florida Junior Academy of Science is seeking volunteers to assist in judging and to act as section

moderators at its competition, to be held on Saturday afternoon (March 11). Persons interested in participating in this rewarding experience should contact the FJAS Coordinator: Pat Zalo, FJAS Coordinator, 2812 26th Avenue Drive W., Bradenton, FL 34205-3707, telephone: 941-756-4156, e-mail: pzalo@yahoo.com

COMMERICAL 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. Students wishing to be considered for one or more of these awards should indicate their interest on the Abstract Submittal Form.

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. Central Florida Chapter, The Explorer's Club Award - This prize of \$500.00 is awarded for the "most original student research paper in the spirit of exploration." The prize for the winning paper is awarded when the student presents the paper again at an Explorer's Club banquet in Orlando.
4. Sigma Xi Awards - The first award, presented by the University of Florida chapter of Sigma Xi, is for \$50 and a certificate. The award is presented to graduate students only. The second award is presented by Florida Institute of Technology for the best paper by an Florida Tech student. The award is for \$50 and \$100 for undergraduate and graduate students respectively.

5. William W. Behrens, Jr./Florida Institute of Oceanography Award - This \$750 prize is awarded by the Florida Institute of Oceanography to a graduate student for the best paper in any area of ocean or marine sciences. A written manuscript is required and must be submitted by February 13, 2000 to: Dr. Ernest D. Estevez, Chairman, FAS Awards Committee, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota, FL 34236, telephone 941-388-4441. Please, no facsimile or email submittals.

ANNOUNCEMENTS

YEAR 2001 MEETING: The Annual Meeting for Year 2001 will be held at Saint Leo University, March 8-10, 2001.

PERMANENT OFFICES FOR THE ACADEMY: The FAS office has been located at the Orlando Science Center. The Executive Secretary is Debbie A. Jackson. The address and telephone numbers are shown below.

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

FLORIDA ACADEMY OF SCIENCES 2000 ANNUAL MEETING PROGRAM SUMMARY

THURSDAY, MARCH 9

TIME	EVENT
3:00 PM - 5:30 PM	Registration, Skurla Hall
5:30 PM - 7:00 PM	Dinner on your own at local restaurants (information at Registration Desk)
7:00 PM	FAS Council Meeting

continued, next page

FAS MEETING SUMMARY, continued**FRIDAY, MARCH 10**

TIME	EVENT
7:30 AM - 4:00 PM	FAS Registration & Information Desk, Skurla Hall
8:00 AM - 12:30 PM	FAS Concurrent Paper Sessions, Skurla Hall, Various Rooms Anthropology Films (9:30-11:15 AM RM 106)
12:00 PM - 2:15 PM	Lunch, Business Meeting & Gale Plenary Lecture
2:30 PM - 5:00 PM	FAS Concurrent Paper Sessions, Skurla Hall, Various Rooms Oceanography Films (3:15-4:55 PM RM 116)
6:00 PM - 7:00 PM	Reception, Denius Student Center
7:00 PM - 10:00 PM	FAS Banquet & Medalist Address Denius Student Center

SATURDAY, MARCH 11

TIME	EVENT
8:30 AM - 12:00 PM	FAS Registration & Information Desk, Skurla Hall
8:30 AM - 12:00 PM	FAS Concurrent Paper Sessions, Skurla Hall, Various Rooms
9:30 AM - 11:30 AM	Tours of the Botanical Garden
10:30 AM - 11:30 AM	Symposium: Environmentalism in the Next Millennium, F. W. Olin Engineering Complex Auditorium
12:00 PM	Lunch on your own at local restaurants (information at Registration Desk)
AFTERNOON	Trips to various local attractions (information at Registration Desk)

AGRICULTURAL AND NATURAL RESOURCES

SATURDAY 8:30 AM SKURLA 116

MARTIN ADJEI, RANGE CATTLE RESEARCH AND EDUCATION CENTER, presiding

8:30 AM AGR-1 The Effects of Elevated CO₂ and Temperature on Growth and Yield Processes of Two Rice Cultivars. A.M. SNYDER (1), K.J. BOOTE (1), R.W. GESCH (2), J.M. THOMAS (1), L.H. ALLEN (2). (1) University of Florida, Gainesville, 32611, (2) USDA, Building 164, Gainesville, 32611. A study was conducted to evaluate growth and yield processes of rice under projected global warming conditions so as to determine climatic limitations to yield. Two rice cultivars of contrasting climatic origin, IR72 (*japonica* type, temperate) and M103 (*indica* type, tropical) were grown under two levels of CO₂ (350 and 700 ppm) at five diurnal temperature cycles (40/30, 37/27, 34/24, 31/21 and 28/18 °C). Lifecycle durations shortened with increasing temperature. The duration of grain fill at higher temperatures was generally shorter as well. Biomass declined steadily with higher temperature. Yield was optimum at 31/21 °C, decreasing to near zero at 40/30 °C for both cultivars. A high filled grain percentage was basically maintained at temperatures as high as 34/24 °C, declining towards 0% at 40/30 °C. The near 0% filled value at this temperature was correlated with very low numbers of pollen grains on spikelet stigmas. The number of panicles per plant declined as temperature increased, while tiller number was higher at low and high ends of the temperature range. Weight per seed was stable for all treatments until 37/27 °C, at which point it declined sharply.

8:45 AM AGR-2 Temperature Effects on Cell Development and Seed Shriveling at Maturity in Soybean. J.M.G. THOMAS (1), K.J. BOOTE (1) and L.H. ALLEN (2). (1) University of Florida, Gainesville, FL 32611, (2) USDA, Building 164, Gainesville, FL 32611. Seeds were sampled from soybean grown at 28/18 °C and at 40/30 °C diurnal max/min during the period of seed fill. The pods and seeds were weighed, and the length of each pod was recorded. Seeds were fixed in formalin acetic acid (FAA) for microscopic examination. For light microscopic examination, cotyledon cells were enzymatically separated for counting. There were no statistical differences in the number of cells per cotyledon. For the scanning electron microscope (SEM), seeds were frozen in liquid N₂ and fractured. The resulting seed pieces were dehydrated in an ethanol series from 50% to 100%, then 'critical point dried' to replace all ethanol with carbon dioxide. Seed pieces were examined under the SEM and photographs were taken at

600 and 1500 X magnification. The size, number and contents of the cells were analyzed with the 'SigmaScanPro_5' (Jandel Scientific) image analysis program. Differences were noted in that very few or no nuclei were visible in cotyledon cells from plants grown in 40/30 °C compared to the normal development of cells from 28/18 °C. All mature seeds from plants grown at 40/30 °C were shriveled, but none were shriveled at 28/18 °C.

9:00 AM AGR-3 Plant Yield and Plant and Soil Analyses of American Wild Ginger from Wayne County, Tennessee. EMMA-ROSE BANCROFT, R.N. GALLAHER AND MARY PFAFFKO. University of Florida, Gainesville, FL 32611. American Wild Ginger (*Asarum canadense*) is a medicinal plant native to North America and can be found from North Carolina to Missouri. Wild ginger is affective when the tea is taken as a carmmative to expel gas, and can be used as a diaphoretic to promote perspiration and aid in breaking a fever. Concern exists over loss of native habitat, therefore, our objective was to investigate a typical habitat in which high populations of wild ginger grow in order to understand management needs for potential cultivation. Three replications of 1 m² from high density sites were sampled for soil and plant nutrition, additional soil chemical and physical properties, light, temperature, slope and aspect, and yield of plant parts. A global positioning system (GPS) was used to permanently identify sites. Sites averaged 125 plants m⁻² with no yield differences due to sites. We concluded that habitats sampled were ideal to optimize growth of wild ginger. The loam texture of these sites had an average pH of 6.5, a high CEC, good water holding capacity, medium to high extractable nutrients, except for P, and high organic matter. Yield of plant parts, light intensity, soil temperature, other plant species in this native ecosystem and other data will be discussed.

9:15 AM AGR-4 Plant Yield and Plant and Soil Nutrient Analyses of Bloodroot from Wayne County Tennessee. KRISTIN FOX (1), R.N. GALLAHER (2), AND NICK BATTY (3). (1) Plant Pathology, (2) Agronomy and (3) Horticultural Science, Univ. of Florida, Gainesville, FL 32611. Much interest has occurred regarding wild medicinal plants and their habitat. Constituents of Bloodroot (*Sanguinaria canadensis*) are a treatment for several medical conditions, including ringworm and gingivitis, among others. The objectives of this research were to identify dry matter partitioning yield, soil and plant nutrient analyses and ecological conditions of dense colonies in the wild from an area representative of much of the eastern USA. Plant and soil samples were taken from three ½ square meter areas and analyzed for many of the essential nutrients (N, P, K, Ca, Mg, Cu, Fe, Mn and Zn). Other routine chemical and physical properties of the soils were also determined. Plant characteristics were observed, along with

temperature and light intensity. There were no differences among sites for most measurements, therefore we concluded that the habitat observed represented ideal growing conditions. Soils had loamy texture and were low only in P. Data show that Bloodroot grows best in 90% shade in areas of high humidity and a pH of about 6.7. These colonies averaged 150 plants m^{-2} and were estimated to produce 700 kg/ha of dried rhizomes. Reproduction of soil and ecological conditions found in this study should be an aid to anyone desiring to enter into commercial production of bloodroot.

9:30 AM AGR-5 Elemental Nutrition and Ecological Data for Mayapple, *Podophyllum peltatum*. D. SIANO (1), R. N. GALLAHER (1), AND K. GALLAHER (2). (1) University of Florida, P.O. Box 110730, Gainesville 32611, (2) Lipscomb University, 7643 Cumberland Road, Nashville, TN 37204. Although Mayapple (*Podophyllum peltatum*) is an important medicinal plant of eastern North American forests, scientific study of its habitat is limited. The objective of this paper was to identify environmental conditions and nutrient analyses. Data was recorded in early May 1998 for five sites in Wayne County, Tennessee. Soil, litter, and plant parts (leaf, stem, rhizome) were collected. The samples were dried, weighed and analyzed for yield relationships of plant parts, elements (N, P, K, Ca, Mg, Na, Cu, Fe, Mn, Zn), moisture, organic matter, etc. American Mandrake was found on both alluvial and colluvial soil types. Shade at plant height ranged from 77 to 96%. Soil temperature generally decreased from 16 °C at the surface to 14 °C at 30.5 cm depth. Partitioning of dry matter averaged for the five sites was in the order of rhizomes (117 g m^{-2}) > leaves (35 g m^{-2}) > stems (23 g m^{-2}) > fruit (0.88 g m^{-2}). Populations ranged from 33 to 67 plants m^{-2} among the five sites. From these data dry rhizome yield ranged from 2.01 to 3.45 g plant⁻¹, averaging 2.50 g plant⁻¹. Plants appeared to be healthy with no apparent plant nutrient deficiencies. These limestone-derived soils averaged 8.7% organic matter, 6.3 pH, and 20.92 cmol kg⁻¹ CEC. Soils were low in extractable P.

9:45 AM AGR-6 Performance of Sorghum Sudan and Annual Ryegrass as Nutrient Recycling Crops Following Staked Tomato Production. GREGORY M. HITZ, C.S. GARDNER, and O. S. MBUYA, Division of Agricultural Sciences, Florida A & M University, Tallahassee, Florida 32307. The purpose of this study was to investigate the effectiveness of Sorghum Sudan and Annual Ryegrass in the recovery of residual soil nitrogen following staked tomato production. The test site consisted of 20 plots, with five end levels in four replications. Nitrogen fertilizer levels were 0, 90, 180, 270 and 360 lbs acre⁻¹ season⁻¹ applied during the tomato growing season. Following removal of tomato plants, the plots were divided into three subplots: nutrient recycling crop (NRC),

fallow, and polyethylene mulch. Background soil samples were collected prior to NRC planting to measure residual nitrogen levels. During NRC growth, bi-weekly soil samples and crop samples were collected in the subplots. Following the removal of NRC, soil samples were also collected to measure the amount of residual nitrogen. Soil samples were analyzed for nitrate-nitrogen using a spectrophotometer, and crop samples were measured to determine dry-matter yield. Then ground and further analyzed for total nitrogen, using a Technicon Autoanalyzer. Preliminary findings suggest that Sorghum Sudangrass and Annual Ryegrass are effective in recovering residual nitrogen.

10:00 AM AGN-7 Utilization of Urban Plant Debris to Improve Soil Quality and Sweet Corn Yield. J.D. GREENWOOD(1), R. N. GALLAHER(1), AND R. MCSORLEY(2). (1) Department of Agronomy, (2) Department of Entomology and Nematology, University of Florida, Gainesville 32611. Approximately 3,000,000 Mg of yard waste are produced annually in Florida. One possible alternative to disposal in landfills is the application of urban plant debris to agricultural land. The objectives of this experiment were to evaluate the effects of residual yard waste compost (YWC), new applications of YWC, and three fertilizer rates on soil properties and plant yield. Three residual YWC treatments (269 Mg ha⁻¹ yr⁻¹ YWC incorporated into the soil, 269 Mg ha⁻¹ yr⁻¹ YWC applied as a mulch, and 0 Mg ha⁻¹ yr⁻¹) were split with two new YWC treatments (0 versus 269 Mg ha⁻¹ yr⁻¹). These split plots were further split and received three fertilizer treatments (full extension fertilizer recommendation, one-half extension recommendation, and control). Therefore, the experimental design was a split-split-plot with the residual YWC treatments in a randomized complete block design with four replications. In 1998 and 1999, 'Silver Queen' sweet corn (*Zea mays*) was planted one month after the application or new YWC. Samples were taken for soil moisture, bulk density, nematode densities, and sweet corn yield. Soil water at field capacity was highest in the treatments containing both old and new YWC. Bulk density significantly decreased from both old and new YWC treatments. Root-knot nematodes were greatest in the YWC-treated plots compared to the control while the reverse was true for lesion nematodes. The application of new YWC did not impact yield in 1998, but increased yield by over 1000 kg ha⁻¹ in 1999.

10:15 AM BREAK

10:30 AM AGR-8 Teaching Methods for the New Millennium. MARK A. WADE, University of Florida IRREC, 2199 South Rock Road, Fort Pierce, FL 34945. Success in the new millennium classroom requires that educators recognize a variety of learning styles and adapt in order to

facilitate the learning process. A positive classroom environment is comfortable and non-threatening, a place where expectations are exchanged between teacher and student. Part of the goal in moving young minds from a dualistic intellect to a more relativistic stage, requires that the student accept that what is being taught has value, not only educational value, but value worth entering into a transactional relationship. This transaction occurs when the learner makes a rational decision to exchange dollars, time and energy for the knowledge offered by the instructor. As in any relationship between buyer and seller, the transaction requires that a level of receptivity be created so that features, advantages and benefits of the transaction can be examined. This research examined student response to instructor efforts to create a vested covenant in the classroom. Teaching methods were altered in two of four course sessions taught by the same instructor over two consecutive semesters. Results reported in the study found that when efforts were made to gain student ownership of the class, both student grades and teacher evaluations improved significantly.

10:45 AM AGR-9 Predicting the Potential Distribution in Florida of a Classical Biological Control Agent of Brazilian Peppertree, *Shinus terebinthifolius*, with CLIMEX and FAWN J. P. CUDA, J. H. PEDROSA-MACEDO and M. D. VITORINO. University of Florida, Entomology & Nematology, Gainesville, Florida 32611. According to conventional wisdom, the better adapted a biological control agent is to the climate of the region of introduction, the greater the chance that it will establish and become abundant. Matching the climate of the region of introduction with that of the region of origin is a useful indicator for predicting the potential geographic range of an introduced biological control agent. The computer program CLIMEX is a dynamic simulation model that was developed to predict whether potential biological control agents are likely to be limited or favored by the climate in the release area. We used the CLIMEX model to incorporate meteorological data available from the Florida Automated Weather Network (FAWN) with some life cycle data to predict the geographic distribution of the defoliating sawfly, *Heteroperreya hubrichi*, a candidate for classical biological control of Brazilian peppertree, *Shinus terebinthifolius*, in Florida.

11:00 AM AGR-10 Growth and Yield Performance of Corn Grown on *Imperata cylindrica* Controlled Plots. G. BOLFREY-ARKU (1), O.U. ONOKPISE (2), D. SHILLING (3), AND C. COULTAS (2). (1) Crops Research Institute, Kumasi, Ghana, (2) Florida A&M University, Tallahassee, Florida 32307, and (3) University of Florida, Milton Campus, Milton, Florida. The performance of corn was evaluated on farmlands after two years of *Imperata cylindrica* control using non-chemical means. The experimental design was split-split-split plot design with treatments

factorially randomized within blocks in four replications. The best yields were obtained on plots that were plowed and planted with cover crops compared to those that had been burned or slashed and planted with cover crops. In all treatments, performance was best with *Mucuna pruriens* compared to *Stylosanthes* sp. when used as legume cover crops.

11:15 AM AGR-11 Tillage, Variety, Herbicide and Cropping System Effects on Fresh pod Yield and Fall Panicum Control for Peanut. R.S. TUBBS, R.N.GALLAHER AND J.A. TREDAWAY. Department of Agronomy, University of Florida, Gainesville, 32611. In one study, the objective was to determine tillage requirements, the effectiveness of control of fall panicum (*Panicum dichotomiflorum*) and the fresh pod yield of two varieties of peanut (*Arachis hypogea*). Five methods of tillage, including strip-till and conventional tillage and two herbicides were used on 'Georgia Green' and 'Andru' varieties of peanut. Strip-till peanut was equal in yield and in populations of fall panicum to conventional tillage peanut. Georgia Green yielded 5.5% more fresh weight than Andru, 6353 kg ha⁻¹ versus 6025 kg ha⁻¹. Cadre controlled fall panicum better than Starfire. Yet, Cadre plots yielded less fresh weight than Starfire (6074 kg ha⁻¹ versus 6305 kg ha⁻¹), showing there must have been some injury to peanut plants from Cadre compared to Starfire. There was also a significant interaction between variety and herbicide for percent fall panicum control. Data will also be presented on strip till peanut yield and weed control among six varieties and two cropping systems, rye (*Secale cereale*) followed by peanut and lupin (*Lupinus angustifolius*) followed by peanut.

11:30 AM AGR-12 Environmental Impact of Bahiagrass Pasture Fertilization. M.B. ADJEI AND J.E. RECHCIGL. University of Florida, Range Cattle Research and Education Center, 3401 Experiment Station, Ona, Florida 33865. The effects of source (liquid sludge, cake biosolid or ammonium nitrate) by rate (0, 80, 160) of N application on bahiagrass forage yield and on soil and groundwater nutrients were studied for two years. Sources of N were the main plots and rates of N were the subplots. The same pasture plots were fertilized in March 1998 and 1999. Forage yield was measured at 30-d intervals from May to November. Surface ground water was sampled from 0.61 and 1.22 m wells at 30- to 60-d intervals based on rainfall. The 2-yr forage yield means from liquid sludge or ammonium nitrate application were 4 and 5 Mg ha⁻¹ for the 80 and 160 kg N ha⁻¹, respectively. The cake biosolid application resulted in only 70% the yield from the other sources of N at equivalent N rates. Concentration of minerals in forage tissue and soil were generally not affected by fertilizer treatments. Spikes of groundwater nitrates exceeded the 10 mg L⁻¹ EPA limit in the shallow wells only immediately after ammonium nitrate

application. The data indicates that processed domestic septage could be a slower release and safer substitute to inorganic N fertilizer for pasture use.

11:45 AM AGR-13 Consumer Information and the Safety of Beef Consumption. MARK A. WADE, University of Florida IRREC, 2199 South Rock Road, Fort Pierce, FL 34945. A matrix method approach to content analysis was utilized to test the hypothesis that the print media provides an impartial or unbiased representation of the safety of beef consumption to consumers. Magazine and newspaper articles were generated from an InfoTrac SeachBank search. Each article was evaluated by three judges individually, with each following two established typologies. Each article was determined to be biased or unbiased based on the summarized panel evaluations. The InfoTrac search produced 114 articles relating to beef consumption and food safety between 1989 and 1997. Seventy-three articles were eliminated because they failed to meet established criteria. The remaining 41 articles were evaluated by the judges. Three articles were declared positively biased, 23 were declared negatively biased, and the remaining 15 articles were deemed unbiased by the panel of judges. The reliability among judges' assessments was calculated using an interjudge reliability coefficient by dividing the number of coding agreements by the total number of coding decisions. The levels of informational bias were determined to be statistically significant.

12:00 NOON BUSINESS MEETING: AGRICULTURAL AND
NATURAL RESOURCE SCIENCES
MARTIN B. ADJEI, presiding

ANTHROPOLOGICAL SCIENCES

FRIDAY 9:00 AM SKURLA 106
KAREN WALKER, UNIVERSITY OF FLORIDA, presiding

9:00 AM ANT-1 The Effects of the Social Habitat Implemented by Zoos on the Behavior of the Naturally Semi-solitary Orangutan. GWENDOLYN MARIE BEAVER, Univ. of South Florida, 4202 East Fowler Ave, Tampa 33617. Beginning in the 1930's and continuing to the present day, many zoos underwent reforms in the habitats of their animals, enhancing stimulation for healthy behavioral development by implementing the use of large, more socially complex compounds. This model was a great success for captive gorillas; it diminished neurotic behavior and increased successful reproduction. Therefore the gorilla model was applied to all apes, regardless of whether or not they are a social or solitary animal. Orangutans are the only great ape that is arboreal and semi-solitary;

therefore these differences set the orangutans apart from the other great apes, which are terrestrial and social, and thus presents the question of whether the orangutans benefit from the captive environment in zoos that contradicts their typical semi-solitary behavior. By observing the orangutan group at Lowry Park Zoo, this paper will examine the effects of husbandry and a social environment on the behavior of the orangutan. It is necessary to research the orangutan not only because they are critically endangered but also it is also humane to consider an animal's psychological and behavioral needs and apply them to the captive environment..

9:15 AM ANT-2 Late Holocene Archaeological Sites of Florida's Gulf Coast and Everglades and their Role in Sea-Level and Climate Research. K. J. WALKER, Florida Museum of Natural History, PO Box 117800, Gainesville, 32611. Archaeological sites ranging in date from 1900 to 350 YBP and located along Florida's Gulf coast and in the Everglades are excellent sources for proxy data relevant to sea-level and climate histories. Environmental fluctuations perceived as "rapid," "small-scale," or "minor" in many geological contexts are recorded in these sites as long-term (i.e., at the century scale) episodes with considerable impact to the landscape and its human element. Three archaeological data sets—all well dated with radiocarbon dates and/or pottery—are described: settlement pattern (intra-site and inter-site); geoarchaeological site components; and archaeofaunas. Earlier settlement patterns indicate episodes of movement away from shorelines to "upland" areas followed by a return to new, more sea-ward shorelines. Later (post-1150 YBP), settlement included movement inland in some cases and movement upward (i.e., mound-building) in others. Geoarchaeological components include interbedded deposits generated during episodes of storms, sea-level rise, and mangrove recolonization. Fluctuating estuarine salinity and predator-prey relationships are inferred from archaeofaunas, along with a cooling episode based on a stratigraphic horizon of migratory duck remains. Integrated, the archaeological data corroborate a growing number of studies characterizing regional and global climatic and sea-level episodes for the past 2 millennia.

ANTHROPOLOGY FILMS

9:30 AM ANT-3 *Expedition Florida: From Research to Exhibits* (30 minutes). Accompany Florida Museum of Natural History's scientists to Florida's riverine fossil beds, limestone caverns, and Indian shell mounds – the adventurous field settings of their research. Then join the museum's scientists, exhibit designers, and artists for a behind-the-scenes look at how research evolves into the major exhibits currently under construction at the

FLMNH's new Exhibition Center in Gainesville. (Produced by WildTracks Video and Florida Museum of Natural History.)

10:00 AM BREAK

10:15 AM ANT-4 *Shadows and Reflections: Florida's Lost Peoples* (30 minutes). Florida's Native Americans of the sixteenth century are recreated in paintings by artist Ted Morris. Subjects, settings, and objects of material culture are based on archaeological and ethnohistoric research. Archaeologists from around the state are featured and the film is rich in beautiful images. (FL Dept. of State, Division of Historic Resources, the FL Anthropological Society, Chaos Productions)

10:45 AM ANT-5 *The Domain of the Calusa: Archaeology and Adventure in the Discovery of South Florida's Past* (30 minutes). The Calusa. A people whose domain stretched from the Atlantic to the Gulf, from Lake Okechobee to the Florida Keys. A people whose impressive earthworks, engineered canals, elaborate ceremonies, and intricate art were built on a foundation not of farming but fishing. Today, archaeologists of the FLMNH's Randell Research Center strive to restore the lost heritage of the mysterious Calusa. (Produced by Main Sail Video Productions, Inc.)

11:15 AM BUSINESS MEETING: ANTHROPOLOGICAL SCIENCES
KAREN WALKER, presiding

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES

FRIDAY 2:30 PM SKURLA 116

GARY ZARILLO, FLORIDA INSTITUTE OF TECHNOLOGY, presiding

2:30 PM ATM-1 An Occurrence and Classification of *Acropora Cervicornis* Abundance in Nearshore Waters Adjacent to Ft. Lauderdale, FL. S.A. HERBER, Nova Southeastern University Oceanography Center, 8000 Ocean Drive, Dania Beach 33004. Numerous colonies of the scleractinian coral *Acropora cervicornis* have been discovered in the coastal waters adjacent to Ft. Lauderdale, Florida, between Hillsboro Inlet and Port Everglades Inlet. The extent of coverage between inlets appears restricted to bottom topography. Initial data indicates the colonies are primarily found in shallow water (less than 5 m); hard bottom zones and colonies are dispersed intermediately. Mapping and classification of this unexpected occurrence are in process and will include classification of the colonies of *A. cervicornis* into distinct descriptive categories. A map of this

specific area was divided into quadrates. Each quadrate was individually assessed for the occurrence of *A. cervicornis*. Percentage of coverage and distribution of *A. cervicornis* within each quadrate were ascertained. The colonies were then classified. The classification scheme is based on, but not limited to several variables including: bathymetry, location, distribution pattern, and size of the outcrops. This data will assist in future assessment of *A. cervicornis* colonies, including succession, regression and migration.

2:45 PM ATM-2 Marine Reserves and Artificial Reefs: A Low Technology Upgrade for the Future. C. D. PETRIE (1), R. S. POMEROY (1), AND E. O. KEITH (1), (1) Nova Southeastern University, Farquhar Center, Department of Math Science and Technology, 3301 College Ave, Fort Lauderdale, Florida 33314-7796. Coral Reefs of the United States are declining at rates so drastic that localized disappearance is extremely probable. The critical centers of reef biodiversity in the Florida Keys and Caribbean waters are under extensive anthropogenic stresses and their future is dreadfully uncertain. Current protocols involve the establishment of marine reserves in threatened regions to ensure protection of critical habitats. These areas and structures are defined as critical habitats designed to safeguard threatened environments, but current research suggests that they are failing in their objectives. Recent research regarding chemical extracts and larval morphogens conducted off Fort Lauderdale, Florida suggests that simple upgrades to current methodologies and protocols may reap enormous benefits to marine conservation efforts. We discuss the results of this research and the ramification of implementing such technologies.

3:00 PM ATM-3 Linking Students to Scientists: "Hands-on" Science Education at Harbor Branch Oceanographic Institution. S. B. COOK, Harbor Branch Oceanographic Institution, 5600 US #1 North, Fort Pierce 34946. Over the last five years, staff at Harbor Branch's J Seward Johnson Marine Education Center have developed a suite of programs designed to promote student interactions with HBOI staff and provide opportunities for practical hands-on work experience as well as the design and implementation of individual or group research projects. Programs to be described range from graduate level thesis and course work accredited by the Florida Institute of Technology to a new upper division undergraduate marine science program currently being developed in partnership with Florida Atlantic University. Information on two "research experience and career exposure" programs for lower division college students will also be presented; these projects have been developed with funding from the National Science Foundation to increase the representation of minorities and women in science. A third focal point will be pre-college programs that bring high school students into contact with role models within a real

scientific workplace and promote environmental awareness and good stewardship at the middle and elementary school levels.

OCEANOGRAPHY FILMS

3:15 PM ATM-4 *The World of Harbor Branch Oceanographic Institution*: (15 minutes). Introducing the mission, staff, and programs of HBOI. Based on a 500-acre complex in Fort Pierce, HBOI's fleet includes some of the most technologically advanced research vessels in the world.

3:30 PM ATM-5 *Bridging the Gap: Minorities in Marine Science* (15 minutes) . Produced with funding from NSF. Includes a short history of African American contributions to the marine sciences and interviews with role models, mentors, and students preparing for oceanographic careers.

BREAK

4:00 PM ATM-6 *Galapagos: Beyond Darwin*: (55 minutes). Superb photography from a Harbor Branch Oceanographic Institution expedition to study life in the Galapagos Islands, with particular attention to the remote and unexplored deepwater habitats (a 1996 Discovery Channel production).

5:00 PM BUSINESS MEETING: ATMOSPHERIC AND
OCEANOGRAPHIC SCIENCES
GARY ZARILLO, presiding

BIOLOGICAL SCIENCES

FRIDAY 8:30 AM SKURLA 102
SESSION A

PATRICIA DOORIS, SAINT LEO UNIVERSITY, presiding

8:30 AM BIO-1 Interpopulation Variation in Patterns of Prey Resource Use by Largemouth Bass, *Micropterus salmoides*. S.H. HUSKEY AND R.G. TURINGAN, Florida Institute of Technology, Biological Sciences Department, 150 West University Boulevard, Melbourne, FL 32901. Interpopulation variation in prey resource utilization was examined between two endemic populations of largemouth bass, *Micropterus salmoides*, through all stages of ontogeny. Stomach contents of 284 largemouth bass from subtropical, east-central Florida were compared with stomach contents of 327 conspecifics from temperate, southwestern Michigan during an overlapping temporal scale. Stomach contents were classified into functional categories (e.g. plankton, insect, crustacean, and

fish) and compared for the volumetric contribution of each prey item. These comparisons revealed that prey consumption differed significantly between Michigan and Florida *M. salmoides*. In addition, stage-specific differences in food habits were observed; *M. salmoides* in Florida shifted from feeding on invertebrates to piscivory before 20mm standard length, whereas Michigan bass did not begin consuming fish until after 30mm standard length. Furthermore, after the onset of piscivory, Florida bass consumed more crustaceans than fish, whereas Michigan bass maintained piscivorous feeding habits throughout ontogeny. It is hypothesized that the ability of *M. salmoides* to respond to locally available food resources may be the main factor in determining the species' distribution and overall success.

8:45 AM BIO-2 Prey -induced changes in feeding biomechanics of *Archosargus probatocephalus*. M. FOUGEROLLE, R. G. TURINGAN.) Dept. Biol. Sci., Fla. Inst. Technol., 150 W. University Blvd., Melbourne 32901. Species in heterogeneous habitats consequently encounter variable prey-resources. We examined the biomechanical basis for the ability of *A. probatocephalus* to consume both soft and hard prey organisms within its environment. Fish from the same location within the Indian River Lagoon were reared under two diets: whole bean clams (*Donax gouldii*) [hard prey] and *D. gouldii* with shells removed (soft prey). At the end of a 70-day rearing period, fish were measured for key biomechanical features of the prey-capture and processing mechanism. Analysis of Covariance revealed that biting muscles and bones of fish fed hard prey were more massive than fish fed soft prey. Total body mass and mechanical advantage of the feeding mechanism did not differ between diet treatments. We hypothesize that the ability of *A. probatocephalus* to consume different prey organisms is associated with its ability to alter the development of its feeding mechanism. Phenotypic plasticity appears to be one of the mechanisms that underlie a species ability to exploit locally available prey-resource.

9:00 AM BIO-3 Bilateral Asymmetry of Feeding Biomechanics in Juvenile Summer Flounder. A. W. FRANCIS, JR. AND R. G. TURINGAN. Department of Biological Sciences, Florida Institute of Technology, 150 West University Boulevard, Melbourne 32901. Hatchery reared *Paralichthys dentatus* larvae were examined for differences in feeding biomechanics between the left (ocular) and right (blind) sides of fish. Seventy-two day post-hatch juveniles were preserved and measured for standard length, wet weight, developmental stage, head depth, jaw gape, and biomechanical properties of the lower jaw. Biomechanical properties included closing in-lever, opening in-lever, and out-lever arms. Biomechanical advantage of both left and right lower jaws was calculated from lever arms by dividing each in-lever by the out-lever. Morphometrics were log transformed while ratios were arcsine-transformed for subsequent

hypothesis testing with analysis of covariance (ANCOVA) or analysis of variance (ANOVA). Closing in-lever, opening in-lever, and out-lever arms were significantly different between left and right sides of the head ($P < 0.05$). Closing lever ratios were also found to be different between sides ($P < 0.05$). However, opening lever ratios were not significantly different ($P > 0.05$). Values for closing and opening lever ratios suggest prey capture is principally by suction feeding. Movement of the adductor mandibulae complex dorsally on the blind side has likely contributed to asymmetry of feeding biomechanics. We hypothesize that bilateral asymmetry in feeding biomechanics has implications for feeding performance in flatfishes.

9:15 AM BIO-4 Low-level Monitoring of Bottlenose Dolphins in Biscayne Bay. J.A. WICKER, SNHS, Barry University, Miami 33161. Biscayne Bay is located in Miami, Florida. Because of its nearness to a large metropolitan area, human interaction with animals in the bay is almost inevitable. This includes human interactions with mammals such as bottlenose dolphins (*Tursiops truncatus*). Surveys are conducted once a month in three sections of Biscayne Bay - North, Central, and South. All the bottlenose dolphins that inhabit Biscayne Bay have been identified via a photographic identification process.

A low-level monitoring of these dolphins has been ongoing since 1994. Included in this monitoring are observations of various behaviors such as feeding, mating, and playing as well as interactions between the dolphins and humans. The location of individual dolphins was identified at various times and, based on all the information gathered, the seasonality of abundance in the bay was assessed. From this study insights can be gained on dolphin abundance in the bay and on the impact that human interactions may have in dolphin behavior and wellness.

9:30 AM BIO-5 Development of Feeding Biomechanics and Prey Consumption in Larval *Sciaenops ocellatus*. R. G. TURINGAN AND M. M. PROVENCAL. Florida Institute of Technology, 150 West University Boulevard, Melbourne 32901. The relationship between key features of the feeding mechanism and feeding performance from hatching through metamorphosis was examined in *Sciaenops ocellatus*. We tested the hypothesis that the ability of fish larva to capture prey is constrained by the development of its feeding mechanism. The lower-jaw depressing mechanism develops from a simple system, driven by the hyoid-mandible linkage around first-feeding (hyoid stage). This is followed by the development of a more complex system, driven by both hyoid- and opercular series-mandible linkages (hyoid-opercular stage) around metamorphosis. Laboratory-feeding experiments revealed that less than 50% of larvae fed successfully during the hyoid stage. In contrast, almost 100% of larvae at the hyoid-opercular stage consumed prey. First-feeding

larvae also preferred small, less elusive prey relative to conspecifics at metamorphosis, which preferred larger, more elusive prey. We hypothesize that this two-stage development of the feeding mechanism in larval *S. ocellatus* influences the ability of larvae to capture prey. Understanding the functional relationship between feeding biomechanics and feeding performance in fish larvae may have a profound influence on our ability to understand pre-recruitment processes that help structure juvenile and adult populations of marine fishes.

9:45 AM BIO-6 Early ontogeny of feeding ecomorphology in sciaenid fishes. C. POTTS, R. G. TURINGAN. Florida Institute of Technology, 150 West University Blvd., Melbourne 32901. The relationship between mouth gape and size of prey consumed in four pre-settlement sciaenid species was examined to test the hypothesis that larval fishes are gape-limited predators. Ichthyoplankton were collected during flood tide at Sebastian Inlet, FL. Gut-content analysis revealed that planktonic sciaenids fed mostly on copepods and other zooplankton prior to recruitment into the Indian River Lagoon. In all sciaenid species, gape height, width, and prey size consumed increased linearly with fish standard length (SL). Although size of prey consumed increased with fish body size, prey width was less than 50% of gape width. Moreover, the gape width-SL relationship had a greater slope than prey width-SL. These suggest that gape did not limit prey size consumed by larval sciaenids in the wild. We hypothesize that factors (e.g., development of key features of the feeding mechanism, relative availability of prey) other than gape could have influenced the type of prey consumed by pre-settlement sciaenids. We propose that our ability to understand pre-recruitment processes that help structure juvenile and adult populations of marine fishes depends on our ability to understand the functional relationship between feeding biomechanics and feeding performance in fishes at the planktonic, larval stages.

10:00 AM BREAK

10:15 AM BIO-7 Trophic ecomorphology in gray triggerfish, *Balistes caprisus* (Teleostei, Balistidae): a comparison between Gulf of Mexico and Atlantic Ocean conspecifics. C. J. DURIE, R.G. TURINGAN. Florida Institute of Technology, Biological Sciences, 150 W. University Blvd., Melbourne 32901. The relationship between prey-capture/processing biomechanics and prey consumption in *Balistes caprisus* were compared between Gulf of Mexico (Gulf) and Atlantic Ocean (Atlantic) conspecifics to determine if intraspecific variation in ecological morphology exists. Gut content analysis revealed that Atlantic fish fed more on hard-shelled prey than Gulf conspecifics. Although *B. caprisus* is a known durophagous predator, perhaps the relatively low abundance of hard-shelled prey in Gulf

habitats has driven the switch to feeding on softer prey organisms. ANCOVA on key biomechanical properties of the prey-capture and processing mechanism revealed that more durophagous Atlantic *B. capriscus* had more massive jaw bones and muscles than Gulf fish. The mechanical advantage (lever ratios) of the lower jaw appeared to be less reflective of the dietary differences between fish from both locations. We hypothesize that *B. capriscus* has the ability to alter the development of its feeding mechanism to match the requirements for capturing and processing available prey-resources at post-recruitment habitats.

10:30 AM BIO-8 Sherman's Fox Squirrel (*Sciurus niger shermani*) at White Oak Plantation: an Ecological Study. KENNETH D. HOOVER, Department of Biology and Marine Science, Jacksonville University, 2800 University Blvd. N., Jacksonville 32211. Sherman's fox squirrel is a Species of Special Concern in Florida. Declining populations have been directly related to habitat destruction and modification resulting from human activities. The optimum habitat for this species in the future will likely result from habitat management which could include frequent prescribed burning. The first phase of this study is to determine optimum habitat characteristics for this species. Nest density is used as an indicator of population numbers because of the relative difficulty in acquiring accurate direct squirrel counts. Habitat characteristics for Sherman's fox squirrel were examined in several areas with varying nest densities at White Oak Plantation in Northeast Florida in 1999. The influence of tree species, density, dominance, frequency and importance value on nest density were examined. Historically fire is thought to have played a major role in creating habitat suitable for this species. Fire may be important in determining habitat composition and species abundance in many parts the Southeast U. S. The impact of prescribed burning and influences of additional human activities on habitat characteristics and, in turn, their influence on nest densities, were also examined.

10:45 AM BIO-9 Wildlife Reintroduction After Rehabilitation. A. L. LONG, SNHS, Barry University, Miami 33161. The purpose of the Audubon Center of the North Woods in Sandstone, MN is environmental education. Rehabilitation of wildlife is also part of their program. The reasons why it is necessary to rehabilitate wildlife and the need for a good pre-release program will be presented along with some discussion of my duties as the wildlife intern at the Center. I will also describe the pre-release program and my improvements to it. I will describe the animals worked with and how they were prepared for their return to the wild. My other duties as the intern included first aid to incoming wildlife and education of the youth. In conclusion, wildlife centers not only play an important

educational role to the public but also play a role in the preservation of wildlife. (Supported in part by NIH-MARC.USTAR grant)

11:00 AM BIO-10 Reintroduction of the Przewalski's Horse (Takh). R.R. KEIPER, Valencia Community College, 1800 South Kirkman Road, Orlando 32811. Przewalski's Horse (*Equus przewalski*) once roamed widely in Europe and Asia, but no wild populations have been observed since the 1960's. Because scientists were concerned about the survival ability of zoo-bred animals, 12 generations removed from the wild, breeding groups comprised of genetically diverse animals were released into "semi-reserves" in the Netherlands to allow them to acclimate to the transition from captivity to life in the wild. The behavior, social organization, and reproductive biology of these populations were extensively studied in preparation for reintroduction. Since 1992 horses from these semi-reserves have been introduced into the 57,000 ha Hustain Nuruu mountain forest steppe reserve in Mongolia. Preliminary results suggest that the horses have adapted well to the climate and environment and more than 40 foals have been produced. Ultimately the reserve may hold more than 500 horses that can serve as breeding stock for releases into other geographic areas.

11:15 AM BIO-11 Hermit Crab Population Dynamics in Sarasota Bay. S. GILCHRIST, New College of USF, 5700 N. Tamiami Trail, Sarasota, Florida 34243. Intertidal seagrass beds and sandflats in Sarasota Bay harbor dynamic populations of five hermit crab species. Over the course of 15 years, census techniques have revealed similar shell use patterns for juveniles and adults of the species. Distributions of crabs within the habitats vary seasonally as do recruitment patterns. Shell resources are partitioned to some extent by recruitment timing. However, predation on the juveniles also plays an important role in shell availability across hermit crab groups. Experimental sites have been seeded with novel shells (from gastropods not found in the area; approximately 100,000 shells/year for 15 years) to examine how shells become distributed within and between crab species that occupy different microhabitats and that have different peak population times. The complex process of hermit crab shell cycling and resource use are discussed in the context of short term and long term patterns.

11:30 AM BIO-12 New Records of Echinoderms from the Gulf of Mexico. R. L. TURNER (1) AND B. D. GRAHAM (2). (1) Dept. Biol. Sci., Fla. Inst. Technol., 150 W. University Blvd., Melbourne 32901, (2) Continental Shelf Assoc., 759 Parkway St., Jupiter 33477. Two sea urchins (*Calocidaris micans*, *Pseudoboletia maculata*) and one seastar (*Mithrodia clavigera*) were collected or photographed in the Gulf of Mexico since

1985. These constitute new records for their distributions. *Calocidaris micans* has been reported off the northwestern coast of Cuba and off Barbados. Our specimen was photographed and collected in the northeastern Gulf of Mexico off Alabama/Mississippi at 100 m. *Pseudoboletia maculata* is distributed in the Pacific Ocean from Ceylon to Japan, in the South Atlantic only at Ascension and St. Helena islands, and in the North Atlantic from Venezuela, Barbados, and off Miami, Florida; an unpublished document of a federal agency reports this sea urchin from the western Gulf of Mexico. Our collections and photographs from off Pensacola, Florida, at ~40 m depth reveal that *P. maculata* occurs there in mixed-species aggregations with the echinoid *Lytechinus variegatus*. *Mithrodia clavigera* occurs from the western Indian Ocean to the eastern tropical Pacific and off Brazil. It was recently reported from the Yucatan Channel and off Nicaragua. Several specimens of this seastar are easily identified in a photograph taken of the seafloor at ~60 m on 28-Fathom Bank in the western Gulf of Mexico. In addition, we have *M. clavigera* from the Atlantic Ocean off West Palm Beach (32 m) and Fort Lauderdale (<6 m), Florida.

11:45 AM BIO-13 Photocatalytic surface agents for inhibiting algae growth. G. J. CARTER and C. A. LINKOUS. Univ. of Central Florida, Orlando, FL 32816. Photocatalytic surface agents were tested for the prevention of algae growth in an aqueous environment. Titanium dioxide and tungsten trioxide, with and without various co-catalysts, were used as surface paints on cement substrates. They were exposed to an algae-rich environment for several days and then analyzed for algae growth via spectroscopic chlorophyll absorption. By varying the light source, it was evident that there was a photocatalytic inhibition of the algae, as opposed to toxicity or morphology. The results are aimed toward developing a nonconsumable and nontoxic algacide that will save maintenance time and costs.

12:00 PM BIO-14 Effects of low salinity on photosynthesis of the coral *Siderastrea radians* from Biscayne Bay, Florida. NERINA A. RAMDIAL (1), AND DIEGO LIRMAN (2). (1) SNHS-Biology, Barry University, 11300 NE 2nd Ave., Miami Shores, FL 33161, (2) Center for Marine and Environmental Analyses, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Cswy., Miami, FL 33149. In this study, we examine the effects of low salinity exposure on the photosynthesis and respiration of a common Bay coral, *Siderastrea radians*. Coral colonies were collected from Elliot Key and kept in the outdoor mesocosm facility at the Rosenstiel School of Marine and Atmospheric Science in Key Biscayne, FL. Coral colonies were exposed to two low salinity treatments (25 and 15 ppt) and a control treatment (35 ppt)

for 1, 2, 4, 12, or 24 hours. Colony photosynthesis and respiration were assessed using the light-dark bottle method. Our experiments revealed significant negative effects of lowered salinity on coral photosynthesis. Significant decreases in photosynthetic rates were observed after 2 hours in both salinity treatments; corals stopped photosynthesizing after 4 hours of exposure to the lowest salinity treatment (15 ppt). Although significant decreases in photosynthesis were recorded, no coral mortality was observed even after 24 hours of exposure. Furthermore, photosynthetic rates approached normal levels after a recovery period of seven days.

FRIDAY 2:30 PM SKURLA 102

SESSION B

THOMAS DRESCHER, DYNAMAC CORPORATION, presiding

2:30 PM BIO-15 Population Dynamics of the Adult Horseshoe Crab, *Limulus polyphemus*, on a mating beach in Sarasota Bay, Florida. KIMBERLY HEIMAN, New College of the University of South Florida, 5700 N. Tamiami Tr. Sarasota FL, 34243. The American Horseshoe crab, *Limulus polyphemus*, migrates from deeper waters to the intertidal zone during the spring to mate. In Sarasota, Florida the 1999 spawning season was observed during the spring high tides of April and May. The peak in mating during this period was on 4/30/99. The number of single males was highest during and after the peak, although they never outnumbered the amount of mating pairs. Single females were observed with some regularity throughout the observational period. The number of mating pairs was highest when the water was 29°C indicating that adult horseshoe crabs may use high tide as well as water temperature as environmental cues for spawning.

2:45 PM BIO-16 Effects of Increased Carbon Dioxide Concentrations on Stomatal Density of Local Flora in Proximity to Florida Natural Springs. B.L. RODENBECK AND D. KEARNEY, Biological Sciences Department, University of Central Florida, Orlando, 32816-0114. Stomata are vital structures used for plant respiration, but they also allow for transpiration to occur. In response, plants have devised a variety of tactics to limit transpiration. One of these tactics is a decrease in stomatal density in the presence of increased carbon dioxide concentrations. The theory being tested is that fewer stomata should be necessary for respiration in an environment with increased carbon dioxide levels. In previous studies, natural springs have been shown to have an increased carbon dioxide concentration localized around the spring discharge. We acquired leaf samples from local flora around spring sites and compared stomatal density of the samples with that of a baseline study, a difference in stomatal

density would be evident if present. Early results have shown a decrease in density for select species. While it is too early to make conclusions, the applications of these data are relevant to understanding the effects of increasing atmospheric carbon dioxide on autotrophs.

3:00 PM BIO-17 Quantitative and qualitative characterization of long-desiccated wetlands in Brooker Creek Preserve, Pinellas County, FL. P. DOORIS (1), R. WUNDERLIN (2), B. HANSEN (2), G. DOORIS (1). (1) Dept. of Mathematics and Science, Saint Leo Univ., Saint Leo, FL. 33574 (2) Dept. of Biology, Univ. of South Florida, Tampa, FL 33620. Wetlands located in the 7,000 acre Brooker Creek Preserve in northeast Pinellas County have been excessively dry for over 15 years as a result of groundwater withdrawals from the nearby Eldridge-Wilde Wellfield. As expected, calculated community parameters describing the wetlands' vegetation differ significantly from those describing wetlands having normal hydroperiods. In particular, major differences occur in herbaceous and shrub species with respect to the diversity, richness, and distribution of species. Qualitative comparison of the wetlands indicated that the wetlands are in a degraded condition.

3:15 PM BIO-18 An evaluation of hydrologic changes to isolated cypress domes resulting from the construction of an adjacent borrow pit. D. W. CARR. Southwest Florida Water Management District, 2379 Broad St, Brooksville, FL 34609. A common practice during land development (e.g., subdivisions), is to construct borrow pits or ponds within the landscape. Typically, the excavated material is used as fill on-site and these borrow pits are utilized for flood attenuation and stormwater treatment. Regulators at the Southwest Florida Water Management District expressed concerns that these borrow pits may have an adverse hydrologic affect when constructed adjacent to isolated wetlands. A study to document whether isolated wetlands would be impacted by a small borrow pit was initiated in March 1998 and continues to date. The study site was selected where a seven acre borrow pit was scheduled to be dug adjacent to four isolated cypress domes. This site is part of a housing development located in Pasco county Florida. The data include surface and surficial ground water monitoring, detailed transect/quadrat vegetation analyses, surface water quality sampling, and rainfall data collection. Data to be discussed will include one year pre-borrow pit construction data and approximately one year of post-construction data. Emphasis will be placed on surface and surficial groundwater data.

3:30 BIO 19 Late Summer Trends in the Benthic Infaunal Community of Tampa Bay (1993-1997). D. J. KARLEN, S. A. GRABE, AND A. D. G. KIRALY, Environmental Protection Commission of

Hillsborough County, 1410 N. 21st. Street Tampa 33605. Samples have been collected annually from Tampa Bay since 1993 as part of the Tampa Bay Estuary Program's bay wide benthic monitoring program. The sampling protocols were modeled after the Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP). Sampling stations were stratified by bay segments and randomly generated. Approximately 100-150 random sampling stations were sampled each year bay-wide. Samples were collected during September through early October in order to reflect the most "stressed" environmental conditions of the year (highest temperature, highest runoff, lowest dissolved oxygen). Samples were collected with a Young-modified Van Veen grab sampler. The samples were analyzed for benthic community composition (species richness, abundance, diversity, evenness), and subsampled for percent silt/clay analysis. Additional grab samples were taken at each station for analysis of metal and organic contaminants. Hydrographic data (temperature, salinity, dissolved oxygen, pH), were also collected at each site. The results from the first five years (1993-1997) of the monitoring program will be summarized. The spatial and temporal distributions of the benthic macroinvertebrate infauna will be examined in relation to habitat type, physical conditions, and sediment quality.

3:45 PM BREAK

4:00 PM BIO-20 The City of Tampa, Bay Wide Sampling Program. JOHN J. PACOWTA, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. The City of Tampa founded the Bay Study Group in 1976 to initiate a comprehensive study of phytoplankton production and standing crop and to monitor the anticipated effects of sewage pollution abatement in Hillsborough Bay. The Bay Study Group has developed the initial study into a detailed program that is concentrated in Hillsborough Bay, but encompasses all parts of Tampa Bay. This multidisciplinary program contains sampling in water quality, phytoplankton, benthos, and submerged aquatic vegetation (sav), including macro algae and seagrasses. The Bay Study program is designed to show changes to the bay caused by nutrient reduction to the system. We have seen an increase in the fauna diversity at benthic stations, a decrease in macro-algae biomass, an increase in the seagrass coverage in Hillsborough Bay, and a decrease in chlorophyll-a that is an indicator of phytoplankton biomass. Annual trends from the different sampling programs will be presented.

4:15 PM BIO-21 Declining Phytoplankton Trend in Hillsborough and Middle Tampa Bay, Florida. K. HENNENFENT, City of Tampa, Bay Study Group, 2700 Maritime Boulevard, Tampa, 33605. The City of

Tampa, Bay Study Group has been monitoring phytoplankton trends as a water quality indicator for Tampa Bay on a monthly basis since 1979. From three stations located in Hillsborough and Middle Tampa Bay, historical data of phytoplankton taxonomy and enumeration have been applied to determine changing trends in species composition and populations. With improving water quality in Tampa Bay, a decreasing long-term trend in phytoplankton biomass is apparent. In addition, shifts in species composition have also been observed.

4:30 PM BIO-22 Determination of Water Depth (MSL) at the Deep Edge of Seagrass Meadows Using GPS Carrier Phase Processing: A Tool for Evaluating Water Quality and Seagrass Restoration Progress in Tampa Bay, Florida. J.O.R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. The Tampa Bay Estuary Program has selected seagrass restoration target depths for each major bay segment at which adequate light conditions (20.5% of subsurface irradiance) shall be maintained to ensure seagrass growth and the long-term Tampa Bay seagrass goal of 15,400ha. To evaluate the progress of the seagrass restoration effort, field investigations of accurate water depths at the deep edges of Tampa Bay seagrass meadows are now underway using carrier phase GPS data recorded by Trimble PRO-XR GPS instruments. One instrument serves as base station at a surveyed benchmark with a known altitude above MSL and the other instruments (one or more) are deployed at the seagrass survey sites. The technique yields acceptable depth measurements of survey sites located up to 10km from benchmark sites. The elevation of the deep seagrass edge, combined with light attenuation data from water quality monitoring programs, is used to calculate percent subsurface irradiance available at the deep edges of the different seagrass species. Specific seagrass species light requirements in the major bay segments will be determined and current Tampa Bay water quality conditions will be related to the seagrass restoration goal.

4:45 PM BIO-23 Marine Algae Colonizing Invertebrate Egg Masses: A Mutually Beneficial Relationship? K.A. PEYTON (1), (2), M.D. HANSIAK (2), J. LIN (1), (1) Florida Tech, Melbourne 32901, (2) Harbor Branch Oceanographic Inst., Fort Pierce 34946. Several infaunal marine invertebrates found in the Indian River Lagoon have diatoms living in their gelatinous egg masses, the polychaetes *Axiiothella mucosa* and *Arenicola cristata*, and the mollusk *Haminoea elegans*. The nature of the relationship between intra-gelatinous diatoms and invertebrate embryos was investigated. Diatoms contribute several benefits to the embryos, however the significance of each benefit is not necessarily the same for each host species. First, *A. mucosa* lacks a larval stage and the embryos graze on diatoms. The embryos were cultured with and without diatoms to test the

hypothesis that diatoms improve the fitness of the crawl away juveniles. Second, tenuous egg masses of *A. cristata* are negatively buoyant when spawned and show a buoyancy reversal within days. It was the presence of photosynthesizing microalgae in the jelly matrix that changed the egg mass buoyancy, perhaps situating the lecithotrophic larvae in a better position for dispersal. Third, three local *Haminoea* species produce gelatinous egg masses, but only those of *H. elegans* host diatoms. Therefore, egg mass characteristics such as size, shape and embryonic longevity were compared among the species to describe egg masses as substrates for microalgae.

5:00 PM BIOLOGICAL SCIENCES SECTION BUSINESS MEETING
PATRICIA DOORIS, presiding

FRIDAY 2:30 PM SKURLA 106
SESSION C
GEORGE DOORIS, SAINT LEO UNIVERSITY, presiding

2:30 PM BIO-24 Identification of the function of a venom protein that exhibits an ontogenetic shift in pigmy rattlesnakes (*Sistrurus miliarius barbouri*). R. C. LAUGHLIN, S. T. DEYRUP, T. M. FARRELL, Stetson University, 421 N. Woodland Blvd., DeLand, FL 32720. Upon analysis of venom from different generations of pigmy rattlesnake using SDS-PAGE, a protein specific to adult rattlesnake was found. This 31-kDa protein was exposed to a Hide Powder Azure Assay (HPAA) to determine if the protein demonstrated protease activity. A 20-mM solution of EDTA was added to the HPAA and protein solution to determine if the chelating agent could inhibit the protease activity. A reduction in activity would indicate the presence of a metal ion in the protein, suggesting the identity of a metalloprotease. Metalloproteases are common bio-reactive molecules found in a wide variety of venoms. The delayed expression of the protein could be an adaptive shift related to the snake's change in diet, from small reptiles and amphibians to more complex and larger mammals.

2:45 PM BIO-25 Strategy for identifying and sequencing the *Polycomb* (*Pc*) gene in *Danio rerio* (zebrafish). C. N. NADAL, Y. W. P. LIN, G. PACKERT, T. PETRINO-LIN, Barry University, 11300 NE 2nd Ave., Miami Shores 33161. The *Polycomb* (*Pc*) gene is a member of a large group of genes (*Pc* group) that have been found to regulate expression of *homeotic* (*Hox*) genes during development in *Drosophila*, mouse and humans. The mechanisms of regulation have yet to be understood. The long term goal of this study is to evaluate the role of the *Pc* gene in the regulation of *Hox* gene expression and axial skeleton development in zebrafish. Because the zebrafish does not have intrauterine development

and the embryo is translucent during the early stages of development, it is an ideal organism to study the influence of the *Pc* genes on homeotic gene expression during development in a vertebrate species. Sequencing information on the zebrafish *Pc* gene is currently unavailable. We are presently trying to identify and sequence the *Pc* gene in zebrafish by screening an embryonic cDNA library using polymerase chain reaction (PCR). The BLAST comparison of homology between various species and data on primer designs will be discussed. The study was supported by the Barry University Scholarship Grant.

3:00 PM BIO-26 Venom ontogeny in dusky pigmy rattlesnakes (*Sistrurus miliarius barbouri*). S. DEYRUP, T. FARRELL, AND D. NICLAS. Stetson University, 421 N. Woodland Blvd., DeLand, FL 32720. Snake venoms are complex mixtures of many different chemicals that serve to disable, kill, or digest prey. Some of the major components of snake venom are peptides and proteins. The primary prey of pigmy rattlesnakes varies with their age from mostly anurans and other amphibians when young to warm-blooded prey when older. We collected venom from pigmy rattlesnakes of varying ages. We then performed several polyacrylamide gel electrophoresis assays to separate the protein components of the venom by molecular weight. We had two sets of observations. One set was with venom samples from random snakes and the other set was parental and offspring venom samples. We ran 16 venom samples for each group. We then compared the protein components of venom from young pigmy rattlesnakes with those of older snakes. There was a protein component found in older snakes (those over two years old) that was missing in younger snakes. This protein has a molecular weight of approximately 30 kilodaltons, and research is currently being conducted on its function.

3:15 PM BIO-27 An Analysis of Zebrafish Chromosomes and Development. S. TORREALDAY, G. PACKERT, T. PETRINO-LIN AND Y.W. LIN, Barry University, School of Natural and Health Sciences, 11300 Northeast Second Avenue, Miami Shores 33161. Identifying heritable states of transcriptional activation and silencing has become an important topic in research and is revealing many epigenetic mechanisms that are conserved from fly to man. The zebrafish has recently become an important organism in studying vertebrate development and epigenetics. *Polycomb group genes (Pc-G)* maintain differential repression of homeotic genes during development and have been studied extensively in *Drosophila*. These genes are evolutionarily conserved from fly to man and their gene products associate with many locations in the *Drosophila* and the mouse genome. No information is presently available on the *Pc-G* in zebrafish. Here we will present information on zebrafish development, chromosomal analysis and evaluation of *Pc* binding sites in the zebrafish genome using

Drosophila antibody to the *PC* gene. The study was supported by the Barry University Scholarship grant.

3:30 PM BIO-28 Environmental effects on the production of chemical defense against herbivory in *Passiflora incarnata*. H. C. WHEELER AND C.C. BENNINGTON. Department of Biology, Stetson University, 421 N. Woodland Blvd., DeLand, FL 32720. We investigated how light availability and exposure to previous herbivory may affect levels of cyanogenic glycosides in field-collected leaves of *Passiflora incarnata* from six central Florida populations. From three sun and three shade populations, we collected leaves from plants that had previously experienced herbivory and from plants that had little or no evidence of herbivory. Although there was a significant variability in cyanide production among the six populations used in the study, there was no difference between sun and shade sites. However, while shade populations demonstrated no difference in cyanide levels measured from previously eaten versus uneaten leaves, leaves from sun populations that had experienced heavy herbivory tended to generate lower levels of cyanide than did uneaten leaves from the sun populations. We also asked whether herbivore performance varies with levels of defense compounds by exposing caterpillars of *Agraulis vanillae*, a specialist herbivore of *P. incarnata*, to leaves from assayed plants. Total larval weight gain by *A. vanillae* did not decrease with increasing levels of cyanide production.

3:45 PM BREAK

4:00 PM BIO-29 Sex and the Single Rivulus: the Enigma of Males in a Selfing, Hermaphroditic Fish. D. Scott Taylor. Brevard Mosquito Control District, 2870 Greenbrooke St., Valkaria, FL 32950. The killifish Rivulus marmoratus is found in mangrove systems over an enormous range in the tropical Western Atlantic, and the fish is unique among vertebrates in being a self-fertilizing, synchronous hermaphrodite. Natural populations generally consist of groups of homozygous clones, but homozygosity does not appear to constrain the success of the fish in stressful mangrove environments. However, male fish are found in some populations, and in two populations sexual reproduction is now confirmed, resulting in heterozygous individuals. The ecology and genetic system of this unusual fish is reviewed, and the role of male fish is discussed.

4:15 PM BIO-30 Performance of *Agraulis vanillae* caterpillars on *Passiflora incarnata* in three different light environments. C. S. WILLS AND C. C. BENNINGTON. Department of Biology, Stetson University, 421 N. Woodland Blvd., DeLand, FL 32720. Light levels in natural plant populations may affect the performance of herbivorous insects due to the

effect of light on plant and abiotic environmental characteristics. In central Florida, *Passiflora incarnata* occurs in both sunny and moderately shady environments. The specialist herbivore of *P. incarnata*, *Agraulis vanillae*, is typically associated with sunny, rather than shady, sites. Two possible explanations for this microsite preference were investigated by exposing *A. vanillae* caterpillars to field collected leaves of *P. incarnata* from populations characterized by either high or low light levels. During feeding trials, caterpillars were contained within cages that allowed feeding in either full sunlight, 70% sunlight, or 50% sunlight. Caterpillar weights and leaf areas calculated before and after each experimental trial were used to determine relative consumption rate (RCR), efficiency of conversion of digested food (ECD), and relative growth rate (RGR). There was no evidence to suggest that light levels in cages affected the amount of leaf material eaten or the performance of caterpillars. In addition, caterpillar performance was similar on leaves collected from both sun and shade sites. The abundance of *A. vanillae* in sunny microenvironments may be explained by the environmental preference of adult butterflies.

4:30 PM BIO-31 Effects of growth factors on survival and development of calbindin immunopositive cultured septal neurons. L.M. MUDD (1), A. SILVA (1), T.F. LOPEZ (2), AND J.R. MONTAGUE (1), SNHS, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161, (2) The Miami Project to Cure Paralysis, PO Box 016960 (R-48), Miami, Florida 33101-6960. Alzheimer's Disease affects cholinergic neurons in some areas of the brain, including the septal nucleus. Embryonic day-16 rat septal neurons were grown in bilaminar culture with astrocytes and in the absence of serum. The cultures were treated chronically with estrogen (Es), insulin-like growth factors (IGF-I, IGF-II), basic fibroblast growth factor (bFGF), and nerve growth factor (NGF). IGF-II significantly increased the number of neurons immunoreactive for calbindin, suggesting either an increase in the survival of these cells, or in the increase in the percentage of cells expressing calbindin. Chronic treatment with NGF, IGF-II, and Es significantly increased the number of 1°-neuritic processes on calbindin-positive neurons, whereas NGF and Es caused significant increases in the number of 2°-neuritic processes and total lengths of all neuritic processes. Thus, the effects of IGF-II, estrogen, and NGF on survival and maintenance of this neuronal subpopulation may be dependent on alterations in neurons that are immunopositive for calbindin. (Supported by NIH-NIGMS MBRS Grant GM 45455 to Barry University).

5:00 PM BIOLOGICAL SCIENCES SECTION BUSINESS MEETING
PATRICIA DOORIS, presiding

COMBINED MEETING
COMPUTER/MATHEMATICAL SCIENCES
ENGINEERING SCIENCES

FRIDAY 2:30 PM SKURLA 103

FREDERICK BUONI, FLORIDA INSTITUTE OF TECHNOLOGY,
presiding

2:30 PM CMS-1 Considerations in the Application of Nearest Neighbor Techniques. J. J. AMADOR, 4400 Feather Street, Cocoa, FL 32927. The Nearest Neighbor (NN) technique is a brute force pattern recognition approach. This method has an error bound of no more than twice the error rate of an ideal pattern recognition system (Bayesian Recognizer). However, reaching the limit in higher dimensional spaces is challenging. The issues are presented via theoretical and computer simulations, and potential resolutions are discussed.

2:45 PM CMS-2 Fractal 3-D Surface Modeling. GARRETT POTTS, 3151 South Babcock Street, #201, Melbourne, FL 32901. In 3-D graphics photo realism is the goal. To model realistic three-dimensional objects, fractal techniques will be required to provide natural surface tone. Three dimensional voxel modeling techniques are two computer intensive; therefore, the genus of three dimensional surface modeling technique is developed with examples.

3:00 PM CMS-3 Overcoming Pattern Recognition Modeling Errors Through Increased Image Resolution, JIHUN CHA, 1142 Goldenrod Ctr., N.E., Palm Bay, FL 32905. Object modeling is an important technique in Patter Recognition, but can be subject to error. Loss of recognition accuracy through such error must ideally be made up through other information gains. This paper investigates the relationship of gaining recognition information through increased image scene resolution against recognition information loss via object modeling errors. It is shown that some modeling errors can not be overcome by increased resolution while others can. For those types of modeling errors that can be overcome, example curves of required resolution improvement required to overcome modeling errors are given.

3:15 PM ENG-1 Feedstock Blending In A Continuously Fed Gasifier. GREG P. SCHAEFER, NATHAN A. CHANCY AND ALEX E. S. GREEN, Clean Combustion Technology Laboratory (CCTL), University of Florida, PO Box 112050, Gainesville, 32611. Imported oil, nuclear energy and coal now contribute about 55% of the energy that the USA consumes, and those forms of energy are under environmental, social and

legal scrutiny. There are limits to which non-"clouded" natural gas and renewables can replace these sources. This has motivated the CCTL to pursue R&D on blending domestically available fuels in thermal reactors to produce more useful gaseous or liquid fuels. This is a progress report on initial work with a continuously fed indirectly heated gasifier (IHG) scaled to potentially give a gaseous output suitable for a 5-20 kW microturbine or a reciprocating engine. The IHG is robust and has many unique features, including the capacity for the output gas to be filtered by the incoming feedstock, and a tapered reactor cone that compresses the solid material as it is auger-fed through the reaction zone. The gasifier can be operated continuously by attaching a biomass feeder, or it can be operated semi-continuously by loading a certain amount of biomass into the gasifier and capping off the feeder inlet. Results using both operation modes and various particle sizes and feedstock blends are presented. Also, the fate of volatile metals potentially contained in the input feedstock is assessed. With the replacement of the electric tube furnace by an output gas or charcoal combustor, a later application to microturbines is within reach.

3:30 PM ENG-2 Investigations on Light-Emitting Porous Silicon.
C. ALTINELLER, Florida Institute of Technology, 150 W. Univ. Blvd.,
Melbourne, 32901. Having superior electronic properties, silicon has
dominated the semiconductor industry for a long time. However, due to its
poor radiative recombination efficiency as an indirect bandgap material,
efficient light emitting devices have not been achieved in *Si* technology [1].
In this work, the author presents electroluminescence measurements from
porous silicon, obtained by selective exposure of *Si* surfaces to *HF* vapor.
Fabrication of Light Emitting Diodes by using *Por-Si* is also investigated.

3:45 PM BUSINESS MEETING, COMPUTER & MATHEMATICAL
SCIENCES, ENGINEERING SCIENCES
FREDERICK BUONI, presiding

ENVIRONMENTAL AND CHEMICAL SCIENCES

FRIDAY 9:00 AM SKURLA 110
SESSION A

CHERIE GEIGER, UNIVERSITY OF CENTRAL FLORIDA, presiding.

9:00 AM. ENV-1 Organic gelation within Florida Bay sediments.
J. W. LOUDA (1), J. W. LOITZ (1), E. W. BAKER (1), W. H. OREM (2)
and D. T. RUDNICK (3). (1) Organic Geochemistry Group, Florida
Atlantic University, 777 Glades Road, Boca Raton, FL. 33431, (2) United
States Geological Survey, Reston, VA, 20192, (3) Everglades Restoration

Division, South Florida Water Management District, West Palm Beach, FL, 33416. The concept of direct biotic mediation of sediment stability is well known. Using the quantitative distribution of chlorophylls and carotenoids, we have described the microphytobenthos of central Florida Bay as a diatomaceous cyanobacterial biofilm underlain with purple-S bacteria. When this becomes thicken to the 'mat' stage, such growth can obviously increase the level of turbulence (shear stress) required to suspend these carbonates (aka lime marls). What is less obvious is the legacy of this microphytobenthos. Here we refer to the bulk organic matter and specifically the polysaccharides. When sedimentary organic carbon (Corg) is over 1.6% dry wt., we find a direct linear relationship [$\text{water} = (0.076807)\text{Corg} + (0.2986)$; Pearson $r = 0.8974$] with water content, even in the face of mild (1.2m) compaction pressures. We suggest that this relationship and the observation that milky liquid and gray solids phases separate, upon physical mixing prior to sieving, are do to a gelation within the sediments containing 1.6% Corg. The implications of gelation to sediment stability and 'prop-scar' healing in Florida Bay will be covered.

9:15 AM ENV-2 Synthesis and Biological Evaluation of Polyamine DNA-Intercalator Conjugates. P. VARSHNEYA AND O. PHANSTIEL, IV, Dept. of Chemistry, Univ. of Central Florida, Orlando, FL 32816. One of the most challenging areas in the development of new anti-cancer drugs is to improve their selective delivery to targeted cell types. Many of the side effects of current therapeutics result from the non-selective delivery of the toxic chemotherapeutic. Ideal drugs should only target the affected cell type. This project involves the synthesis and biological evaluation of several polyamine-DNA intercalator conjugates. Several conjugates have shown complete inhibition of human DNA topoisomerase II (TOPO II) activity at 10 μM . The investigation of these derivatives strongly suggests that the appended spermidine does not disrupt the ability of an appended DNA intercalators to inhibit TOPO II.

9:30 AM ENV-3 The Volatile Compounds in Fenugreek. CARY M. BUCASAS, AND RAMEE INDRALINGAM, Department of Chemistry, Stetson University, DeLand 32720. There is a trend in the new millennium for the general population to turn to herbal remedies in order to alleviate medical symptoms. Spices from the bark, seeds, berries, and leaves of plants have long been used to flavor foods and to concoct herbal remedies for various maladies. Fenugreek, the dried seed of *Trigonella foenum-graecum* L. (Fabaceae) is an annual herb widely cultivated in Mediterranean countries and Asia. The seeds have a powerful aroma and a bitter taste and are used in limited amounts in curry formulations, while the oil has a maple-like flavor and is used in confectionery. Fenugreek is also used in herbal formulations because it has long enjoyed a reputation for

being "cleansing to the bronchial passages...soothing to inflamed conditions of the stomach and intestines...effective as a poultice on wounds, inflamed areas, boils and carbuncles...[and a] lubricant for the intestines." Recently, scientific studies have been carried out on the effects of fenugreek on plasma cholesterol, non-insulin dependent diabetes, and wound healing. We will present the results of our efforts to separate and identify the volatile compounds of fenugreek, using soxhlet extraction, subsequent trituration, and gas chromatography with a mass spectrometer detector.

9:45 AM ENV-4 Isolation and Characterization of Bioactive Compounds from *Typha domingensis*. M.T. GALLARDO(1), C.L. GEIGER(2), AND D.F. MARTIN(1). (1) Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620, (2) Department of Chemistry, University of Central Florida, Orlando, FL, 32816. The bioavailability of phytotoxins plays an important role in establishing their ecological significance. We have been able to isolate several bioactive secondary metabolites from aqueous extracts and leachates of *Typha domingensis*. Our separation protocol involves the use of activated charcoal as a solid phase support for the organic compounds and successive extraction with organic solvents and analysis by GC/MS. The materials we have isolated are fatty acids and phenolic compounds with known phytotoxic activity. Both the extracts and the phytotoxins have the potential of inhibiting the growth and chlorophyll production of several ecologically relevant species. The observed phytotoxic effects are in good agreement with the proposed mathematical model for allelopathic compounds.

10:00 AM ENV-5 A Computational Study of the Interaction of Ligands with Folate Binding Enzymes. M. MORA, AND H.L. PRICE, Department of Chemistry, University of Central Florida and the Center for Discovery of Drugs and Diagnostics, Orlando, Florida 32816. Molecular modeling was used as a tool for evaluating differences in the interaction of ligands with the essential reduced folate requiring enzymes dihydrofolate reductase (DHFR) and thymidylate synthase (TS). The goal of this study was to determine whether hypothetical ligands could be designed that preferentially interacted with one protein relative to the other. Using the flexible ligand-rigid binding site approach, eleven different ligands were docked into binding sites within DHFR and TS. Molecular mechanics energy minimization of bound ligands resulted in the identification of a molecule that displayed preference for DHFR and one that displayed a preference for TS.

10:15 AM BREAK

10:30 AM ENV-6 Florida Bioreactor Landfill Demonstration Project. D. R. REINHART, University of Central Florida Department of Civil and Environmental Engineering. The bioreactor landfill is an emerging technology for the on-site management of leachate generated by municipal solid waste landfills. The benefits of bioreactor landfills have been well documented by a variety of researchers and include enhanced and accelerated waste stabilization, improved leachate quality, and more rapid landfill settlement. The most effective element of bioreactor operation is moisture control through leachate recirculation. Leachate is commonly recirculated using tankers at the working face, surface ponds, spray or drip irrigation, horizontal trenches, and/or vertical wells. The presentation will describe bioreactor landfill benefits and implementation.

10:45 AM ENV-7 Fungi Growth Testing and Inhibitors. E. PONE AND J. GRAWE, Palm Beach Atlantic College, West Palm Beach, 33401. Sick building syndrome (SBS) is reported to affect 30 to 70 million U.S. workers, cost employers \$60 billion in sick leaves and involve one in three buildings. Fungi, molds and microbials are contributors to SBS and have been the source of Legionnaire's Disease and Humidifier Fever. Residents in the Southeast experience headaches, itchy eyes, rashes and respiratory problems due to *Cladosporium*, *Penicillium* and *Aspergillus*. Mold and fungus growth closed the Martin County Courthouse when employees became ill from SBS. The inhibition of fungal growth via anti-microbial coatings may be tested under accelerated conditions according to ASTM D 5590-94 in petri-dish media. Recently, Jakubowski et al. reported using *Aureobasidium* and *Alternaria* in ASTM D 5590-94 to more closely duplicate field conditions. The present study compared Jakubowski's modifications against an *Aspergillus* control using SteriShield, Steridex and Perma-White anti-fungal coatings. The estimated growth results to cover each sample were: 1. *Aureobasidium*: Control = 100% in 8 days, Steridex = 100% in 11 days, Perma-White = 85% in 31 days, SteriShield = 68% in 31 days. 2. *Alternaria*: Control = 100% in 5 days, Steridex = 91% in 9 days, Perma-White = 93% in 9 days, SteriShield = 83% in 9 days. 3. *Aspergillus*: Control = 100% in 5 days, Steridex = 100% in 10 days, Perma-White = 77% in 31 days, SteriShield = 40% in 31 days. These results suggest *Aspergillus* should be retained as one of the test fungi in ASTM D 5590-94. SteriShield provided the greatest degree of growth inhibition.

11:00 AM ENV-8 Characterizing the Naturally Occurring Substances That Inhibit the Growth of *Hydrilla verticillata*. DAVRON L. DAVIS AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. *Hydrilla verticillata* a submersed aquatic plant was introduced into Florida

about 1959. Subsequently it has been spread to number of areas of the United States. It is a serious problem in waterways or lakes, because of its ability to form dense mats and occupy the top meter of water thus shading out and dominating the macrophytic communities. Previous studies have shown that several lakes do not support Hydrilla as well as others. The lakes that do not support Hydrilla have shown an inhibitor effect in the laboratory using leachates from the lake sediments. The current study involves characterizing the leachates from the lake sediments.

11:15 AM ENV-9 Synthesis and Characterization of 9,9-Didecyl-2,7-bis(N,N-diphenylamino)fluorene: a Novel Fluorene Derivative. K. D. BELFIELD AND W. MOURAD, Department of Chemistry, University of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. An example of nonlinear optics within the field of chemistry is nonlinear or two-photon absorption. This phenomenon involves the simultaneous absorption of two or more photons by a molecule in the presence of intense laser pulses. The transition probability associated with the absorption of two photons is proportional to the square of the intensity of the laser pulse, I^2 . Molecules that exhibit this behavior are said to have large two-photon absorption cross-sections, σ . The two-photon absorption (2PA) properties of organic molecules are of interest for several practical applications such as two-photon fluorescence imaging, optical power limiting, two photon microfabrication, etc. Here, we report the synthesis and characterization of a novel, electron-rich fluorene derivative, designed to exhibit large nonlinear absorption. Details of the synthesis, including a Cu-catalyzed Ullmann coupling reaction, and spectroscopic data will be presented.

11:30 AM ENV-10 Two-Photon Induced Photochemical Reactions. K. D. BELFIELD AND Y. LIU, Department of Chemistry, University of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. Over the last half century, the field of organic photochemistry has produced a wealth of information, from reaction mechanisms to useful methodology for synthetic transformations. However, comparatively few studies of two-photon induced organic photochemistry have been reported. Two-photon absorption can be defined as simultaneous absorption of two photons via virtual states in a medium. Thus, unlike single-photon organic photochemistry, there is a relatively miniscule body of empirical data from which to draw upon for two-photon, nonlinear optical photochemistry. Selected two-photon induced reactions have been conducted. Reactions to be presented include two-photon induced $2s+2s$ photocycloaddition and photoisomerization. This research represents the beginning of a comprehensive investigation of fundamental two-photon absorption-induced reactivities of organic molecules, expected to have significant impact on, and help define, the field of nonlinear organic photochemistry.

11:45 AM BUSINESS MEETING: ENVIRONMENTAL AND CHEMICAL SCIENCES

CHERIE GEIGER, presiding

FRIDAY 2:30 PM SKURLA 110

SESSION B

CHRISTINA CLAUSEN, UNIVERSITY OF SOUTH FLORIDA, presiding.

2:30 PM ENV-11 Seeking the Environment of Michael Faraday's Resting-Place. DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Michael Faraday (1791-1867), surely one of the major English scientists of his time, or before or since, was appreciated by Prince Albert, consort of Queen Victoria. Curiously enough, he was not buried in Westminster Abbey. It was a personal quest to determine (in May 1999) the environment of his final resting-place and why he was not honored as other scientists and prominent Victorians were in the choice of final resting-place. The answer is a clue to his life.

2:45 PM ENV-12 The Use of Electrokinetic Remediation for In-Situ Remediation of Soils Contaminated with Lead. J. KESSELRING(1), V.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 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 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. Data from the field application of this process will be discussed. The potential benefits and applications to NASA, Kennedy Space Center (funding agency) will also be discussed.

3:00 p.m. ENV-13 Metal Extraction From Particular Media using Amines Supported on Silica Gel. C.A. BOWE AND D.F. MARTIN. Institute for Environmental Studies. University of South Florida, Tampa, FL 33620 Previous work has established the scope of using known chelating agents supported on silica gel in the removal of metal ions such as Copper (II) and Silver (I) from solution of known concentration. Preliminary studies illustrate the effectiveness of using coordinating compounds such as amines supported on silica gel to achieve comparable

results. The current study reports the results of an investigation involving the use of straight chain alkyl amines as coordinating agents. The amines used in the study range from the n-nonylamine to stearyl amine. The effect of coordination was evaluated as a function of pH for the copper and silver ions.

3:15 PM ENV-14 Removal of Heavy Metals from Polluted Waters by Various Aquatic and Terrestrial Plants. MELISSA C. FOSTER AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Heavy metals in ground water and wastewater have been shown to be toxic. Water hyacinths and other aquatic plants have been looked at for their bioremediation ability to remove these heavy metals. Applications of inorganic chemistry and the use of terrestrial plants are being looked into for removal of various heavy metals.

3:30 PM BREAK

3:45 PM ENV-15 Chlorophyll geochemistry in Florida Bay. J. W. LOUDA, J.W. LOITZ, E. W. BAKER. Organic Geochemistry Group, Florida Atlantic University, 777 Glades Road, Boca Raton, FL. 33431. Here we summarize our findings on the input and diagenesis of the chlorophylls, and to some extent, the carotenoids in the waters and sediments of Florida Bay. The distributions of chlorophylls and the accessory carotenoids are described in ways which allow *chemotaxonomic* assessment of extant and extinct populations. One major result enabled us to type the microphytobenthos as a diatomaceous cyanobacterial biofilm/mat underlain by purple-S bacteria. The senescence and death of turtle grass (*Thalassia testudinum*) is described and reveals that the pigments which accompany dead blades into the sediments derive from diatoms living on/in the decaying grass. Chlorophyll-*a* which is heterotrophically 'processed' is altered into pyropheophorbide-*a* and, upon burial, undergoes diagenesis to yield cyclopyropheophorbide-*a*-enol (aka CYCLO). The relative abundances of CYCLO and bacteriochlorophyll-*a* derivatives were found to fluctuate in different directions and that finding, plus several other observations to be discussed, allow us to formulate ideas as to the syndepositional paleoenvironment. Specifically, sub-oxic/oxic *versus* strongly anoxic, respectively. These studies were funded by the South Florida Water Management District and, in part, by Florida Atlantic University.

4:00 PM ENV-16 Dehalogenation of Chlorinated DNAPL Pools In-Situ Using Emulsified Nanoscale Iron Particles. K. B. BROOKS (1), C. A. CLAUSEN (1), C. L. GEIGER (1), D. HURLY (1), D. R. REINHART (2), Department of Chemistry(1) and Civil and Environmental

Engineering(2),University of Central Florida, P.O. Box 162366 Orlando 32816-2366. Chlorinated solvents found in water are most commonly remediated using pump and treat technologies. However, due to the slow dissolution of the solvents from pooled dense non-aqueous phase liquid (DNAPL) sources such as trichloroethene (TCE), the pump and treat process needs to be operated decades in order to maintain protection of human health and the environment. Previous research concludes that zero-valent metals reductively dechlorinate DNAPLs such as TCE to non-toxic ethene. This project delivers the zero-valent iron in the form of an emulsion to contamination pools via a system of push wells. This project would decrease the need for long term treatment and monitoring of the contaminated areas.

4:15 PM. ENV-17 New Environmentally Acceptable Millimeter Wave Screening Materials. M. OFORI (1), AND C.A. CLAUSEN (2). Engineering Technology Inc., Orlando 32826 (1), (2) University of Central Florida, Department of Chemistry, Orlando, 32816. The work that is presented in this paper is the latest results from a continuing program to develop new electromagnetic screening materials that possess more desirable properties than those exhibited by the materials that are currently being used by the military. The primary interest of our program has been focused on developing a fiber material that is effective in blocking millimeter wave (MMW) radiation. The need for this project arose from the problems associated with the Army's use of chopped graphite fiber as a MMW screening material. The problems are that they are expensive to produce and upon dissemination they do not degrade, thus presenting an environmental contamination problem. The new materials that will be discussed in this paper are designed to be environmentally acceptable and are capable of being produced from inexpensive materials.

4:30 PM ENV-18 Some Preliminary ARMA Models for Precipitation Chemistry in East Central Florida. B. C. MADSEN(1), D. M. NICKERSON(1) AND T.W. DRESCHER(2), (1) University of Central Florida, Orlando 32816, (2) Dynamac Corporation, Kennedy Space Center 32899. Continuous monitoring of precipitation in East Central Florida has occurred from 1977 to the present. Rainfall was collected at a site located on the University of Central Florida (UCF) campus and chemical composition has been determined and aggregated into monthly values. Typical monthly pH has ranged from 4.0 to 5.5, with a single extreme value of 6.3. The variables volume weighted concentration and deposition of acidity, Na, K, Ca, Mg, NH₄, Cl, NO₃, and SO₄ were considered. Non-marine SO₄ concentration was also considered. After a log transform, all series under consideration were stationary and exhibited auto-correlation. Consequently, autoregressive moving average (ARMA) models were fit

separately to each concentration and deposition. In many of the series, auto-regression was present up to lags of 12 and 13 months. Subsequently, cross-correlations between pH and these variables were examined. Concentrations of non-marine SO_4 , NH_4 , NO_3 and Ca contributed significantly to the explanation of acidity. Furthermore, even after accounting for these variables, there was a 2nd-order autocorrelation remaining in the acidity series.

4:45 PM ENV-19 Two-Photon Induced Polymerization. K. D. BELFIELD, X. REN, AND J. LIU, Department of Chemistry, University of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. Emerging device technologies such as microelectromechanical systems and integrated sensors are placing increased demands on the development of materials processing and fabrication techniques. In response, the characteristic three-dimensional (3-D) spatial resolution of the simultaneous two-photon absorption (2PA) process is being harnessed for 3-D photoinitiated polymerization, facilitated by the nonlinear properties associated with simultaneous absorption of two-photons. Two-photon absorption can be defined as simultaneous absorption of two photons via virtual states in a medium. We report the near-IR two-photon induced free radical polymerization of (meth)acrylate monomers and the near-IR two-photon induced cationic polymerization of epoxide and vinyl ether monomers using commercially available photoinitiator systems previously employed in single-photon visible photopolymerization and chromophores synthesized in our laboratory possessing high 2PA cross sections. Details of the polymerization experiments and resulting microstructures will be presented.

SATURDAY 9:00 AM SKURLA 110

SESSION C

DEAN MARTIN, UNIVERSITY OF SOUTH FLORIDA, presiding

9:00 AM ENV-20 Sonication as a Technique for Restoring the Efficiency of Reactive Iron in Permeable Treatment Walls. C. L. GEIGER(1), C. A. CLAUSEN(1), D. R. REINHART(2), N. RUIZ(2), K. FARRELL(2), N. LAU(1), J. QUINN(3). University of Central Florida Departments of Chemistry(1) and Civil and Environmental Engineering(2), Orlando, Florida. NASA(3), Kennedy Space Center, Florida. In-situ permeable barriers containing iron as the reactive agent have gained popularity in the past decade as a technology for treatment of groundwater contaminated with halogenated solvents. Although iron has been shown to be effective for this purpose, a continuing problem is the loss of reactivity over time. Probable reasons include a build up of corrosion products or precipitates on the iron surface. The lifetime of the barrier could be

extended with a methodology capable of removing the materials blocking the iron surface. Results to date indicate that a sonication period as brief as one hour has a significant positive impact on the first order rate constant for TCE degradation to nonchlorinated species.

9:15 AM ENV-21 Oxidation and Removal of Nitrogen Oxides from Flue Gases Using Hydrogen Peroxide. L. PETTEY (1), M. COLLINS (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, 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 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.

9:30 AM ENV-22 Synthesis and Thermal Study of a Series of *N* - Benzoyloxyamines. V. BADESCU, O. PHANSTIEL, IV, Department of Chemistry, University of Central Florida, Orlando, FL 32816. The synthesis of hydroxylamine derivatives has long been of interest due to their potential as organic intermediates. A variety of primary amines ($\text{R} - \text{NH}_2$) were converted to their corresponding benzoyloxyamines ($\text{R} - \text{NHOCOPh}$) under biphasic conditions (using an aqueous carbonate buffer/dichloromethane mixture). Preliminary kinetic studies and the products for the thermal decomposition of a series of *N* - benzoyloxyamines will be described.

9:45 AM ENV-23 Phosphorylated Electro-Optic Chromophores and Polymers. K. D. BELFIELD, O. NAJJAR, S. ANDRASIK, AND D. PIOT, Department of Chemistry, University of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. Organic materials, in general, and polymers, in particular, are gaining increased acceptance as photonics materials and waveguides because of their exceptional performance and processing characteristics. Notable examples of devices are electro-optic modulators operating with bandwidths in excess of 100 GHz, photorefractive media with record writing efficiencies, electroluminescent

and lasing devices, and parametric mixing for cascading applications. The materials that have been used in device demonstrations to date have been far from optimum. In fact, the focus of the chemistry community continues to be higher nonlinearities and better chemical stability. It is now clear that optimizing just the physical property that gives a large response, for example the electro-optic coefficient for electro-optic modulators, is only a small part of the materials problem. We wish to report progress in the preparation and characterization of organic polymers containing NLO chromophores with the goal of achieving minimal near-IR absorption while maintaining high nonlinearity. One strategy to accomplish this involves using the phosphonate group in NLO chromophores, employing synthetic methodology developed in our lab.

10:00 AM ENV-24 Synthesis and Characterization of Fluorene Derivatives for Two-Photon Absorption Studies. K. D. BELFIELD AND K. J. SCHAFER, Department of Chemistry, University of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. Many technological innovations have been realized over the last 50 years due to the exploits of organic photochemistry, including photoresists and lithography for the production of integrated circuits, photodynamic therapy for cancer treatment, and photoinitiated polymerization. These processes involve single-photon absorption-based photochemistry. Comparatively few studies of two-photon-induced absorption and photochemistry have been reported. Two-photon absorption can be defined as simultaneous absorption of two photons via virtual states in a medium. The two-photon absorption (2PA) properties of organic molecules are of interest for several practical applications such as two-photon fluorescence imaging, optical power limiting, two photon microfabrication, etc. Here, we report the synthesis and characterization of a series of fluorene derivatives with different electron withdrawing and donating groups, synthesized via transition metal catalyzed coupling reactions. Our goal is to develop a clear relationship between molecular structure and the magnitude of 2PA cross sections.

10:15 AM BREAK

10:30 AM ENV-25 Advanced Infrared Screening and Filter Materials. C. HARTMANN, AND C.A. CLAUSEN. University of Central Florida, Department of Chemistry, Orlando, 32816. In the Department of Defense Smoke and Obscurants Handbook, smoke and other dispersions of fine particles in air, such as brass flake, are listed as the primary technique for attenuating infrared radiation. The drawback of using such smoke screens is that they attenuate visible light with even greater efficiency. Consequently, the Defense Department would like to develop a gaseous substance capable of absorbing IR radiation over a particular band of

wavelengths, but that remains totally transparent to visible light. By combining non-reacting substances with the appropriate characteristics, this goal should be possible to achieve. This paper will present the results that have been achieved thus far with regard to achieving this goal.

10:45 AM ENV-26 Smart Bolaamphiphile Crystalline Tube Assembly with pH-induced Structural Transformation: Possible Application to Gene Therapy. BOGDAN GOLOGAN AND HIROSHI MATSUI, University of Central Florida, Department of Chemistry, Orlando, FL 32816. Crystalline peptide-based nano tube assembly has been attracting a great attention due to various applications such as gene delivery, sensor, and molecular recognition. We report a new bolaamphiphile nano tube assembly and interesting pH dependent structural transformation of this assembly. N,N'-bis(carboxymethylcarbonylmethyl)nonane-1,9-dicarboxy amide was assembled under various pH values. In basic condition, ribbon-like helices were assembled, while crystalline tubes were formed in acidic condition. The pH dependent structural changes in nano meter scale will be suitable for gene delivery carrier and sensor applications. Vibrational analysis of these assemblies by Raman microscope shows that the nano tube formation under low pH is driven by shortening hydrogen bonds in carboxylic acid and amide groups. The structure transformation is also studied based upon molecular modeling and x-ray diffraction.

11:00 AM ENV-27 The Lysis of Erythrocytes by Two Fatty Acid Methyl Esters. M.L. DERBY (1), DEAN F. MARTIN (1), AND JOSEPH J. KRZANOWSKI (2), (1) University of South Florida, Department of Chemistry, 4202 E. Fowler Avenue, CHE 305, Tampa, FL., 33620, (2) University of South Florida, College of Medicine, Department of Pharmacology and Therapeutics, 12901 Bruce B. Downs Blvd., MDC Box 09, Tampa, FL. 33612-4799. Two fatty acid methyl esters, found naturally in *Nannochloris occulata* and *Nannochloris eucaryotum*, are known to inhibit the red tide organism *Gymnodinium breve*. Studies indicated these methyl esters to be stearic acid methyl ester and palmitic acid methyl ester. The esters are going through a series of biological testing to make sure no harmful effects will occur if used to control red tide. This study focused on how they would affect the red blood cells in animals. Preliminary results show that no lysis occurs until high concentrations of the Esters are used.

11:15 AM ENV-28 Examination of the Volatile Species Released During Phytoremediation of Selenium Contamination by Selected Wetland Species. K. M. CARVALHO, R. F. BENSON, M. T. GALLARDO, AND D. F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, Florida, 33620. Phytoremediation of selenium by aquatic plants is of recent

interest because of the ability of some plants to remove extremely toxic concentrations of selenium. There are five mechanisms by which plants are believed to remove, degrade, or stabilize environmental contaminants have been proposed. Plants may take up and assimilate contaminants (phytoaccumulation), volatilize the contaminants into the atmosphere (phytovolatilization), or degrade the contaminants within plant tissues using enzymes (phytodegradation). In the rhizosphere of some plants, released plant exudates and enzymes that stimulate biochemical activities may enhance the biodegradation of environmental contaminants (rhizodegradation). For metals, plants may be used to absorb and precipitate large quantities of toxic metals in soils, thus reducing their bioavailability and preventing their entry into ground water and food chains (phytostabilization). We have previously studied the aspect of phytoaccumulation and found that this is not the main mode of action for removal of selenium by the aquatic plants under investigation. Phytovolatilization was examined for selected aquatic plants in an enclosed environment and speciation of the volatile forms was conducted by gas chromatography/mass spectrometry.

11:30 AM ENV-29 Photocatalytic Production of Hydrogen from Hydrogen Sulfide. G. J. CARTER AND C. A. LINKOUS. Florida Solar Energy Center, Melbourne, Florida. Using an alkaline solution and a photocatalyst, we were able to generate hydrogen and elemental sulfur from hydrogen sulfide, a waste product from crude oil refining, in a thermodynamically uphill photolytic process. The photocatalyst cadmium sulfide was modified with 1.0 weight percent platinum, suspended in a sulfur-rich solution, and exposed to a Xe lamp. Hydrogen gas was evolved, and the solution became yellow due to formation of disulfide ion, S_2^{2-} (aq). Disulfide ion was further treated to yield elemental sulfur, thus completing the cycle. The end result is useful and harmless to the environment. The process, results, and benefits will be discussed.

11:45 AM ENV-30 The Determination of Trace Levels of Total Mercury in Environmental Samples. T. M. CHANDRASEKHAR (1), XIANCHAO YU (1), BETINA TOPOLSKI (1), AND MARK FUTRELL (1), (1) Florida Department of Environmental Protection, Bureau of Laboratories, 2600 Blair Stone Road, Tallahassee 32399-2400. An automated method for the analysis of ultra-trace levels of total mercury and a semi-automated method for the analysis of methyl mercury in surface water samples are described. Clean sampling, and other experimental factors which need to be taken into consideration in performing such analyses are described. The need for monitoring trace levels of mercury in the environment will be discussed. Both methods are currently used for the routine analysis of large numbers of water samples.

FAS POSTER SESSION (ENV)
SATURDAY, 9:00 AM – 12:00 PM
SKURLA HALLWAY

POS-1 Investigation of the Anticancer Activity Present in Kudzu Root. L. AMEBLE. Dept. of Chemistry, University of Central Florida, Orlando, FL 32816.

POS-2 The Effects of Two Fatty Acid Methyl Esters on Trachealis Smooth Muscle. M. DERBY. Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

POS-3 The Effects of Two Fatty Acid Methyl Esters on Aortic Smooth Muscle. M. DERBY. Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

POS-4 Inhibition of Germination of Selected Agricultural Crops by Selenium Compounds. K. M. CARVALHO. Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

POS-5 Lead Accumulation by Three Aquatic Plants. D. F. MARTIN. Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

POS-6 *Gynmodinium breve*: The Effects of an Organism. M. DERBY. Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

FLORIDA COMMITTEE ON RARE AND ENDANGERED
PLANTS AND ANIMALS

FRIDAY 9:00 AM SKURLA 116
JACK STOUT, UNIVERSITY OF CENTRAL FLORIDA, presiding

9:00 AM REB-1 Investigations of the Ecology of a Large Population of *Nemastylis floridana* Small in Northern Palm Beach County. D. W. BLACK AND P. G. DAVID, South Florida Water Management District, 23500 S. W. Kanner Hwy., Canal Point, FL 33438. The population of *N. floridana* in the 1435 ha Unit 23 of the DuPuis Management Area was randomly sampled and estimated to contain 220,000 plants growing mostly near the edge between wet prairie and pine flatwoods. Median pH of samples of the upper 4cm of soil at the bases of plants was 6.7. The commonest species growing within 10 cm of the bases of plants were

Ludwigia microcarpa, *Heterotheca graminifolia*, *Melanthera nivea*, *Cladium jamaicense*, and *Panicum virgatum*. Flowers of *N. floridana* were determined to be effectively pollinated by *Megachile brevis* Say and were frequently visited by other species of the Megachilidae and Halictidae. *N. floridana* flowers and sets seed freely in October following burning in August. A program of prescribed burning and vegetation monitoring is in place to assure preservation of the habitat of this species.

9:15 AM REB-2 Mixed Populations of *Drosera*: More Questions than Answers, FREDERICK B. ESSIG, Department of Biology, 4202 E. Fowler Ave., University of South Florida, Tampa, FL 33620. *Drosera capillaris* and *D. brevifolia* are often found in close proximity or in mixed populations, and generally bloom at the same time. Although the two species are distinguished by very subtle characters in the vegetative state, they are morphologically quite distinct when blooming, suggesting that an effective, but yet unknown, reproductive barrier exists between them. Both have narrowly defined and slightly different soil moisture requirements, and appear to have different strategies for surviving drought. *Drosera brevifolia* can survive as a dormant rootstock, while *D. capillaris* dies when the soil dries out and survives only as seed. Seed production may be enhanced by self-pollination in the latter species. Preliminary observations on the life histories of these two species are presented, along with hypotheses to be tested in upcoming investigations.

9:30 AM REB-3 Proximate Causes of Brood Reduction in Florida Scrub-Jays (*Aphelocoma Coerulescens*) in Suburban Habitats . SHAWKEY, M.D. (1) AND R. BOWMAN (2), (1) Dept. Biology, Univ. South Florida, Tampa, FL and (2) Archbold Biological Station, Lake Placid, FL. The Florida Scrub-Jay is a cooperative breeder endemic to peninsular Florida. It has been studied in its natural habitat of xeric, pyrogenic oak scrub at Archbold Biological Station (ABS) for the past 30 years, and in the suburban habitat of Placid Lakes Estates (PLE) for 9 years. Brood reduction, the non-random loss of nestlings from nests that otherwise fledge at least one young, is higher in suburban habitats. Brood reduction is often associated with starvation of last-hatched nestlings. During the 1998 and 1999 breeding seasons I measuring the rate, quantity, and distribution of food delivered by adult scrub-jays in both natural and suburban habitats. Because scrub-jays feed their nestlings mostly arthropods, I also estimated the relative abundance of arthropods in both habitats. Arthropod abundance was higher at ABS than at PLE in both years and higher in 1998 at both sites. In 1998, parents of 4-nestling broods at ABS increased food delivery rates relative to parents of 3-nestling broods so the per nestling distribution of food remained constant. Food delivery rates by parents of 3- and 4-nestling broods at PLE did not differ, so individual nestlings in broods of 4

received less food than nestlings in broods of 3. In 1999, a year of low arthropod availability, food delivery rates for broods of 3 and 4 did not differ and brood reduction was higher. These data suggest that when arthropods are scarce, parents of larger broods may be unable to adjust their food delivery rates, resulting in the starvation of some nestlings. Lower availability of arthropods may be the cause of high brood reduction rates of Florida Scrub-Jays in suburban habitats.

9:45 AM REB-4 Bald Eagle Nesting in Ocala National Forest: 1972-99. LAURA C. LOWERY, United States Department of Agriculture Forest Service, Ocala National Forest, 17147 East Highway 40, Silver Springs 34488. Southern bald eagle (*Haliaeetus l. leucocephalus*) nesting success in Ocala National Forest has been monitored for 27 years. The cumulative total of historical and active nesting territories has ranged from 20 in 1972-73 to 83 in 1998-99. The number of breeding pairs has ranged from 10 in 1972-73 to 50 in 1997-98. Increased survey effort accounts for part of this increase but there is little doubt the population has steadily grown. Small lakes and prairies that provided significant nesting habitat in the 1970's are no longer occupied, probably due to long-term drought that has reduced water levels. Some old territories are now unsuitable because all mature trees were lost to wildfire or windstorm. Most currently occupied nesting territories in Ocala National Forest are on the shoreline of Lake George. This habitat has remained essentially unmodified and many territories have been reliably productive since monitoring began.

10:00 AM REB-5 Eagle Demography and Nesting on Merritt Island National Wildlife Refuge: The Last Decade. V. L. LARSON (1), R.B. SMITH (1), G. POPOTNIK (2), AND M. EPSTEIN (2). (1) Dynamac Corp. DYN-1, Kennedy Space Center, FL 32899, (2) US Fish and Wildlife Service, Merritt Island National Wildlife Refuge, P.O. Box 6504, Titusville, FL 32782. What are the habitat characteristics of successful eagle nest sites? Ten years of eagle demography and nesting data from Merritt Island National Wildlife Refuge/ Kennedy Space Center (MINWR/KSC) were analyzed using a Geographic Information System (GIS). The spatial location of nest sites, within the 56,000 ha of public land, were compiled using federal, state and local information from 1983-2000. Spatial data on nest demography included nest site fidelity and reproductive success. Nesting habitat was characterized based on vegetation within a 1.5 km radius. GIS proximity analyses determined distance of each nest to open water (> 25 ha), roads, and urban development (> 10 ha). Habitat fragmentation and other landscape-scale criteria were evaluated as spatial factors that may influence nest success. Results from the analyses were used in eagle habitat management on MINWR/KSC. These data provide a

spatio-temporal baseline in which eagle nesting habitat can be monitored in association with future landscape change.

10:15 AM BREAK

10:30 AM REB-6 Distribution and relative abundance of *Graptemys* c.f. *barbouri* on the Choctawhatchee River, Florida. GEORGE E. WALLACE, Florida Fish and Wildlife Conservation Commission, 3911 Hwy. 2321, Panama City, 32409-1658. Following the discovery of *Graptemys* on the Pea and Choctawhatchee River in Alabama in 1998, I conducted surveys of basking turtles on the Choctawhatchee River in Florida. I conducted nine surveys during the period 11 August - 6 October 1999, covering the Choctawhatchee River from Highway 2 south to Highway 20 and lower Holmes Creek up to Shell Landing, a distance of 133.2 river km. All surveys were conducted between 1000 - 1400 hr. A total of 765 turtles were observed of which 256 were *Graptemys*. At river km 100 (as measured from the river mouth), the bottom substrate rapidly changes from sand to limestone. 29.3% (39 km) of the distance surveyed was upstream of this limestone transition zone and accounted for 96.9% of all *Graptemys* observed. On this stretch, the frequency of *Graptemys* observed was 6.36 per river km. The highest concentration was observed in the 12.2 km below Highway 2 where the frequency was 7.05 *Graptemys* per river km. The Choctawhatchee River population represents a significant addition to the known range and population size of *Graptemys* c.f. *barbouri* in Florida.

10:45 AM REB-7 Preliminary Survey of Sea Turtles in the Southern Region of the Indian River Lagoon System. MICHAEL BRESSETTE (1), JONATHAN GORHAM (2) AND BRUCE PEERY (3), (1) 4160 NE Hyline Dr., Jensen Beach, FL 34957, (2) 5502 Seagrape Dr., Ft. Pierce, FL 34982, (3) 4104 Lookout Court, Ft. Pierce, FL 34951. In contrast to the well studied aggregations in the northern Indian River Lagoon System (IRLS), there is a notable lack of basic information on sea turtles utilizing the southern region of the lagoon. An open water net capture program was initiated in the southern region and between September 1998 and December 1999 a total of 78 sea turtles were captured, tagged and released at Jennings's Cove, Ft. Pierce, Florida. This total includes 68 green turtles (*Chelonia mydas*) and 10 loggerheads (*Caretta caretta*). Morphometric data were collected for all turtles captured and observations as to general health were recorded. Green turtles ranged in size between 37.1-74.8 cm straight carapace length, with a mean of 54.6 cm (n=66). Loggerheads ranged in size between 57.1-82.6 cm straight carapace length, with a mean of 70.2 cm (n=5). The fibropapilloma rate for green turtles at this site was 66.1%. No fibropapillomas were visually apparent on

any of the loggerheads captured during this study. Preliminary results of this study show a remarkable abundance of sea turtles in the southern region of the IRLS and a markedly different size class distribution compared to the turtles of the northern IRLS.

11:00 AM REB-8 A Comparative Study of the Feeding Ecology of the Green Turtle (*Chelonia mydas*). K.G.HOLLOWAY-ADKINS AND L.M. EHRHART, University of Central Florida, P.O. Box 25000, Orlando 32816. A population of juvenile green turtles in the central region of the Indian River Lagoon (IRL) has been under study since 1982. In 1989 Ehrhart initiated a second population study nearby but in the Atlantic over the *Sabellariid* worm rock reef. Both sites are located at latitude 27 degrees 48 minutes North. The first study site is in a brackish estuarine environment and the second is oceanic. The populations utilize these areas as foraging grounds but the available vegetation differs dramatically between the two sites. The IRL study site has four abundant species of algae; *Bryothamnion seaforthii*, *Acanthophora spicifera*, *Gracilaria* sp. and *Solieria* sp.; while the nearshore reef provides a much greater diversity of algae for a foraging green turtle. There are 109 species of algae recorded for the *Sabellariid* worm rock reef in this region, including the same four species abundant in the lagoon. Turtles were captured by tangle net from both study sites and a dietary sample was collected by an esophageal flushing technique. Analysis of the samples revealed the algal types preferred by turtles of both populations and provided the basis for examination of similarities and differences in their diets.

11:15 AM REB-9 Hatchling Success in Loggerhead Turtles. S. MATTHEWS, SNHS, Barry University, Miami Shores 33161. The Restoration and Enhancement Section of the Department of Environmental Resources Management (DERM) for Miami-Dade County conducts sea turtle research to determine the effects of different sand types and temperatures on the Loggerhead (*Caretta caretta*) nests. From the beginning of June to the beginning of October each year, data is collected on various aspects of the Loggerhead sea turtle nests and the hatchling success. Every nest is relocated into one of three hatcheries on Miami Beach. During relocation, probes are placed within the nest to monitor the temperature. Then shortly before the turtles are expected to hatch, twenty randomly selected eggs are removed from each nest and incubated. Once the incubated hatchlings have begun to pip, alantoic fluid samples are taken to determine sex. Three days after the majority of the hatchlings emerge from the nest on the beach, the nests are excavated and evaluated to determine hatchling success. Due to the time delay in processing the data collected to determine the sex ratio of the hatchlings, this report will concentrate on how the temperature within the nests affects the overall

hatchling success. High numbers of dead and pipped dead hatchlings are believed to be a result of high temperatures within the nest. Since nest temperature is influenced by sand type, an assessment of sand type impact on temperature will also be discussed.

11:30 AM REB-10 The 1999 Hurricane Season and its Impact of Sea Turtle Nesting at Kennedy Space Center, Florida. MARIO MOTA, NASA/Dynamac, DYN-1, KSC, FL 32899. Three hurricanes came very close to the East Coast of Central Florida in 1999, but it was Floyd that did the most damage to Kennedy Space Center (KSC). The eye of Floyd passed 121 statute miles away with wind gusts of 91 mph, and maximum sustained winds of 66 mph. The KSC beach lost approximately 600 meters of combined dune front, and a high scarp formed along the remaining dune line. Storm waves over-washed sand and scattered debris over the vegetation line, which recessed westward. Several locations were affected more severely including the region between the space shuttle launch pads 39A and 39B, where the storm completely washed away an area over 16,600 m². Historically, this region had the highest sea turtle nesting density. This damage raised major issues that will affect the 2000 nesting season. Despite towering launch pads and numerous lighting requirements, the KSC beach had a low record (3%) of hatchling disorientations in the last 5 years. This was due to a high dune profile that shielded adult and hatchling sea turtles from exterior lights. Since this shield is compromised, illumination from launch pads and industrial areas can be seen from the beach creating the potential for disorientation and misorientation of adult nesting and hatchling sea turtles. In order to reduce future disorientation potential, the USFWS plan to rebuild dunes and plant vegetation in the affected areas. An early spring update of this endeavor will be given at the conference.

11:45 AM REB-11 The Florida Committee on Rare and Endangered Plants and Animals (FCREPA). Past, Present and Future. RAY E. ASHTON, JR., Ashton Biodiversity Research & Preservation Institute, 5745 SW 75th St. #331, Gainesville, FL 32608. The Florida Committee on Rare and Endangered Plants and Animals was created more than 25 years ago at the onset of the Endangered Species Act. This "non-organization" was brought together to develop a scientific, non-political list of the flora and fauna in Florida and to help guide the Florida Game and Fresh Water Fish Commission, which was reluctantly taking on the responsibility of developing and enforcing regulations to protect Florida's "nongame species". The original lists became the series of publications "Rare and Endangered Biota of Florida", which were prepared by biologists that were the most familiar with the taxa involved. The series was published by the University of Florida Presses and funded by Title 7 FWS Endangered

Species Funds. Fifteen years later, FCREPA became active again and rewrote the series. More than 150 scientists have contributed from more than 50 organizations. Only one volume is yet to be completed, *The Plants*. As habitat loss and human populations increase at an ever more rapid rate, the political support for protected species protection declines. The competition for funds and members politicize conservation organizations making the need for a non-organization like FCREPA becomes more important. What is it? Who does it? Where do we go from here? These issues will be presented for discussion.

12:00 PM BUSINESS MEETING

LAURA FINN, FLY BY NIGHT, INC., presiding

FAS POSTER SESSION (REB)

FRIDAY 9:00 AM – 12:00 PM

SKURLA HALLWAY

POS-1 Reproductive biology in an endangered sandhill endemic plant, *Warea amplexifolia*. MARCELO J. BLANCO AND KELLY FITZGERALD. Department of Biology, Stetson University, Deland, FL 32720.

GEOLOGICAL AND HYDROLOGICAL SCIENCES

FRIDAY 8:30 AM SKURLA 121

RICK COPELAND, FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, presiding

8:00 AM GHY-1 Quality Control and Assurance in Biological Community Measures. JOY JACKSON, JULIE BAUGHMAN, AND STEVE WOLFE, Florida Department of Environmental Protection, Bureau of Laboratories, Biology Section, 2600 Blair Stone Road, MS 6515, Tallahassee, FL 32399-2400. The ability to recognize anthropogenic effects on biological communities at different scales often depends on controlling variability during both sampling and sample analysis. While this is generally understood and often relatively well controlled for studies involving chemical analysis, it is less widely so for biological assessment studies. This is at least partly because of the difficulty of developing taxonomic QA/QC methods that provide information useful to the researcher. Methods have been developed to allow one to quantify and distinguish among variability resulting from difference components of macroinvertebrate identifications and sample collection. The results are used to help select appropriate sampling methods and to improve the quality and consistency of the identifications.

8:15 AM GHY-2 Quality Control and Assurance in Algal Community Measures. ELIZABETH MILLER AND STEVE WOLFE, Florida Department of Environmental Protection, Bureau of Laboratories, Biology Section, 2600 Blair Stone Road, MS 6515, Tallahassee, FL 32399-2400. The ability to recognize anthropogenic effects on algal communities at different scales often depends on controlling variability during both sampling and sample analysis. While this is generally understood and often relatively well controlled for studies involving chemical analysis, it is less widely so for biological assessment studies. This is at least partly because of the difficulty of developing taxonomic QA/QC methods that provide information useful to the researcher. Methods have been developed to allow one to quantify and distinguish among variability resulting from different components of algal identifications. The results are used to help improve the quality and consistency of the algal identifications and can be used to aid in selecting appropriate sampling methods.

8:30 AM GHY-3 Stream Restoration in Phosphate Mining Areas of Florida. R. B. FRYDENBORG, Florida Department of Environmental Protection, 2600 Blair Stone Rd., Tallahassee, 32399-2400. Strip mining for phosphatic ore results in major watershed disturbances, sometimes including the complete obliteration of stream systems. As part of the permitting process, mining companies are required to re-create or restore these damaged streams. My recommended strategy for stream reclamation includes proper restoration of stream geomorphology (*sensu* Rosgen classification), flow regime, in-stream habitat, and riparian zone features. Fundamental aspects of each component will be presented and explained. Objective measures defining the success of restoration efforts, including habitat assessment and biological population endpoints (*e.g.*, BioRecon or Stream Condition Index) are also discussed.

8:45 AM GHY-4 FDEP's Techniques for Determining Ecological Integrity. T. M. FRICK, Florida Department of Environmental Protection, 2600 Blair Stone Rd., Tallahassee, 32399-2400. Recent mandates by the Environmental Protection Agency (EPA) require States to use biological and habitat data in conjunction with physical/chemical data to determine the health of the State's waterbodies. The State of Florida's Department of Environmental Protection (FDEP) has developed biological and habitat assessment procedures for streams (BioRecon and SCI) and lakes (LCI), and is currently working on wetland techniques. This talk will describe FDEP's assessment tools for streams and lakes and provide examples where these tools were used for decision-making purposes (*e.g.*, TMDL's, BMP's, etc.).

9:00 AM GHY-5 Tampa Bay Seagrass Monitoring: A Regional Effort. W. M. AVERY, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa 33605. In 1998, a consortium of regional agencies initiated a seagrass monitoring program under the auspices of the Tampa Bay Estuary Program (TBEP). Nearly sixty transects are visited each fall in order to document changes within seagrass communities found in the various subsections of Tampa Bay. Transects extend through seagrass restoration target depths established by the TBEP for each bay subsection. Seagrass coverage along each transect is estimated at specific intervals using the Braun Blanquet rating criteria. Data on species composition and zonation over a depth gradient may be used to assess restoration goals.

9:15 PM GHY-6 Design of a Hydrobiological Monitoring Program to Assess the Potential Impacts of Freshwater Diversions from Tampa Bay. A. J. JANICKI (1) AND D.E. ROBISON (2). (1) Janicki Environmental, Inc. 1155 Eden Isle Drive, St. Petersburg, 33704. (2) PBS&J, Inc. 5300 West Cypress Street, Tampa, FL 33607. The Tampa Bay region has been faced with the problem of providing water to an ever increasing population. Historically, groundwater has provided the major source of water to the region. However, the withdrawal of groundwater has lead to serious impacts on lakes in wetlands in the vicinity of some of the wellfields. These impacts have lead decision makers in the region to look to alternative sources of water in order to reduce the groundwater withdrawals. Tampa Bay Water, in partnership with the Southwest Florida Water Management District, has embarked on a master water plan that will allow the alleviation of the lake and wetland impacts while still meeting the needs of the region. This plan includes a number of surface water withdrawals from three major tributaries to Tampa Bay: the Hillsborough and Alafia rivers and the Tampa Bypass Canal. As a requirement of the permits to withdraw water from these sources, Tampa Bay Water is implementing a Hydrobiological Monitoring Program (HBMP) whose overall goal is to ensure that the flows from these sources do not deviate from their norm to the extent that water quality (including salinity), the floral and faunal communities, and recreational uses are not impaired. This paper describes the design of this critical monitoring program whose elements include water quality, fish, benthos, vegetation, and hydrology. The statistical basis for the design is also discussed.

9:30 BREAK

9:45 AM GHY-7 Atmospheric Deposition of Nitrogen to the Surface of Tampa Bay. N. POOR (1), R. PRIBBLE (2), AND H. GREENING (3). (1) University of South Florida College of Public Health, Department of Environmental and Occupational Health, MDC56, 13201

Bruce B. Downs Blvd., Tampa 33617, (2) Janicki Environmental, Inc., 1155 Eden Isle Dr., St. Petersburg, 33704, (3) Tampa Bay Estuary Program, Mail Station I-1/NEP, 100 8th Ave. S.E., St. Petersburg, 33701. In 1995 the Tampa Bay National Estuary Program (TBNEP) estimated approximately 29% of the nitrogen loadings to Tampa Bay came from atmospheric deposition. Wet deposition was estimated utilizing precipitation and nutrient concentration data collected at the National Atmospheric Deposition Program site at the Verna Wellfield, and dry deposition estimates were determined by multiplying wetfall estimates by a regionally-derived ratio determined by the Florida Acid Deposition Study. To validate estimates and to develop the technical basis for regional strategies to reduce the nutrient flux, in 1996 the TBNEP launched the Tampa Bay Atmospheric Deposition Study. In cooperation with the Hillsborough County, the TBNEP established an intensive nutrient deposition monitoring site. To determine dry deposition rates, co-located annular denuder systems (ADS) remove ammonia, nitric acid, and sulfur dioxide from the ambient air onto absorbent-coated denuders, and fine (0.25 mm diameter and smaller) particles of ammonium, nitrate and sulfate onto nylon filters. These ambient air samples are collected every sixth day. The ambient air concentrations are calculated from the mass of inorganic nitrogen. A weather station provides data for the NOAA buoy model that converts measured concentrations to dry deposition rates. For wet deposition estimates, rainfall is collected daily in a wet-only precipitation bucket. Approximately 1000 tons of nitrate plus ammonium nitrogen from the atmosphere is deposited directly to Tampa Bay each year. 50% through dry and 50% through wet deposition processes. Ammonia accounts for 2/3 of the dry-deposited nitrogen, but nitrate accounts for 2/3 of the wet-deposited nitrogen

10:00 AM GHY-8 Southwest Florida Regional Ambient Monitoring Program (RAMP). ROBERT C. BROWN, Manatee County Environmental Management Department, P.O. Box 1000, Bradenton, 34206. In an effort to support natural resource management goals for the Tampa Bay and Sarasota Bay National Estuary Programs, an in-depth, comprehensive ambient monitoring strategy was required. Many local governments in the region had established monitoring programs, however they were disjointed and too inconsistent to reliably support the NEP objectives. With the help of the NEPs, the regional governments formed a coalition of bay managers with a goal to standardize their monitoring activities as much as possible, while still supporting the local requirements. RAMP participants meet regularly for the purpose of standardizing methodologies, evaluating quality assurance between laboratories and coordinating field sampling strategies. Most recently the coalition has expanded to include state and federal representatives with additional objective that include monitoring strategies for freshwater systems and watersheds. These coordinated activities have

allowed the local agencies to develop expertise in areas other than general water quality monitoring (e.g., benthic and seagrass monitoring). This coalition has also economized resources by linking waterbodies and programs instead of creating overlap and is playing an important role in setting standards for regional and state programs such as Southwest Florida Water Management District's Comprehensive Watershed Management Plans and Florida Department of Environmental Protection's activities establishment of Total Maximum Daily Loads (TMDLs).

10:15 AM GHY-9 Analysis of Long-Term Water Quality Changes in Tampa Bay. A.J. JANICKI, R. PRIBBLE, AND D.L. WADE, Janicki Environmental, Inc., 1155 Eden Isle Dr., St. Petersburg, FL 33704. The Tampa Bay Estuary Program (TBEP) is currently reviewing the progress being made toward reaching water quality and habitat goals set forth in the Tampa Bay Comprehensive Conservation and Management Plan. The primary water quality goals deal with eutrophication related issues and include water clarity, chlorophyll, and nitrogen loading targets. As part of this fifth-year progress review, historical trends and changes in water quality are being examined. The Environmental Protection Commission of Hillsborough County (EPCHC) has been collecting monthly water quality data throughout the four mainstem segments of Tampa Bay since 1974. These data have been used by TBEP in the establishment of segment-specific water quality targets as aids for restoration of seagrasses. The analyses of the water quality data include examination of the impacts of changes in water quality regulations on the water quality in the bay, specifically those regulations pertaining to domestic wastewater releases. Comparisons of different statistical tools used to detect changes in water quality are also examined.

10:30 PM GHY-10 Tampa Bay Water Quality Assessment, a Collaborative Long-term Monitoring Effort. A.P. SQUIRES (1), T. CARDINALE (2), J.O.R. JOHANSSON (3), AND R. BROWN (4). (1) Pinellas County Dept. of Environmental Mgmt., 300 S. Garden Ave., Clearwater, 33756, (2) Environmental Protection Commission of Hillsborough County, 1900 9th Ave., Tampa, FL 33605, (3) City of Tampa, 2700 Maritime Blvd., Tampa, 33605, (4) Manatee County Environmental Management Dept., 202 6th Ave. E., Bradenton, 34208. Water quality monitoring in Tampa Bay has been a collaborative effort by the Environmental Protection Commission of Hillsborough County (EPC), the City of Tampa (COT), Pinellas County (PC), and Manatee County (MC). EPC operates the most comprehensive program and has reported water quality since 1974 at over 50 sites covering Old Tampa Bay (OTB), Hillsborough Bay (HB), Middle Tampa Bay (MTB), and Lower Tampa Bay (LTB). COT began reporting water quality in HB and MTB in 1978, while

PC and MC programs were initiated in 1991 (Boca Ciega Bay) and 1992 (Terra Ceia Bay/Manatee River), respectively. Monitoring network managers have made remarkable progress in coordinating their efforts geographically and standardizing sample collection and analytical methods. The program can also provide unbiased assessments of status and trends in water quality through incorporation of probabilistic sampling techniques. Monitoring results show considerable water quality improvement in most bay segments since the early 1980s, and improved conditions persisting through the 1990s. Spatial and temporal patterns and trends in water quality are reviewed based on nutrient, chlorophyll-a, dissolved oxygen, turbidity, and Secchi disk depth measurements. The importance and role of the monitoring network with respect to the Tampa Bay National Estuary Program's Comprehensive Conservation and Management Program is also discussed.

10:45 BREAK

11:00 AM GHY-11 Finding the Smoking Gun to Identify Pollution from Onsite Sewage Disposal Systems. C. JOE KING, Polk County Natural Resources, 4177 Ben Durrance Rd., Bartow 22830. Correctly identifying the sources of pollution to surface and ground water is an important task for environmental managers. Onsite sewage disposal systems (OSDS) have been the human sewage treatment system of choice in many areas of Florida even if the hydrogeology is not conducive to optimal treatment efficiency. OSDS failure is another contributor of pollutants to the environment. A multi method strategy is proposed to identifying the OSDS as the pollution source. Three parameters, or analytes, are used to identify the OSDS "smoking gun." Nitrogen isotopes 14 and 15 ratios in the downstream surficial runoff are used to qualify the nitrogen as organic or inorganic. The bacterial group Enterococci is sampled to identify pathogens that cause human gastroenterites. And, finally the surficial water is analyzed for caffeine, which is a direct indicator of human wastes. If all three analytes are detected, the smoking gun is revealed.

11:15 AM GHY-12 Using Geographic Information Systems to create the Florida Aquifer Recharge Map of Polk County. HINH NGUYEN, Polk county Natural Resources, 4177 Ben Durrance Rd., Bartow 33830. The ground water recharge area map is a useful planning tool for ground water resource management. Hydraulic pressure differential of the surficial aquifer to the Floridan aquifer surface potentiometric head and leakance to the upper confining unit which is separating the aquifers was used to determine the recharge rates to the Floridan aquifer (in May 1994). GIS was used to compile, analyze and manipulate the geologic and hydrologic data needed to map recharge rates to the Floridan aquifer. Due to a limited

software available in this office, AutoCAD (version 11) and Surfer (version 4) were used to create map and contour maps. The additional generic software programs were written to complement what we need to generate a final recharge map of Polk County. The mapping project consists of 240 columns by 196 rows, or it is representing a quarter mile surface on the earth surface. The recharge to the Floridan aquifer occurs in areas where the elevation of the water table of the surficial aquifer is higher than the potentiometric surface elevation of the Florida aquifer. The recharge rates were mapped with four inches per year (in/yr) contour intervals.

11:30 AM GHY-13 Land use activity affects ground-water quality in the Duval County industrial Very Intense Study Area. CINDY COSPER, Florida Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, 32399-2400. The Very Intense Study Area Monitoring (VISA) Network was designed to quantify the effects of various land use activities on localized ground water quality. This report looks for key indicators of the land use in the surficial aquifer of Duval County around Tallyrand Ave. in the City of Jacksonville. For most of the 20th Century this area has consisted of industrial, urban and, commercial land use. The St. Johns River Water Management District installed 33 monitoring wells in the VISA composed of polyvinyl chloride (PVC) in the late 1980s. These wells were sampled in August of 1990, 1992, 1995, and March of 1998. Analysis of the ground water in the VISA and comparison to nearby ambient ground water conditions in the same aquifer resulted in a statistical difference for some analytes. It was concluded that industrial and commercial land use activities affect the ground water quality of the surficial aquifer in Duval County as evident from the variety of organic constituents found in the VISA. The list of indicators detected is as much of a concern as the list of indicators exceeding State ground water guidance concentrations. The presence of a variety of synthetic organic compounds are the key indicators of industrial land use affects upon ground water quality for this VISA.

11:45 AM GHY-14 Nitrate Source Impacts on Private Drinking Well Waters in Northwest Lafayette County, Florida. R. E. COPELAND (1), J. J. DAVIS (2) AND S. P. HANSARD (1), (1) Florida Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, 32301, (2) Florida Department of Environmental Protection, 7825 Baymeadows Way, Suite B200, Jacksonville, 32256. Over the past several years, relatively high nitrate (nitrate-N) concentrations have been documented in the ground waters of an agricultural region of north central Florida. Because the concentrations occasionally exceed the State's health standard of 10 mg/L for drinking water, the Florida Departments of Health and Environmental Protection conducted a survey of nitrate concentrations in private drinking water wells. The purpose was to determine the severity of the problem and

to determine the relative contributions of nitrate from the various types of agricultural landuses. Over 490 private wells were sampled. Nitrate concentrations were compared to the predominant agricultural landuse in the vicinity of each sampled well. The results indicated that approximately five percent of the private drinking water wells in the area had nitrate concentrations exceeding the health standard and that animal feed operations located in proximity to private drinking water wells were the most significant cause of elevated nitrate concentrations. Other contributing landuses were row crops and silviculture.

12:00 PM BUSINESS MEETING: GEOLOGICAL AND
HYDROLOGICAL SCIENCES
RICK COPELAND, presiding

MEDICAL SCIENCES

SATURDAY 9:00 AM SKURLA 106
ARVIND DHOPLE, FLORIDA INSTITUTE OF TECHNOLOGY,
presiding

9:00 AM MED-1 Does the Analgesic Torbugesic Affect Skeletal Muscle Regeneration in Rats? R. MIRABEL (1), E.T. HAYS (1), AND S. SESODIA (2). (1) SNHS, (2) SGMS, Barry University, Miami Shores, FL. 33161. Skeletal muscle regeneration occurs to repair damaged muscle fibers. We used a rat model of muscle injury to examine whether an opioid analgesic, Torbugesic, had any effect on skeletal muscle regeneration. The myotoxin, notexin, was injected around the soleus muscle of one hind limb of each rat to induce a necrotizing injury. In addition to the toxin, one group of rats received two subcutaneous injections of Torbugesic in the shoulder. The first injection was administered immediately after the notexin injection, while the second was administered 24 hours later. Another group of rats received notexin, but no Torbugesic. Seven days after the injection of notexin, muscles were removed. The size, number, and types of skeletal muscle fibers were determined in the regenerating and contralateral control soleus muscles of both groups of rats. Analysis of preliminary results from one animal indicates no difference in muscle fiber number between the regenerating muscle and its contralateral control. (Supported in part by the NIH MARC U*STAR grant # GM08021-17)

9:15 AM MED-2 Muscle fiber properties following reinnervation by embryonic spinal cord cells. S. SESODIA (1), R. GRUMBLES (2), AND C.K. THOMAS (2). (1) SGMS, Barry University, Miami Shores 33161. (2) Miami Project to Cure Paralysis, Univ. Miami, Miami, 33136.

Denervation of skeletal muscles after spinal cord trauma leaves them weak. Sometimes, motor innervation from cord levels proximal to the site of injury is left. If the denervated muscle fibers could be reinnervated by the surviving motoneurons, this would permit the muscle to contract more powerfully. One approach to achieving this is to use embryonic neuronal cells to reinnervate the muscle. In this presentation, we examine the properties of skeletal muscle that have been reinnervated by such cells. Rat medial gastrocnemius muscles (MG) were denervated by sectioning the tibial nerve. In the distal nerve stump, dissociated ventral horn cells from embryonic day 14-15 rats were injected and allowed to reinnervate the newly denervated muscle. MG muscles were examined 12 weeks after the operation for the size and types of muscle fibers present. They were compared to muscles that either received no ventral horn cells or were unoperated controls. Reinnervation had occurred by 12 weeks but was not as extensive as normal. The reinnervated muscles were weaker but more fatigue resistant than normal. All muscle fiber types were present in reinnervated MG. Type 2 muscle fibers in the reinnervated MG showed the greatest change in parameters. The data indicate that while neuronal stem cells are a feasible option for effecting reinnervation additional work needs to be carried out on their efficacy.

9:30 AM MED-3 Isolation of *Mycobacterium avium* subsp *paratuberculosis* in Tissue Specimens from Crohn's Disease Patients. D. SCHWARTZ, I. SHAFRAN, C. ROMERO, AND S.A.NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, 32816. The objective of this study is to investigate the role of *Mycobacterium avium* ss *paratuberculosis* (MAP) in Crohn's disease (CD) using short-term mycobacterial culture media. A total of 63 tissue specimens from 27 CD patients and 36 controls were homogenized, decontaminated and inoculated into 12B Bactec bottles and MGIT media supplemented with OADC, Mycobactin J and PANTA mixture. Cultures were incubated at 37°C and 5% CO₂ for up to one year. Only MGIT cultures contained MAP. Specifically MAP was present in 6/7 (86%) of surgical resected tissue and 4/20 (20%) of biopsies with an overall 37% from CD patients. Only 2/36 (5.6%) of control specimens contained MAP with none in the 3 surgical resected tissue. Cultures positive for MAP were subcultured and confirmed to contain acid fast and mycobactin dependent bacilli. PCR using IS900-derived primers followed by hybridization and sequencing analysis confirmed the presence of MAP in positive cultures. The presence of MAP in MGIT cultures was detected within 10-12 weeks for surgical resected tissue and after 40 weeks for biopsy specimens. Data suggest that MAP resides in the submucosal layer closer to the active part of the ulcer rather than on the surface of the mucosal cells. Thus, surgical

resected tissue cultured in MGIT media is a favourable protocol for rapid cultivation of MAP and for investigating its role in CD pathogenesis.

9:45 AM MED-4 Isolation of *Mycobacterium avium* subsp *paratuberculosis* from Breast Milk of Crohn's Disease Patients. D. SCHWARTZ, I. SHAFRAN, AND S.A.NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, 32816. In this study, seven breast milk samples [two mothers with Crohn's disease (CD) and five healthy controls who have recently given birth] were investigated for the presence of *Mycobacterium avium* subsp *paratuberculosis* (MAP). Aseptically collected samples were centrifuged and each of the cream and centrifugal pellets were decontaminated, inoculated into two modified 7H9-based broth and then incubated at 37°C and 5% CO₂. Following 12 weeks incubation, only MGIT media inoculated with centrifugal pellets from each of the mothers with CD were positive for the presence of MAP. MAP was not present in the cream fraction of both CD samples. The five control samples were negative for MAP in all fractions using both media. The positive cultures contained acid fast and mycobactin dependent bacilli. PCR using IS900-derived primers followed by hybridization and sequencing analysis confirmed the presence of MAP in CD milk samples. Interestingly, the data further demonstrate the gross similarity between humans diagnosed with CD and JD mammals infected with MAP. The finding adds more support to the MAP role in CD pathogenesis.

10:00 AM MED-5 Beer's Outlaw: p-Nitroaniline as a Detector of Leucine Aminopeptidase. ALLEN A. SMITH AND REBEKAH F. SMITH, Barry University, 11300 NE 2nd Ave., Miami Shores, 33161. The rate at which p-nitroaniline is produced from L-leucyl p-nitroanilide is often used as a measure of leucine aminopeptidase activity. P-Nitroaniline is measured by light absorption at 405 nm. The assumption that light absorption is a linear function of p-nitroaniline concentration is justified only at concentrations below 20 µM. Above this concentration p-nitroaniline forms intermolecular associations that break the linear relationship between concentration and absorption, thus violating "Beer's Law." A calibration curve makes it possible to measure a wider range of concentrations.

10:15 AM BREAK

10:30 AM MED-6 Acid Tolerance of *Escherichia coli* 0157:H7 and Its Survival in Apple Cider. LISA KOODIE AND ARVIND M. DHOPLE, Dept. of Biological Sciences, Florida Institute Technology, Melbourne, 32901. Recently, there have been several reports on outbreaks of diarrhea and hemolytic uremic syndrome associated with the consumption of apple

cider. The organism implicated in these outbreaks has been *Escherichia coli* 0157:H7. This indicates the resistance of this serotype to acidic pH. So, a study was undertaken to compare (a) acid tolerance of this serotype to other *E. coli*, (b) to evaluate the effects of preservatives on this serotype, and (c) to study the survival of this serovar in natural apple cider. The results suggest that this serovar could grow in trypticase soy broth at pH levels from 2.0 to 9.0, while other *E. coli* failed to grow at pH levels below 4.0. When this serovar was inoculated into natural apple cider, organisms grew equally well as in the growth medium. Both sorbic acid and benzoic acid inhibited the growth of this serovar both in the medium as well as in apple cider. The results show that *E. coli* 0157:H7 is exceptionally tolerant to acid pH.

10:45 AM MED-7 Comparative Assay for Mycobacterial Growth and Antibiotic Susceptibility Using Alamar Blue. M. MONTIEL DE MORALES, AND A. DHOPE. Dept. of Biological Sciences, Florida Institute of Technology, Melbourne, 32901. In the absence of clinical trials a detailed *in vitro* study is one approach to determine the potential of antimicrobial agents. The emergence of multidrug resistant strains of *Mycobacterium* underscores the need to rapidly determine the susceptibility of isolates of *Mycobacterium* species to antimicrobial agents. A comparative study of four techniques (growth on solid media, growth in liquid media, reduction of TTC and Alamar colorimetric method) to determine the antibiotic susceptibility was undertaken. In doing this, the susceptibilities of *Mycobacterium avium* Complex (MAC) and *Mycobacterium kansasii* to rifampin, ofloxacin, and clofazimine were determined. The effect of time on TTC and Alamar Blue reduction by MAC and *M. kansasii* was determined. Also, the optical density in liquid medium and visible colonies on 7H11 agar were scored at the same time. The use of different methods will be discussed based on the required time needed to determine the susceptibility to the antimicrobial agents.

11:00 AM MED-8 Purification of the Major Bahia Grass Pollen Allergen and Comparison with PH1 pl, the Major Timothy Grass Pollen Allergen. A. MAJIDI, R. GENNARO, S. KLOTZ, A. PETERSEN, S. NASER, M. SWEENEY, AND R. WHITE. Dept. of Molecular Biology and Microbiology, University of Central Florida, Orlando 32816. Pollen proteins of Bahia grass were extracted using ammonium bicarbonate at pH 7.2. These water soluble proteins of Bahia pollen were partially purified using isoelectric focusing. The fractions containing the major allergen of Bahia grass pollen were refocused to purify the major allergen. This protein was shown to be a glycoprotein with molecular weight of 32kD and a pl of 6.92. This 32kD component was reactive with IgE from sera of patients skin test positive to Bahia. The 20 N-terminal amino acids were sequenced,

and the degree of sequence homology with other proteins was determined. The major Bahia allergen, Pas n1, showed 63% sequence homology with Ph1 pI, the major Timothy grass allergen. Western blot analysis of this 32kD protein of Bahia was performed using monoclonal antibodies to the allergens of Timothy grass. The 32kD component of Bahia pollen was reactive with the Timothy grass group I allergen demonstrating cross-reactivity between Bahia and Timothy grass pollen proteins.

11:15 AM MED-9 Molecular Cloning, Expression and Characterization of Pas n 1, the Major Allergen of Bahia Grass (*Paspalum notatum*) Pollen. G. GHOBRIAL, R. GENNARO, S. NASER and R. WHITE. Dept. of Molecular Biology and Microbiology, University of Central Florida, Orlando, 32816. Pollen of grasses, such as bahia (*Paspalum notatum*), are a major cause of type I allergy in the Gulf Coast States. Four allergenic proteins of bahia pollen with estimated molecular weights of 45, 33, 31 and 28kDa were identified and characterized using isoelectric focusing, sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and western blotting. Reactivity of these proteins to IgE was confirmed using sera from patients skin test positive to bahia. The 33kDa allergen of bahia, Pas n I, was the most reactive and focused at pI of 6.59. Following treatments with deglycosylation enzymes, the four allergens lacked carbohydrate moieties but retained their antigenic reactivity against polyclonal IgE antibodies. To further characterize the allergens, a cDNA library was constructed from pollen mRNA, cloned in a lambda ZAP vector, amplified and expressed in *E. coli* strain XL1 Blue. Synthesis of cDNA from pollen mRNA produced cDNA molecules with sizes ranging from 300 bp to 4,500 bp. Screening of the bahia cDNA library identified plaques encoding recombinant allergenic proteins. A recombinant protein expressed in *E. coli* XL1 and *E. coli* SOLR possessed immunological properties closely resembling those of the native bahia allergen of 45kDa size. The nucleotide sequence of the cloned cDNA insert was determined.

11:30 AM MED-10 Presence of Calmodulin-Like Protein in *Mycobacterium leprae* and Antileprosy Activities of Calmodulin Antagonists. ARVIND M. DHOPLE, Dept. of Biological Sciences, Florida Institute of Technology, Melbourne, 32901. Calmodulin, a heat-stable, acidic Ca²⁺ binding protein was first reported in 1970 as protein - activator of bovine brain phosphodiesterase. It has since been recognized as a ubiquitous intracellular calcium ion receptor in virtually all eukaryotic cells. Recently, calmodulin-like protein has been established as the primary receptor of calcium in prokaryotic cells, including mycobacteria. We have demonstrated the presence of calmodulin-like protein in *M. leprae*; however, the levels were consistently lower than those present in other

bacteria, including mycobacteria, tested simultaneously. Approximately 85% of the activity was present in soluble fraction of cell-free extracts. Among the six phenothiazine derivatives tested for their anti-leprosy activities four exhibited significant activity against *M. leprae* in vitro, the most potent being trifluoperazine with MIC of 10 $\mu\text{g/ml}$. The data suggest that phenothiazines have multiple sites of action and probably affects the synthesis of lipids, proteins and DNA.

SATURDAY 11:45 AM

BUSINESS MEETING: MEDICAL SCIENCES

ARVIND DHOPLE, presiding

JOINT MEETING

FAS PHYSICS AND SPACE SCIENCES SECTION SOCIETY OF PHYSICS STUDENTS (SPS) ZONE 6

FRIDAY 9:00 AM SKURLA 120

MARK MOLDWIN, FLORIDA INSTITUTE OF TECHNOLOGY,
presiding

9:00 AM WELCOME AND ORGANIZATION

9:15 AM PSS-1 Fly-By-Wire Astronomy: Experiences in Remote Observing at the SARA Observatory, MATT WOOD, Physics and Space Sciences, Florida Institute of Technology, Melbourne FL, 32901. The Southeastern Association for Research in Astronomy (SARA) operates a 0.9 m telescope at Kitt Peak National Observatory. We now routinely operate the facility remotely from the six SARA Member Institutions -- Florida Institute of Technology, East Tennessee State University, Florida International University, the University of Georgia, Valdosta State University, and Clemson University. I'll report on our experiences with this mode of operation and our plans for the future.

9:30 AM PSS-2 Smoothed Particle Hydrodynamics Simulations of Negative Superhumps, MICHELE MONTGOMERY, MATT A. WOOD, Florida Tech Physics and Space Sciences, AND JAMES C. SIMPSON, Computer Sciences Raytheon, FL. The superhump phenomenon observed in cataclysmic variable systems with mass ratios $0.03 < q < 0.33$ is the result of a tidally-driven disk oscillation. Common (or "positive") superhumps are observed in disks undergoing high mass transfer rates during superoutburst or in some nova-like systems where the disk extends

to the 3:1 eccentric inner Lindblad resonance. Numerical simulations show that over one oscillation period as viewed from face-on, the tidal field pulls the disk into elongated shape, followed by relaxation back to a nearly circular shape. The axis of the positive superhump oscillation precesses slowly and progradely in the co-rotating frame, resulting in a superhump period slightly longer than the orbital period. In recent years a handful of systems have been observed to show "negative superhumps," in which the oscillation period is shorter than the orbital period. It has been suggested that nodal regression in a disk tilted with respect to the orbital plane could be the origin of the negative superhump phenomenon. The energy production curves we obtain from artificially tilted disks largely confirm this model, although agreement with observational results is not perfect.

9:45 AM PSS-3 White Dwarfs in the Old Open Cluster M67, THOMAS J. AHRENS, MATT A. WOOD, Florida Tech Physics and Space Sciences, AND CHARLES F. CLAVER, National Optical Astronomical Observatories. Using deep photometry from the 10-m Keck II telescope, we report color magnitude diagrams from two fields in the old open cluster M67. The data were analyzed using the neural network program called Source Extractor, which distinguishes between stars and galaxies. By comparing the results with white dwarf cooling models, we identify white dwarfs from the two fields. We find fewer white dwarfs than expected, suggesting a high cluster evaporation rate of white dwarfs and other low mass stars. The cooling models suggest an upper limit of 4.5 Gyr for the cluster.

10:00 AM PSS-4 White Dwarfs in Common Proper Motion Binary Systems: Mass Distribution and Kinematics. NICOLE M. SILVESTRI, TERRY D. OSWALT, MATT A. WOOD, Physics and Space Sciences, Florida Institute of Technology, Melbourne FL 32901, J. ALLYN SMITH, Physics, University of Michigan, Ann Arbor, MI 48109, NEILL REID, Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104, and EDWARD M. SION, Astronomy and Astrophysics, Villanova University, Villanova PA 19085. We present the mass distribution, gravitational redshifts, radial velocities, and space motions of white dwarf stars in common proper motion binary systems. The mass distribution we derive for the 41 white dwarfs in this study has a mean of $0.68 \pm 0.04 M_{\text{sun}}$ ($\sigma = 0.04 M_{\text{sun}}$). This distribution has a slightly larger mean and higher dispersion than most previous studies. We hypothesize that this is due to a higher fraction of cool (average $T_{\text{eff}} \sim 10,000$ K), hence old, white dwarfs in our sample. Our analysis shows that white dwarfs with effective temperatures less than 12,000 K are more massive ($\langle M \rangle = 0.72 \pm 0.04 M_{\text{sun}}$) than their hotter counterparts ($\langle M \rangle = 0.59 \pm 0.05 M_{\text{sun}}$). Both the mean and individual white dwarf masses we report here are in better agreement with

those determined from atmospheric profile fits than with some previous gravitational redshift studies of cool white dwarfs. We believe that measurement biases and weak geocoronal emissionlines in the observed spectra may have affected previous gravitational redshift measurements. These have been minimized in our study. A list of complete space motions for 50 cool white dwarfs is presented, derived using radial velocity measurements from their nondegenerate companions. We find that the UVW space motions and dispersions of the common proper motion binary pairs which contain white dwarf components are consistent with those of old, metal-poor disk stars.

10:15 AM BREAK

10:30 AM PSS-5 The Research Productivity of Small Telescopes. F. A. RINGWALD, REBECCA L. LOVELL, SARAH ABBEY KAYS, YOLANDA V. TORRES, Florida Institute of technology, Physics and Space Sciences, Melbourne, FL 32901. Many national and other observatories are considering closing small (<3m) telescopes, to free up funding for larger telescopes. In this contribution, we present statistics of the research productivity of small telescopes, resulting from counting number of papers and number of pages in the *Astronomical Journal* and the *Astrophysical Journal* for 1995, as well as citations in the Science Citation Index for 1998.

10:45 AM PSS-6 Determination of rotation periods of asteroids using differential CCD photometry, CIEZA, LUCAS A; CILIBERTI, LEONARDO N, AND JAVIER, ISERTE A., Science Club "Chaparral " E.E.T No 2 Quilmes. Bs. As. Argentina. Differential CCD photometry has been developed with an eight-inch reflector telescope and a 16 bit CCD camera and the light curves of five asteroids were drawn. This paper reports the following rotation periods: 243 Ida P= 4.655 h; 332 Siri P= 6.957 h; 454 Mathesis P=7.745h; 632 Pyrrha P= 4.687h 987 Wallia P=10.523h , showing a high concordance with previously published data.

11:00 AM PSS-7 Solar System Exploration. M. B. MOLDWIN., Dept. of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne FL, 32901. Through NASA's Jet Propulsion Laboratory's Solar System Ambassadors Program excitement about the missions and science being done to study our solar system is spreading through Central Florida. Current and future missions to our nearest neighbors will be briefly introduced. The search for the origins of life in our solar system will be highlighted by describing missions to comets, Mars, Jupiter's Europa, and Saturn's Titan.

11:15 AM PSS-8 The Dayside Response to Substorms. PAUL MARTIN, MARK B. MOLDWIN, HAMID K. RASSOUL, Dept. of Physics and Space Sciences, Florida Institute of Technology, 150 W. University Blvd., Melbourne FL, 32901. The dayside response to substorms was examined by using the MM 210 meridional array of ground magnetometers when it was located within +/-4 hours of local noon. Substorm onset was identified by using the Los Alamos National Laboratory's Geosynchronous energetic particle detectors. Twenty-six substorm intervals were identified for study. It was found that clear substorm signatures are identifiable in the dayside data even when there is pervasive dayside ULF pulsations.

11:30 AM PSS-9 On occasion, opportunity does knock twice, DAVID SCHIFFERT, Cocoa Beach Jr/Sr High School, Cocoa Beach, Fl; MARK MOLDWIN, Florida Institute of Technology, Melbourne, Fl - The dynamics of research have taught me to be prepared to take advantage of what is available. Even though work on the design and construction of our Space Shuttle undergraduate payload continued, setbacks in NASA's schedule have allowed me to work with my partner on other projects. This included the designing, building, and testing of the prototype for a low-cost High School magnetometer network. This work is being completed in combination with one of my high school research students. The initial group of magnetometers is schedule for deployment next year. These will eventually be integrated with the researcher's main magnetometers. Importance of this is heightened with the impending approach of Solar Max, which may directly affect their day-to-day lives. (Beepers unusable, satellite TV disrupted, any satellite communication, etc).

FRIDAY 2:30 PM SKURLA 120

MARK MOLDWIN, FLORIDA INSTITUTE OF TECHNOLOGY,
presiding

2:30 PM PSS-10 Ink-Jet Printing for Solar Cell Metallizations, JASON M. UNDERWOOD, Florida Institute of Technology, Melbourne, FL, DAVID GINLEY, DOUGLAS SHULZ, CALVIN CURTIS, JOEL BERTELSON, National Renewable Energy Laboratory (NREL). The potential for solar cells to become a viable alternative to fossil-fuel-generated electricity is largely dependent on the manufacturing costs involved. The reduction in materials use that is inherent to thin-film technologies is an important step toward decreasing these costs. However, thin-film solar cells and other optoelectronic devices presently employ complicated and expensive processes, especially in the area of contact metallization (e.g., photolithography or evaporation). By depositing semiconductor metallizations via ink-jet printing, we can avoid process

steps and therefore, lower manufacturing costs. In addition to being inexpensive, the ink-jet process is energy efficient, and can use nanoparticle- or organometallic-based inks. Although previous research has focused primarily on organometallic inks, very little is known about the preparation and application of nanoparticle inks. It also appears that new approaches must be developed in order to achieve the needed resolution. Our research is investigating the deposition of metal nanoparticle inks onto various substrates, including crystalline silicon and thin-film solar cells. The deposition will be performed with a commercial, thermally driven ink-jet printer. Optical, conductivity, and stoichiometric characterization will be carried out to determine the efficiency of the process and its potential for commercial application. Acknowledgements: This research was supported by grant # DE-AC36-83CH10093. In addition, the first author was supported by a fellowship in the Energy Research Undergraduate Laboratory Fellowship (ERULF) program sponsored by the U.S. Department of Energy, Office of Science, Office of University and Science Education Programs.

2:45 PM PSS-11 The Laser Displacement Monitoring System of the Silicon Microvertex Detector in the L3 Experiment at CERN, GYONGYI BAKSAY, Kossuth Univ./ATOMKI, Debrecen 4026, Hungary; Florida Tech., Melbourne 32901, FL. The Silicon Microvertex Detector (SMD) is a subdetector of the large L3 experiment at LEP/CERN. A laser-based system (LDMS) was built to monitor the global and local displacements of the SMD relative to the adjacent Time Expansion Chamber (TEC). The LDMS is capable of detecting very fine movements of the silicon sensors in the range of several microns. Off-line software analysis of the laser data obtained with the regular SMD read-out allows us to reconstruct the SMD relative movements over the complete run period. Based on these results a calibration of the SMD detector can be done. This work was performed at the Kossuth Lajos University/ATOMKI (Debrecen, Hungary), European Center for Particle Physics (Geneva, Switzerland) & Florida Institute of Technology (Melbourne, Florida). This project was supported by the Hungarian State Research Fund (OTKA) No.: T017094 and DOE.

3:00 PM PSS-12 Comparative difference Digital Speckle Pattern Interferometry, ILDIKO LASZLO, ZOLTAN FUZESSY, JANOS KORNIS, Technical University Budapest, Hungary. This method enables one to compare two macroscopically similar but microscopically different rough surfaces -master and test - in a nondestructive measurement process. In this way voids, cracks or differences in the deformation of two objects subjected to the same load can be detected. The system has the advantage that uses the two holographically reconstructed virtual images of the

(unloaded and loaded) master object as references in the comparison process. Therefore each test object can be compared to the very same two states of the master object making the method more precise and faster than conventional techniques. This work has been supported by the National Scientific Research Fund (OTKA) under projects T 4077/92 and F 015777/95.

3:15 PM PSS-13 Innovative Methods in Physics Education, HAMID K RASSOUL, Florida Tech, Physics and Space Sciences, Melbourne, FL. Recently, there has been a movement recognizing the need for inventing and investigating innovative new models for teaching introductory physics. These models seek to radically change the content of future course, the structure of the courses, or both. The new educational methods promise an enlightening and engaging education to physics students, majors and non-majors, and they are based on the current theories and research behind learning cycles and cognitive development. Here, I'm presenting three innovative approaches to teaching physics that have been developed and implemented by science faculty around the country. They are: (1) Peer Instruction method (developed by Harvard University), (2) Just-In-Time Teaching method (developed by US Air Force Academy), and (3) Cooperative Group Problem Solving (developed by University of Minnesota) method. These methods do not use a standard (passive) lecture format. They promote active learning through interactive lectures and/or the World Wide Web assignments as well as cooperative solving of content-rich problems. The goal of this presentation is to gain an "applied" knowledge about these recent innovations in teaching physics.

3:30 PM PSS-14 Is Faraday's Law Faster than the Speed of Light? C. QUACH, T. DUONG, AND H. HICKMAN, Hillsborough Community College, P.O. Box 30030, Tampa, FL 33630. A large diameter solenoid with inductance L , placed in series with a battery and a resistor, will carry a current given by:

$$I(t) = \frac{V}{R} [1 - \exp\{- (R/L)t\}]$$

when the switch is closed at $t = 0$. Electromagnetic theory seems to indicate that the voltage around a small pickup loop, placed coaxially near the center of the big solenoid, decays exponentially with time:

$$\text{(i.e. } -V \propto \exp\{-(R/L)t\})$$

This response is peculiar in that the pickup loop voltage takes on its maximum value at $t = 0$, even though the solenoid contains no current at $t = 0$. Further, there is a jump discontinuity in the response at $t = 0$. Which

means that the pickup loop voltage should go from nothing, to its maximum value, faster than the speed of light. Preliminary experiments, however, do not support this prediction. The experimental response has a definite rise time and looks more like:

$$V \propto t [\exp\{-(R/L)t\}],$$

$$\text{than } V \propto \exp\{-(R/L)t\}.$$

3:45 PMPSS-15 Superluminal Velocities and the Mindset of Physics. R. HARRIS, S. POINDEXTER, AND H. HICKMAN, Hillsborough Community College, P.O.Box 30030, Tampa, FL 33630. The proposition that nothing travels faster than the speed of light is one of the most fundamental tenets of modern physics. During the past 20 years however, both theory and experiment have been produced to suggest that some things can travel faster than the speed of light. Here we examine the scientific community's reaction to 3 confirmed observations of superluminal phenomena; the expansion of distant quasars, photons tunneling through an optical barrier, and the propagation of evanescent microwaves through a pinched off waveguide. In every case there seems to be more than the "usual scientific reluctance to accept new discoveries".

4:00 PM BUSINESS MEETING: PHYSICS AND SPACE SCIENCES
MARK MOLDWIN, presiding

FAS POSTER SESSION (PSS)
FRIDAY 9:00 AM – 4:00 PM
SKURLA HALLWAY

POS-1 Hubble Space Telescope Images of Four Nova Shells, F. A. RINGWALD, Florida Institute of Technology, Physics and Space Sciences, Melbourne, FL 32901

SCIENCE TEACHING

FRIDAY 10:00 AM SKURLA 103
GEORGE DOORIS, presiding

10:00 AM TCH-1 A Modified Approach to the Solution of Kinematic Problems in a First Year Physics Course. ROBERT R. CRISS, Saint Leo University, Saint Leo 33574. The description of motion for the case of constant acceleration typically involves 4 equations for every

dimension of motion. Additionally, students are presented with equations for the range and maximum height of projectiles which are not applicable to many problems. A typical method of problem solving includes making a list of known and unknown quantities and finding the equation which relates the two. This paper presents a modified approach based on 2 equations for every dimension of motion. The proposed method of problem solving is methodical, will always lead the student to a solution, and is consistent with the problem solving strategies used by scientists and engineers.

10:15 AM TCH-2 HPLC in the Undergraduate Biochemistry Laboratory: Separation and Identification of Plant Pigments. D. W. LOUDA, Department of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton 33431. It is often difficult to incorporate modern instrumental methods into undergraduate laboratory courses due to the expense of the equipment and the large number of students involved. In the Biochemistry Laboratory class, we have introduced HPLC experiments using one relatively inexpensive isocratic HPLC instrument with autosampler. One of the experiments performed is the separation and analysis of plant pigments. A rapid procedure has been developed that allows for separation of eight or more major pigments from spinach. Isomerizations caused by heating the pigments and breakdown products due to enzymatic action can also be easily detected. This HPLC method is described and compared to pigment separation by other chromatographic techniques.

10:30 AM TCH-3 Food Irradiation Advances in Science. D.D. WOODBRIDGE, College of Public Health, Univ. of South Florida, 13201 Bruce B. Downs Blvd., MDC Box 56, Tampa 33612-3805. All concepts associated with the nuclear industry raises fear within a large section of the population. Considerable advances in science education are needed to show the large masses of the population the health advantages of the concept of irradiation. Since 1950, the beneficial effects of ionizing radiation have been observed in addition to its potential to reduce the incidence of food borne diseases. Worries about nuclear weapons began to cross over into the concerns of food irradiation after World War II. While the nuclear age did make available large enough quantities of radiation source material, availability of the material was not accompanied by the presentation of scientific data to make food irradiation an acceptable option to the public. There exists a need for teaching students about the health safety factors of irradiation. The concepts of life's interaction with energy need to be expanded in all areas of science education. The industrial use of irradiation is certainly not new. Approximately 50% of all medical disposables are radiation sterilized as well as products such as cosmetic raw materials, bandages, and spices. Irradiation reduces bacteria and extends

the shelf life of many foods. This paper reviews these advances in irradiation science.

10:45 AM BREAK

11:00 AM TCH-4 Predictors of Success in a New Millenium Science Career Program. BARBARA ROTHSTEIN PHD AND MARK GOTTFRIED PHD, BEAM Magnet School, North Miami Beach Senior High School, Miami -Dade County Public Schools 1247 NE 167 St. North Miami Beach FL 33162. The Biomedical and Environmental Magnet School was utilized to examine the early predictors of success in a science – centered high school, where utilization of learned skills, needed in the new millenium, is emphasized. The program at this new school was designed with input from colleges, research institutions, government agencies and science industries. Math grades, science grades, past experience, recommendations, behavior and other criteria were examined to find predictors of success. Comparisons were made of several subgroups to maximize successful utilization of prediction criteria. It is possible that these prediction criteria may be able to help predict success in college and careers because the program is so oriented toward career use of acquired skills.

11:15 AM TCH-5 Useful additions to a web-site accompanying a science course. R. G. JORDAN, Dept. of Physics, Florida Atlantic University, Boca Raton 33431. Increasing numbers of instructors are using web-pages to accompany their courses. Often, the information on the web-sites is the same as that provided in printed handouts given to the students: syllabus, dates of tests, etc. Over the past two years I have developed a number of web-based resources that *supplement* the courses I have taught; my aim is to provide additional information that enhances conceptual understanding and involvement in the class. In this talk I will give a number of examples that can be introduced into any class. The topics I will cover include “brain-teezers”, “try-this ...” (i.e., at home experiments), and practice quizzes that are all designed to enhance conceptual understanding. Also, I will describe my experiences with web-based, discussion forums for the students.

11:30 AM TCH-6 A New Science Curriculum at Saint Leo University. G. M. DOORIS (1) AND P. M. DOORIS (2), (1) Department of Mathematics and Sciences, (2) Department of Environmental Science, MC 2188, P. O. Box 6665, Saint Leo University, St. Leo 33574. A grant for a Departmental retreat, the need to teach non-science majors in a better way, and a change in the University’s philosophy of general education have all led to the development and implementation of a new two-course science

sequence required for all non-science majors at the University. The first course in the sequence, Integrated Physical Science was first offered in the fall semester, 1999. The second course, Integrated Life Science will be offered in the spring of 2000. The events leading to the development of these courses will be discussed as will any problems encountered to date. Funding for the faculty retreat was provided by the Jessie Ball DuPont Foundation.

11:45 AM BUSINESS MEETING: SCIENCE TEACHING
GEORGE DOORIS, presiding

SOCIAL SCIENCE

FRIDAY 2:30 PM SKURLA 121
CHRISTOPHER CRONIN, SAINT LEO UNIVERSITY, presiding

2:30 PM SOC-1 Interpersonal cynicism: An impediment to healthy relationships. D. S. MOORE, Saint Leo University, Psychology Dept., P.O.Box 6665, Saint Leo 33574-6665. Hostility and cynicism have long been known as contributors to cardiovascular disease. Most of the research has focused on the health factors and ignored the interpersonal implications of those attitudes. Cynicism has traditionally been viewed as a negative attitude toward human nature. The research described was designed to develop a measure of cynicism that simultaneously assesses the construct in terms of human nature, relationships, and as a justification for negative behavior. The Scale of Interpersonal Cynicism (SIC) is described, and evidence is presented that suggests the attitude can have a negative effect on relationships, an effect that is somewhat mediated by past experiences, and present relationship status. Cynicism is also discussed in terms of biographic variables, and in regard to the accounts given for painful relationship dissolution.

2:45 PM SOC-2 Counseling Expectancies of Informed and Uninformed College Students: an Experimental Manipulation. A. R. RICCIARDI. Saint Leo University, Saint Leo 33574. The study investigated the manipulation the counseling expectancies of college students by informing or not informing them of the benefits of the counseling process. It was hypothesized that (a) participants who receive written information concerning the benefits of counseling will elicit higher expectations about counseling than those who do not and (b) females will elicit higher expectations about counseling than males, regardless of the experimental condition. Sixty-four freshmen enrolled in an introduction to

college course (20 male and 44 female, mean age = 18.14) were randomly assigned to 2 experimental conditions (a) informed about the benefits of counseling (31 participants) and (b) uninformed about the benefits of counseling (33 participants). Participants were instructed to fill out the Expectations about Counseling-Brief (EAC- B, 17 scales) questionnaire. The majority of the differences between groups and sexes on the expectancy scales were in the direction predicted by the hypotheses; 7 differences were statistically significant. Implications for future research are discussed.

3:00 PM SOC-3 Faculty and Administration Perceptions of Students' Alcohol Use and Related Problems: A Comparison with Information from Students. L. HOMBURGER. Saint Leo University, PO Box 2112, Saint Leo 33574. Student alcohol use is major problem in the American College system. In the spring of 1999, one hundred and forty two students were asked to respond to the Saint Leo College II study. This survey was comprised of several types of questions, including the frequency and quantity the students drank, as well as alcohol related problems that they experienced. In the fall of 1999, a new survey was designed based off the questions from the SLC II, to be given to the faculty and administration of the same college to assess the way these employees perceived drinking patterns of the students. Overall, sixty-four employees returned the survey and their responses to the questions were compared with the responses from the students from the previous semester. It can be deduced from the data that faculty and administration, for the most part, are accurate in perceiving the problems students report in relation to drinking, however the quantity and frequency that students report drinking is different from the estimates provided by the faculty and administration.

3:15 PM BREAK

3:30 PM SOC-4 Examination of Specific Factors Related to Drug Court Treatment Program Success. W. M. HUNT, A. L. HAAS, AND R. H. PETERS, Department of Mental Health Law and Policy, Louis de la Parte Florida Mental Health Institute, 13301 N. Bruce B. Downs Blvd., Tampa 33612-3899. Previous research has shown that drug court treatment programs are effective interventions for individuals who are alcohol or drug involved and are helpful in preventing future re-arrest after treatment. However, little work has explored specific factors that affect success of the programs. This study examined individuals from two Florida county drug court treatment programs which were established for substance abusing non-violent offenders. Findings suggest that individuals who completed the entire program were less likely to be re-arrested at 30 month follow-up than individuals who dropped out of the program. When individuals were grouped into four categories based on completion of the program (yes/no)

and on re-arrest by 30 month follow-up (yes/no), significant differences were found within factors related to involvement in the legal system but not for factors reflecting demographic characteristics, history of abuse, or presence of other psychological disorders. Specifically, individuals reliably differed on number of previous arrests and type of charge at arrest when grouped with regard to whether they had completed the program and to whether they had been re-arrested by 30 month follow-up.

3:45 PM SOC-5 **Reasons for Drinking and Their Relationship To Consumption Patterns Among Non-Traditional Students: D. O. HARRIS.** Saint Leo University, P.O. Box 2112, Saint Leo University, 33574. Using the Reasons for Drinking Scale (RFD) as well as measures of frequency and quantity, the current study examined the reasons for drinking and their relationship to consumption patterns among non-traditional students. Measurements of self-reported motivations that may affect drinking were analyzed in order to predict frequent and heavy alcohol use. The findings of the present study show that among non-traditional students, at least fifty percent of the population consumes alcohol on a regular basis in varying quantities. Non-traditional students in the current study endorsed reasons relating to social cognitions as their principal reason for frequent alcohol use. As a result, social camaraderie (drinking in social situations) was shown to be a strong predictor of frequent and heavy alcohol use.

4:00 PM SOC- 6 **Relationship between Perceived Campus Norms and Binge Drinking among College Students. C. CRONIN,** Saint Leo University, St. Leo 33574. Two hundred and eighty-nine students completed a survey on alcohol use, perceived campus norms for alcohol use and alcohol availability. Males (N=140) consumed more alcohol than females. Males who binge drink (5 or more drinks in one sitting) differed on personal norms and friends' consumption patterns compared to non-binge drinking males. Females who binge drink (4 or more drinks per sitting) also differed on personal norms and perceived consumption patterns for both friends and people in general. Results are discussed in terms of campus intervention strategies.

4:15 PM BUSINESS MEETING: SOCIAL SCIENCE
CHRISTOPHER CRONIN, presiding

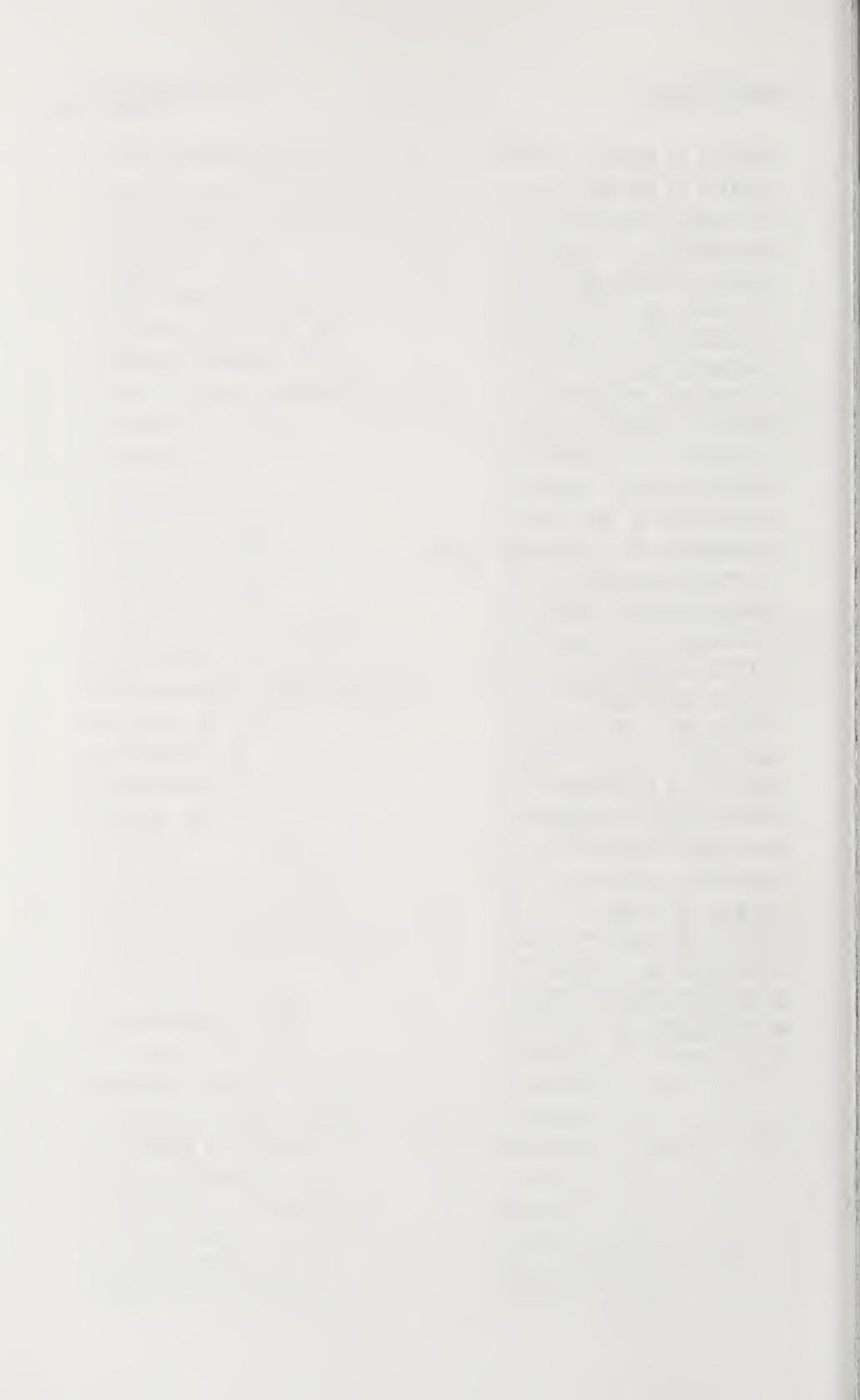
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